

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

UNIVERSITY OF ABDELHAMID IBN BADIS MOSTAGANEM

FACULTY OF FOREIGN LANGUAGES

DEPARTMENT OF ENGLISH LANGUAGE

MASTER



**French Nuclear Tests in the Sahara of Algeria, a
Scar Never to Heal.
The case of Reggane's Tests (1830- 21st Century)**

**A dissertation presented in partial fulfillment of the requirements for the master degree
in Literature and Interdisciplinary Approaches**

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Academic year: 2022/2023

Dedication

I dedicate this dissertation to the soul of my mother, may Allah have mercy on her soul.

To my dearest father, the one and the only person to whom I am thankful to be what I am today.

To my husband M'hamed who has been a source of support, patience and motivation for me throughout this entire experience whom I am truly blessed to have as a partner.

To my beloved kids to whom I wish success in their personal and academic lives as well as in their future careers; Zakaria, Ayoub and Youcef.

To my brothers and sister who shared their words of encouragements to finish this study.

To my closest friends who have always supported me throughout my years of studies, Djamila and Samia.

To my colleagues who contributed in many ways to the success of this dissertation and made it an unforgettable experience for me.

Acknowledgements

Every challenging work needs self-efforts as well as guidance of elders.

I would like to acknowledge and give my warmest thanks to my supervisor Mr. Teguia Cherif who made this work possible. His guidance and advice carried me through all the stages of writing my study. I apologize for being a headache to him during this journey.

A great thank to all the teachers who were behind making this research possible.

Sincere thanks to my husband who has never left my side throughout the process and gave me strength and hope when I thought of giving this up.

A special thank for my dearest friend Djamila for her inspiration and help.

Finally, I would like to thank everyone who contributed to this work.

Abstract

This research aims at investigating the long struggle of Algerian government to obtain French recognition of the crimes they perpetrated during the war of independence, more particularly those committed during the bomb tests of Reggane in 1960. This entails that light was shed on the reasons behind the choice of Reggane as a spot for the tests and their consequences on the whole region and its people. This research also attempts to put forward the French obstinacy to refuse any accusations regarding such crimes and their determination to close their eyes on the crimes perpetrated during that bloody era. This research is based on descriptive and analytical analysis. Based on the findings, it has been found out that France chose Reggane as a test site because of its closeness to the country. In addition, it is also remote and deserted. Furthermore, it was a good place to study the consequences of the atomic bomb detonations on the environment and human beings. In addition to that, France needed to acquire the atomic power and to be at the same level as the other European superpowers. Finally, this research has cast light on the Algerian continuous battles to seek and obtain French recognition and compensations and the latter's obstinate refusal to acknowledge its responsibility.

Keywords:

Algeria, Reggane, France, atomic bomb, nuclear tests, crimes, recognition, compensation.

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List of Abbreviations and Acronyms

APS:	Algeria Press Service
CTBT:	Comprehensive Nuclear-Test-Ban Treaty
FLN:	National Liberation Front
NPT:	Treaty on the Non-Proliferation of Nuclear Weapons
OMEC:	Oasis Military Experiment Center
PTBT:	The Partial Test Ban Treaty
SCME:	Saharan Center for Military Experiments
TNT:	Trinitrotoluene
TPNW:	Treaty on the Prohibition of Nuclear Weapons
UN:	United Nations
USA:	United States of America
USSR:	Union of Soviet Socialist Republic

General Introduction

General Introduction

In June 2023, Algerian president Abdelmadjid Tebboune signed a decree according to which a part of the national anthem would be brought back and reused in national and international events. This missing part was actually the one that referred to the French occupation in Algeria. If this reflects anything, it in reality depicts the long history of political struggle between Algeria and France that dates back to 1962 with the independence of the country. Indeed, Algerian history with France was full of a lot of events that in most cases set the fire between both nations and led to a long period of political instability between both countries.

Since 1830, Algeria had suffered from the French occupation which lasted for over a century. During their forced stay, the French had been barbarian which was reflected in their actions with the Algerians by taking their lands, their properties and killing them. The crimes perpetrated by the French towards the Algerians are still the subject of long debates and one of the crimes was the testing bombs of Reggane which took place between 1957 and 1961.

The colonial oppression in Algeria, particularly during and after French colonial rule from 1830 to the present day, left deep scars that continue to impact the nation. The wounds inflicted upon Algeria by French colonialism can be exemplified by the events surrounding this town. The native population of Reggane, as well as other nearby areas suffered the devastating consequences of these tests, both in terms of immediate health effects and long-term environmental damage. Howbeit, the impact of these nuclear testing on Reggane and its people has left lasting scars. The local population experienced direct exposure to radiation, resulting in severe health problems and chronic illnesses. Additionally, the land's biodiversity and ecosystem were vastly contaminated. The environmental consequences persist to this day, creating ongoing challenges for the people of Reggane.

While Algeria gained independence in 1962, the wounds of colonialism are still not easily healed. The effects of the past continue to resonate in Algeria's present-day, impacting its socio-political landscape, economic development, and cultural identity. The scars left by colonial oppression in Algeria serve as a reminder of the deep-seated

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challenges faced by the nation as it strives to overcome its colonial past and build a more equitable and prosperous future.

In the 21st century, Algeria continues to grapple with the legacy of the nuclear tests in Reggane. The government has continued to demand compensation from France, and the issue remains a point of tension in Algerian-French relations. The governmental and health impacts of the tests continue to be felt by local populations with many suffering from high rates of cancer and other radiation-related illnesses.

This leads one to raise few questions that will help me build this research, and which are the following:

1. How did the French nuclear tests impact the region of Reggane during the colonial period?
2. Is the impact of the nuclear tests still affecting the region? If so, to what extent?
3. How did the French and the Algerian authorities tackle the problem of nuclear tests in Reggane?

To answer such questions, the following hypotheses are put forward:

Maybe the French nuclear testing in Reggane had severe environmental and health consequences, including radiation exposure for the local population. It likely disrupted traditional livelihoods and negatively impacted the socio-economic well-being of the region. The lasting effects of these tests are believed to have been detrimental to Reggane.

The nuclear tests conducted in Reggane may have had lasting impacts, including environmental contamination and potential harm to the local population. These effects could extend to agriculture, the ecosystem, and the socio-economic well-being of the region. Overall, the tests continue to have enduring consequences on Reggane's environment, health, and socio-economic aspects.

The hypothesis suggests that both French and Algerian authorities addressed the nuclear testing issue in Reggane, albeit with different approaches. The French initially downplayed the impact but later took action to mitigate environmental contamination and health concerns.

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Meanwhile, the Algerian authorities likely sought compensation and restitution from the French, resulting in a complex process involving environmental remediation, healthcare provisions, and legal actions.

To find out the answers, this dissertation is divided into three chapters. The first chapter, at length; will introduce the historical background of the French colonialism of Algeria. Furthermore, the second chapter will delve into the extensions of nuclear tests in Reggane. In addition, this chapter will highlight the effects of the nuclear bomb on Reggane. At last, the third chapter will focus on modern Algeria and the fight for French recognition of the nuclear tests in Reggane. As it will tackle the scars left by the nuclear tests in Reggane in contemporary Algeria.

Chapter I:
A Historical
Background of French
Colonialism in Algeria
(1830-1960)

Chapter I: A Historical Background of French Colonialism in Algeria (1830-1960)

Introduction

Algeria was a diverse and complex region with a long and rich history before the French arrived in 1830 and began their period of colonial rule. Therefore, this chapter will delve into the period prior to the coming of the French. This entails that the Ottoman presence in Algeria will be first tackled. Then, one will shift to the French colonization of Algeria and the different social and military policies implemented to establish and maintain French control over the region.

1. Algeria Before French Colonialism (1515-1830)

What is called now Algeria was centuries ago a group of self-governed kingdoms suffering from the Spanish invasion, as well as the whole of the Northern Africa, under the European Crusades Campaigns¹. In 1515 the region entered under the protection of the Ottoman Empire² after a request from the Algerian people to support and aid them against the Spanish invasion. Thus, the Ottoman Empire reinforced the Regency³ of Algiers, as it became, with a significant military power to the point where they could partially control the Spanish invasion. Gradually, the Turks⁴ took the control over the whole region where Algeria became the vassal of the Ottoman Empire and a strategic location to spread its territories around the world.

¹ Crusades Campaign: military expeditions, beginning in the late 11th century, that were organized by western European Christians in response to centuries of Muslim wars of expansion. Their objectives were to check the spread of Islam, to retake control of the Holy Land in the eastern Mediterranean, to conquer pagan areas, and to recapture formerly Christian territories; they were seen by many of their participants as a means of redemption and expiation for sins. www.britannica.com/event/Crusades Accessed on 06/05/2023 14:30 AM

² Ottoman Empire: empire created by Turkish tribes in Anatolia (Asia Minor) that grew to be one of the most powerful states in the world during the 15th and 16th centuries. The Ottoman period spanned more than 600 years and came to an end only in 1922, when it was replaced by the Turkish Republic and various successor states in southeastern Europe and the Middle East. www.dictionary.com/browse/ottoman-empire Accessed on 06/05/2023 14:30 AM

³ Regency of Algiers: The Regency of Algiers[a] (in Arabic: الجزائر, romanized: al Jaza'ir),[b] was a state in North Africa, lasting from 1516 to 1830, until it was conquered by the French. www.wikiwand.com/en/Ottoman_Algeria Accessed on 07/05/2023 15:25 PM

⁴ Turks: Turk /tə:k/ plural noun: Turks

1. a native or inhabitant of Turkey, or a person of Turkish descent.

2. historical: a member of any of the ancient central Asian peoples who spoke Turkish languages, including the Seljuks and Ottomans. www.google.dz/search?q=turks+definition&oq=turks+definition&aqs=heirloom-srp..0l4 Accessed on 07/05/2023 16:30 PM

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Through time, Algeria became a remarkable power in the Mediterranean Sea where a new page was written in Algerian history. The Ottoman Algeria passed through several epochs from the Turks' control under different titles of rulers who took the Regency to prosperity and strength. According to Ben Saiden the most remarkable period in the Regency's history was linked by the total domination of the Algerian fleet in the Mediterranean Sea with its countless ships "*the 17th century was the Golden Age of the Algerian Navy in modern terms*" (78). The European countries sought to have loyalty with the Algerian Regency because no one could cross the Mediterranean Sea without paying taxes for the protection of their trade. However, with the growth of the colonial notion and the scramble for Africa⁵ during the 19th century the balance of power had been reversed. In addition to that, the Algerian Regency became less powerful under the rule of Dey⁶ Hussein⁷ where it witnessed internal and external conflicts with nations. Coinciding with this weakness, France emerged powerfully with the notion of colonizing and dividing Africa with the other European competitors.

2. The French Conquest of Algeria (1830)

In the early 19th century, Algeria was a part of the Ottoman Empire which was ruled by a Dey until the French conquest in 1830; that conquest expanded to more than six decades until Algeria gained its independence in 1962 . Plus, the region was home to different fronts that were constantly fighting against each other as Bouchène highlighted "*the Ottoman period in Algerian history was characterized by both cooperation and conflict between the central*

⁵ scramble for Africa The 'Scramble for Africa' is the term that historians use to refer to the expansion of European empires into Africa during the Age of Imperialism. It is referred to as a 'scramble' due to the way in which the European nations raced to capture territory to expand to their empires.

www.historycrunch.com/scramble-for-africa-overview.html#/ Accessed on 09/05/2023 23:40 PM

⁶ Dey was an honorary title in the Ottoman provinces of Algiers and Tunis [conferred](#) upon exceptionally able corsair leaders; also, a lower rank of officer in the Janissaries. The dey was chosen by local civilian, military, and religious leaders to govern for life and ruled with a high degree of autonomy from the Ottoman [sultan](#).

www.britannica.com/topic/dey Accessed on 09/05/2023 23:45 PM

⁷ Dey Hussein: (real name Hüseyin bin Hüseyin; 1765, Smyrna – 1838, Alexandria) (Arabic: حسين داي),

was the last Dey of the Deylik of Algiers. 16:30 PM www.english.alarabiya.net/features/2018/09/05/Who-was-Hussein-Dey-the-Ottoman-who-enabled-France-to-annex-Algeria- Accessed on 07/05/2023 00:15 PM

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government and local tribes” (81). The Barbary⁸ nomads of Algiers were notorious for landing vessels and enslaving their crew.

In 1827, the French consul in Algiers was hit with a fan by the Dey of Algiers for failing to pay the French debts. This was seen as a serious insult by the French government. Such event, along with other grievances, led to a French invasion of Algeria in 1830. The French forces, led by General Charles De Bourmont⁹, landed near Algiers on July 5th, 1830. They snappily gained control of Algiers and also began a crusade to conquer the rest of the country. The Algerian forces, led by Emir Abdelkader¹⁰, put up a fierce resistance, but they were ultimately defeated by the French knowing that *“resistance in the mountains of Algeria remained intense throughout the 1850’s and 1860’s, and the French found themselves drawn into a brutal and protracted conflict that they were ill-equipped to fight”* (Horne 29). Furthermore, the French established a social administration in Algeria, with a French governor-general overseeing the region. The new rulers of Algeria brought in settlers from Europe to establish granges and stations, and they also erected structures such as roads and railroads.

Still, the French rule was marked by a brutal repression of the original population, who were considered inferior by the French pioneers. The Algerians were forced to work on French granges, and their lands were taken down from them. The colonizers also enforced a policy of "action" which involved the forced relocation of the original population to attention camps. Yet, *“the French occupation of Algeria was marked by brutal violence and repression, including the use of torture and the forced relocation of large numbers of Algerians”* (Dwyer 38). Under the leadership of Emir Abdelkader, the Algerians continued to repel French rule throughout the 1830s and 1840s. However, in 1847, The Emir was captured by the French, and the resistance movement lost instigation. Later on, in the late 19th century,

⁸ Barbary this term was used in reference to the coastal regions of North Africa, specifically the areas inhabited by Berber-speaking peoples, and was often associated with piracy and raiding in the Mediterranean. www.collinsdictionary.com/dictionary/english/barbary Accessed on 08/05/2023 20:25 PM

⁹ Charles De Bermount was a French military officer who played a significant role in the colonization of Algeria, and he is widely regarded as a symbol of French colonialism, oppression and violence in Algeria.

¹⁰ Emir Abdelkade an Algerian fighter who was known for his chivalry, diplomacy and military tactics, and he is served as a hero in both Algeria and France for his role in the resistance against French colonialism. www.britannica.com/biography/Abdelkader Accessed on 08/05/2023 21/45 PM

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a new resistance movement surfaced, led by leaders similar to El Mokrani¹¹ and Lalla Fatma N'Soumer¹². The resistance was severely suppressed by the French, but it continued to inspire latterly movements for Algerian independence. *“Despite these efforts at pacification, the rebels in the Kabylie Mountains continued to resist French rule for years to come”* (Horne 35)

The Algerian War of Independence began in 1954, and it lasted for seven years. The war was marked by atrocities committed by both sides, and it was a major factor in the fall of the French Fourth Republic¹³. Moreover, *“the end of the Algerian War was a difficult and painful process for both Algeria and France, marked by violence, trauma, and a sense of loss”* (Branche 160). In 1962, after a vote, Algeria gained its independence from France and that marked a definite end of the French Empire.

Consequently, the French conquest of Algeria in 1830 marked the morning of more than 130 years of French rule over the region. The subjection was marked by a brutal repression of the original population, and it led to a long struggle for Algerian independence. On the other hand, several policies were implemented to establish and maintain French control over the region.

3. The French Colonial Policies Adopted in Algeria (1830-1961)

The French colonization of Algeria in 1830 marked the dawn of a long and complex relationship between France and Algeria that lasted until Algeria gained its independence in 1962. During this period, France enforced several social programs aimed at transforming Algerian society along French lines and maintaining French control over the country. These programs were characterized by a combination of social and military programs, which had a

¹¹ El-Mokrani is remembered as a symbol of resistance and heroism in Algeria, and his legacy has continued to inspire nationalist movements and popular uprisings against oppression and colonialism. Accessed on 08/05/2023 22/00 PM www.monsieur-biographie.com/celebrite/biographie/cheikh_el_mokrani-13244.php

¹² Lalla Fatma N'Soume was a prominent female leader of the resistance against French colonialism in Algeria, and she is celebrated as a symbol of bravery, resilience and the struggle for independence and freedom. Accessed on 08/05/2023 22/30 PM www.algeria.com/blog/lalla-fatma-nsoumer-a-symbol-of-feminine-strength

¹³ French Fourth Republic a parliamentary democracy marked by political instability and a weak executive power. Its struggled to govern effectively and address key issues ultimately led to its downfall and the establishment of the stronger executive presidency in the French Fifth Republic. Accessed on 09/05/2023 23:30 PM www.britannica.com/topic/Fourth-Republic-French-history

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significant impact on Algerian society and contributed to a long and bitter struggle for Algerian independence.

3.1 Social Policies

One of the first social programs enforced by the French in Algeria was the assumption of land from the original population. As Evans asserted:

the French saw themselves as a civilizing force in Algeria, but in reality their policies had the effect of perpetuating poverty and inequality. The vast majority of Algerians were excluded from the benefits of French rule, and were forced to live in squalor and deprivation. (78).

The French also introduced the concept of private property power, which was unknown to the traditional Algerian society. The French created vast estates and granted lands to French settlers, frequently at the expense of the original Algerians as mentioned that:

the French colonial policy in Algeria created two societies that were completely different and almost incompatible. While the French settlers enjoyed the fruits of modernization and progress, the majority of Algerians suffered from poverty, illiteracy, and disease. (Stora 59).

This policy was a significant departure from the traditional Algerian system of collaborative land power, where land was possessed and managed by the community.

On the other hand, the French introduced a Western- style education system in Algeria, which aimed at producing French- educated Algerian nobility as well as

they set about creating a new Algeria that would be firmly anchored in French civilization. The plan was to produce a French speaking, French thinking, French acting population that would owe its primary allegiance to France rather than to its own Arab or Berber culture. (Horne 54).

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Still, education was largely confined to French settlers and some limited unclear number of Algerians who could benefit from it. As a result, the majority of the Algerian population remained illiterate. The French also used education as a tool to spread French language and culture among the Algerian population, farther alienating them from their own traditions, as Feraoun.M declared that: *“the Algerian people were kept in a state of ignorance, and their history and culture were deliberately concealed from them. They were taught to feel inferior and to admire the colonizer”* (Feraoun 41)

The French tried to convert the Algerian population to Christianity and outlawed Islamic practices similar as polygamy and the veil. In other words,

the colonial regime imposed Christianity on the natives as a way of breaking down their resistance and erasing their cultural identity. It was a tool of oppression used to maintain the colonial system and prevent the people from rising up against their oppressors (Fanon 119).

And according to Horne, the French never lost faith in assimilation. However, the Muslims themselves showed little interest in assimilating, and the Algerian nationalists increasingly viewed the French policy of integration as merely a means of maintaining the Algerians in a condition of subordination (178).

the French colonial rule was characterized by a highly centralized and authoritarian style of government... Power was exercised by the European minority, and the Muslims were excluded from any real role in the administration of the colony (S. Alexander 25)

The French also interfered in the religious affairs of the Algerians and appointed French officers to oversee the operation of Islamic institutions. These programs were aimed at undermining traditional Islamic values and replacing them with French morals. Whereas, the French colonial administration pursued policies aimed at exploiting Algeria’s natural resources and labor for the benefit of France, as it is mentioned that:

the French army began to organize roundups of Algerians for ‘regroupment’ in designated villages, where they could be more easily controlled and monitored. These forced resettlements were often

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accompanied by the conscription of able-bodied men for forced labor projects, such as the construction of military fortifications and the digging of trenches (Horne 137).

This included the establishment of large scale agricultural plantations, mining operations, and the forced conscription of Algerians to work in French industries. Moreover, the colonizer established a centralized administrative system to govern Algeria, with French officials holding key positions in the government and the judiciary. This system was designed to maintain French control over the region and suppress any dissent resistance. Besides, the French colonial administration adopted a policy of repression towards Algerians who opposed or resisted their rule. This included the use of force to suppress uprisings and resistance movements, the imprisonment and torture of political prisoners, and the forced displacement of entire communities.

3.2 Military Policies

In addition to social programs, the French also enforced military programs aimed at maintaining their control over Algeria. These are some detailed explanation of the military programs. The French conquest of Algeria in 1830 was the first step in establishing French control over the country. After the original subjection, the French enforced a policy of action aimed at subduing the Algerian population and precluding them from rising up against French rule. This policy involved the establishment of military posts throughout Algeria, the construction of roads and structures, and the use of force to suppress any resistance as

the French colonial authorities in Algeria implemented a system of institutionalized discrimination against the Arab and Berber populations, treating them as second- class citizens in their own land. This policy of oppression included land expropriations, forced labor, and restrictions on the freedom of movement and expression of Algerians (Horne 28)

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The French enforced a policy of forced labor, known as *corvée*¹⁴, which involved the conscription of Algerians to work on public workshop systems similar to roads, islands, and structures. This policy was designed to support the French military presence in Algeria and to give a source of cheap labor for French settlers. They also signed Algerians into the French military service, primarily as dogfaces and sloggers. This policy was aimed at establishing a pious Algerian military force that could be used to maintain French control over the country.

Additionally, the French government also used suppression as a means of maintaining control over Algeria. The French service and police forces were given broad powers to suppress any resistance to French rule, frequently using brutal tactics similar to torture, summary offences, and forced relegation of Algerian communities as claimed that *“the French believed that military force was the only means of maintaining control over the colony... The use of torture was widespread and many Algerians were killed or ‘disappeared’ during the course of the war”* (D. Le Sueur 33). On the other hand,

the use of torture by French military and security forces was a key component or the counterinsurgency strategy in Algeria. The French viewed torture as a necessary tool for obtaining information and breaking the will of the nationalist movement (Rahal 75).

Overall, the military policies adopted by the French colonial administration were characterized by a brutal and repressive approach to maintaining control over the region. These policies contributed to the rise of nationalist and anti-colonial movements, culminating in the Algerian War of Independence between 1954 and 1962 and the eventual independence of Algeria in 1962

4. The French Military Progress after World War II (1945-1960)

In the early 20th century, scientists made significant advances in understanding the structure of atoms. The outbreak of World War II in 1939 and the rise of Nazi Germany¹⁵

¹⁴ *Corvée* refers to an unpaid labor obligation imposed on individuals, typically for the benefit of the ruling authority or the community as a whole. The term has historical significance, as it was a common form of labor extraction used during the colonial period in many parts of the world including Africa.

¹⁵ Nazi Germany was the totalitarian regime that ran Germany, countries and regions annexed by Germany, and countries occupied by Germany during World War II, between January 30, 1933, when Adolf Hitler was named Chancellor of Germany, and May 8, 1945, when Germany surrendered to the Allied troops led by the United

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intensified concerns about the potential development of atomic weapons. In response, the United States launched its well-known atomic bomb named “Little Boy” on the Japanese city of Hiroshima on August 6th, 1945, followed by the “Fat Man” bomb on Nagasaki city on August 9th. The bombings of Hiroshima and Nagasaki revealed the devastating power of nuclear weapons.

Following World War II, the United States and the Soviet Union emerged as the leading superpowers and engaged in a race to develop and store nuclear arms. This period known as the nuclear arms race, spanned the Cold War era and was characterized by intense competition to maintain military superiority.

After World War II, France sought to rebuild its military and regain its status as a significant player on the world stage. The country faced security concerns due to the emergence of the Cold War, the division of Europe, and the arms race between the United States and the Soviet Union. However, during the period between 1945 and 1960, France faced significant challenges in its process of decolonization and military engagement. The country struggled to maintain control over its colonies, leading to various conflicts as colonial territories sought independence. The Indochina War (1946-1954) and the Algerian War (1954-1962) are two prominent examples that had a profound impact on French domestic and foreign policy.

And to satisfy France’s desire to show its military strength and confirm its position as a global power in the aftermath of World War II and during the Cold War, the latter decided to conduct nuclear tests in Algeria and it chose the regions of Reggane¹⁶ and Ain Ikker¹⁷ as test fields starting from 1957, as it is referred, “*the French government decided to conduct nuclear tests in Algeria primarily because the Sahara region offered a sparsely populated area with a dry climate, suitable for testing*” (Evans 112). The nuclear testing program was

States, the United Kingdom, and the Soviet Union. www.aboutholocaust.org/en/facts/what-was-nazi-germany
Accessed on 10/05/2023 23:55 PM

¹⁶ Reggane is a town located in the Adrar Province of Algeria. It gained historical significance for being the site of nuclear tests conducted by France in the 1960s.

¹⁷ Ain Ikker is a region located in the Tamanrasset Province of Algeria. It is known for its sunning desert landscapes and serves as a gateway to the majestic Hoggar Mountain. The region attracts tourists with its unique geological formations, ancient rock art and opportunities for outdoor activities such as hiking and camping. It also offers a glimpse into the natural beauty and cultural heritage of southern Algeria.

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conducted in secrecy, without the knowledge or consent of neither the local Algerian population nor the United Nations. Many Algerians suffered from the effects of radiation exposure and other health problems as a result of the tests. The French government also disregarded international concerns about the environmental and health risks posed by nuclear testing, which ultimately led to widespread condemnation and protests.

Conclusion

The French colonial period in Algeria from 1830 to 1962, had a significant and profound impact on the country's social and political landscape. In fact, the policies adopted by the French colonial administration in Algeria had a significant impact on the country and its people. From the late 19th century until the mid-20th century, Algeria was considered an integral part of France and was subject to policies that aimed at integrating the country into the French empire. These policies had a profound effect on Algeria's economy, culture, and society. The French authorities introduced new systems of land tenure that forced Algerians to give up their traditional communal land-use practices. This, in turn, led to a loss of agricultural productivity and weakened the traditional social structures of Algerian society. One of the most terrible examples of French colonial policy in Algeria was the use of the country as a site for nuclear testing. Between 1957 and 1960, the French military conducted many nuclear tests in the Algerian Sahara, exposing thousands of people to dangerous levels of radiation. And this what will be tackled thoroughly in the next chapter.

Chapter II:
The Extensions of
Nuclear Tests in
Reggane (1957-1961)

Introduction

This chapter focuses on the extensions of nuclear tests in Reggane including France's aim for choosing Reggane's region for its nuclear tests and its diverse effects on people and environment. As, it also sheds light on Reggane's nuclear tests in press documentations and oral narrations.

1. The Geographical Location of Reggane

When France hurried to follow the lead of the major countries and joined the nuclear club at that time, and since 1957, it began searching for a place to conduct nuclear tests. Eventually, the Algerian desert was chosen to be a laboratory for the detonation of the first French nuclear bomb in 1960 without taking into account the international agreements¹ ratified in this regard. Thus, after several surveys the choice fell on Reggane's region.

Reggane is a town located in the Adrar² Province of Southern Algeria. It is situated at an elevation of about 610 meters (2000 feet) above sea level. It is located in the Sahara Desert region, which means it experiences an arid desert climate. Summers are extremely hot, with temperatures often exceeding 40°C, while winters are relatively mild with temperatures averaging around 18°C to 20°C. In addition, rainfall is occasional, averaging less than 50 millimeters annually. Still, the town is located in a vast desert landscape characterized by flat, sandy plains and rocky plateaus.

Due to the dry desert conditions, vegetation in and around Reggane was limited. However, some drought-resistant plant species, such as acacia³ trees and desert plants, can be found spread throughout the region. On the other hand, water is a scarce resource in the area,

¹ International agreements instrument by which states and other subjects of international law, such as certain international organizations, regulate matters of concern to them. The agreements assume a variety of form and style, but they are all governed by the law of treaties, which is part of customary international law.

www.britannica.com/topic/international-agreement Accessed on 10/06/2023 22:40 PM

² Adrar (*Arabic*: ولاية أدرار) is a *province* (*wilaya*) in southwestern *Algeria*, named after its capital *Adrar*. It is the second-largest province, with an area of 424,948 km², roughly the size of the *US* state of *California*. It had 402,197 inhabitants at the 2008 population census. It is bordered by five other wilayas: to the west by *Tindouf*; to the north by *Béchar* and *El Bayadh*; to the east by *Ghardaïa* and *Tamanrasset*. To the south, it is bordered by *Mauritania* and *Mali*. www.en.wikipedia.org/wiki/Adrar_Province Accessed on 05/06/2023 20:25 PM

³ *Acacia* /ə'keɪʃə/, a tree with yellow or white flowers. There are several types of acacia tree, some of which produce a sticky liquid used in making glue. www.oxfordlearnersdictionaries.com/definition/english/acacia Accessed on 05/06/2023 20:40 PM

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and the town relies on wells and underground aquifers for its water supply. The nearby Oued Saoura River⁴ provides some water resources for agricultural activities in the region. So far, the Ahaggar Mountains⁵, also known as the Hoggar Mountains are located to the southeast of Reggane. This mountain range is part of the larger Sahara Atlas and features peaks, deep canyons, and unique rock formations.

Besides, Reggane is accessible by road, primarily via the N52 highway, which connects it to other towns in the region. The town also has an airport, the Reggane Airport which provides domestic flights to and from other parts of Algeria. Furthermore, the population of Reggane was estimated to be around 20,000 people, primarily consisting of Berber⁶ and Tuareg⁷ communities. The town serves as a regional administrative center and a pivot for trade and services in the surrounding desert area. Hence, these geographical and environmental features and characteristics of Reggane were a strong motive for rehabilitating the region to conduct nuclear tests, and its selection was not in vain since it provided suitable conditions for conducting these tests away from populated areas, ensuring a high level of secrecy and security. (Dr. DJefal 57)

⁴ Oued Saoura River is an intermittent river, or [wadi](#), formed from the confluence of the [Oued Guir](#) and [Oued Zouzfana](#) at [Igli](#), forming the [Saoura](#) valley.^[1] While in the past the flow of the river was steady and plentiful, in recent years it has diminished due to the construction of the [Djorf Torba](#) dam on the Oued Guir. www.en.wikipedia.org/wiki/Oued_Saoura Accessed on 05/06/2023 21:00 PM

⁵ Ahaggar Mountains also spelled **Hoggar**, large [plateau](#) in the north centre of the [Sahara](#), on the [Tropic of Cancer](#), [North Africa](#). Its height is above 3,000 feet (900 m), [culminating](#) in Mount Tahat (9,573 feet [2,918 m]) in southeastern [Algeria](#). www.britannica.com/place/Ahaggar Accessed on 06/06/2023 11:30 AM

⁶ Berber an indigenous person of northern and north-western Africa. Traditionally, the Berbers speak Berber languages, although most literate Berbers also speak Arabic. The Berbers are Sunni Muslims, and their local tribal groups are often led by a hereditary religious leader. www.oxfordreference.com Accessed on 06/06/2023 11:45 AM

⁷ Tuareg Ethnic group of Niger, Mali, Burkina Faso, Algeria, and Libya. Often called “the blue people” because of the color that the indigo dye of their clothing leaves on their skin, [Tuareg](#) are Muslim: traditionally, the men wear blue veils, but women do not cover their faces. Catherine. Accessed on 06/06/2023 12 :00 AM www.oxfordreference.com

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Map 1: The Geographical Location of Reggane.



Source: Google Map www.google.com/maps/place/Reggane/ Accessed on 06/06/2023 23:30PM

1.1 Motives for choosing the region of Reggane

After the French authorities had chosen the region of Reggane in 1957 to be a field for military experiments, which was known as the desert center for military experiments, they rushed to prepare the region for the detonation of the first nuclear bomb in the region. Therefore, the French army settled in the Saharan Center for Military Experiments⁸, and it formed a base that contained an airport and all the technical and administrative departments, since Algeria was still under their colonial rule. This helped France to maintain control over the entire process and allowed it to bypass potential complications and negotiations that could have arisen if the tests were conducted elsewhere. Therefore, Reggane contained huge underground installations, monitoring devices and an airport. However, there were many other reasons behind the choice of the region of Reggane for nuclear tests. (D.Sokolski and Tertrais 30) (See Appendix 1)

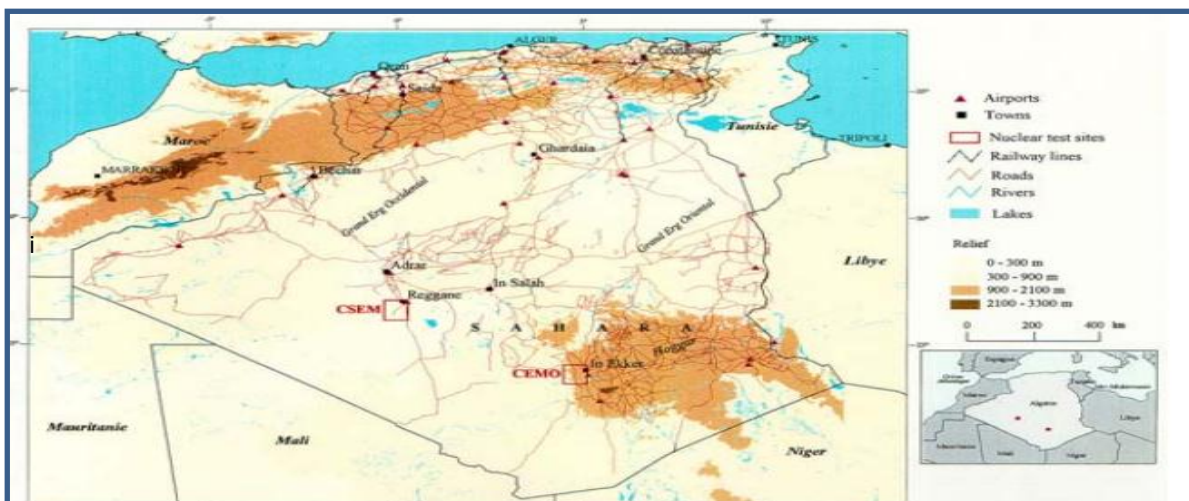
⁸ Saharan Center for Military Experiments also called the Centre Saharien d'expérimentations militaires (CSEM), A so-called *base-vie* (life base), it included 10,000 people civil and military. base was constructed secretly on 17 October 1957 and It comprised dwellings, administrative services, ammunitions and fuel depots, a water pumping station, a swimming pool, a hospital, and several temporary airfields until the completion of the aerodrome in May 1958. www.thefunambulists.net/magazine/14-toxic-atmospheres/toxic-imprints-of-bleu-blanc-rouge-frances-nuclear-bombs-in-the-algerian-sahara-by-samia-henni Accessed on 06/06/2023 12 :10 AM

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The geographical location of Reggane was the strongest factor for detonation; the region allowed monitoring the missile routes. In addition, the area was far from the media and it was difficult to have access to it; as it was surrounded from the south and the west by French colonies such as Mali, Niger and Mauritania. The region of Reggane was also characterized by a moderate climate during the period from January to April, which did not negatively affect the success of the experiments. Moreover, the region was rich in many types of agricultural products, which helped to know the effect of radiation on plants; yet, before the first explosion, different samples of plants were brought in with the aim of detecting their viability. After exposure to nuclear and thermal radiation, as one of the witnesses, the fighter “Muhammad Harizi” stated that he was one of those who supervised the collection of seeds of all kinds and gave them to the French authorities, who placed them at different distances from the point of explosion. (Dr. Ziani 138).

In fact, the vastness of the Algerian Sahara, its sparse population and its remoteness from Europe facilitated the process of starting work to build the base for conducting experiments, so the French authorities dug tunnels and constructed accommodation buildings, gasoline tanks, water pumps and rest and entertainment stations, in preparation for the tests.

Map 2: Location of Test Sites. CEMO: Oasis Military Experiment Center; CSEM: Saharan Center for Military Experiments

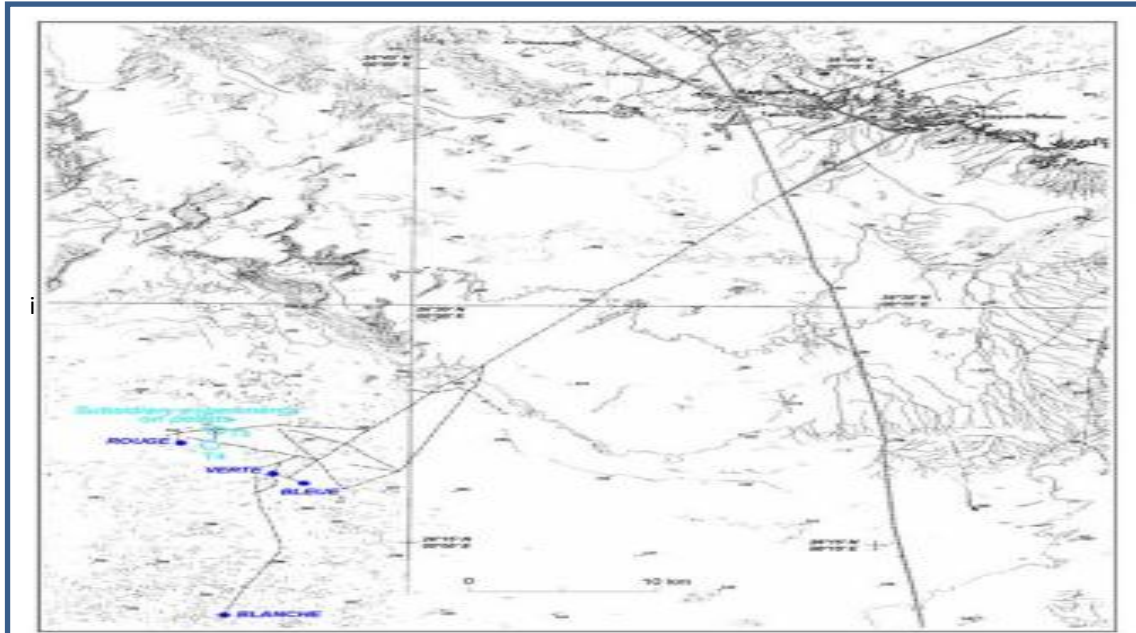


Source: *Radiological Conditions at the Former French Nuclear Test Sites in Algeria: Preliminary Assessment and Recommendations*, International Atomic Energy Vienna, 2005, p3.

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As previously mentioned, the preparation work for the base began in 1957, and with the passage of only three years, the region of Reggane became an urban city, in which about 6500 French scientists, technicians and soldiers settled, and about 3500 Algerians prisoners who were fixed on poles as guinea pigs and thus, the area became forbidden after it was divided into three main areas to implement the project of nuclear bombings. First, the Central Area which covered 60,000 square kilometers, and flying over it had been permanently banned. Second, the area surrounding Reggane which extended over an area of 50 square kilometers and was called the Blue Zone. It was also forbidden to fly over its territory at an altitude of less than 3000 meters during the six hours following the explosion. Third, the Green Zone which extended over an area of 2000 km in width and 150 km in length, and it was also prohibited to fly over its territory at an altitude of less than 3000 meters for a period of 12 hours following the explosion. Above all, the nuclear tests were a series of explosions which had different names and significance and were done in a chronological way. (Yahyaoui and Brahim France24 English). (See Appendix 2)

Map 3: Map Showing Reggane and the Locations of the Four Gerboise Atmospheric Nuclear Tests and the Pellet Experiments.



Source: *Radiological Conditions at the Former French Nuclear Test Sites in Algeria: Preliminary Assessment and Recommendations*, International Atomic Energy Vienna, 2005, p6.

1.2 Nuclear Tests in Reggane (1957-1961)

The nuclear experiments conducted by France between 1957 and 1961 in the region of Reggane were a series of nuclear tests amounted to four main atmospheric experiments, with an estimated total energy of about 100 kilotons of TNT⁹. They were codenamed Jerboas¹⁰ in reference to a rodent animal that lived in the desert. Indeed, the Blue Jerboa (Gerboise Bleue) conducted on February 13th, 1960 was the first and the largest bomb that marked France's entry into the exclusive club of nuclear-armed nations. The bomb had a capacity of about 70 kilotons, more than three times the nuclear bomb dropped by the United States of America on the Japanese city of Hiroshima in 1954, and its costs amounted to one billion and 260 French Francs¹¹ obtained by France from Israeli funds after the agreement concluded between them in the nuclear field. (See Appendices 3, 4)

The subsequent test, the White Jerboa (Gerboise Blanche) was conducted on April 1st, 1960 and was the second explosive experiment with a capacity of 10 kilotons. Its explosion occurred on a cement base, which caused serious pollution to the environment and created a large hole that caused significant pollution resulting from the deposition of heavy particles that reached 20 km. Then, the Red Jerboa (Gerboise Rouge) occurred on December 27th, 1960, on a tower with a height of 50 meters and its force was estimated at about 3 kilotons, according to the expert in physical engineering, "Ammar Mansouri". (Yaquin Husamuddin new arab.com). Thus, the last French surface experiment was the Green Jerboa (Gerboise Verte), which was launched on April 25th, 1961 with a capacity of 10 kilotons. The experiment took place in special circumstances represented in the rebellion¹² of the French generals, so

⁹ TNT *noun* /,ti:.en'ti/ abbreviation for trinitrotoluene: a powerful, yellow explosive substance. www.dictionary.cambridge.org/dictionary/english/tnt Accessed on 06/06/2023 13:00 PM

¹⁰ Jerboas *noun* /dʒɜːr'bəʊə/ a rat with very long back legs, which lives in deserts in Africa, the Middle East and Asia. www.oxfordlearnersdictionaries.com/definition/english/jerboa Accessed on 06/06/2023 13:30 PM

¹¹ French Francs was used to refer to the currency systems of France and Belgium, before it was replaced by the euro in which 1. It is also used to refer to the currency systems of some other countries where French is spoken. www.collinsdictionary.com/dictionary/english/franc Accessed on 11/06/2023 13:30 PM

¹² Rebellion *noun* /rɪ'bɛljən/ rebellion (against somebody/something), an attempt by some of the people in a country to change their government, using violence. Also means, opposition to authority within an organization, a political party. www.oxfordlearnersdictionaries.com/definition/american_english/rebellion Accessed on 17/06/2023 23 :15

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De Gaulle ordered the bomb to be detonated as soon as possible in case the rebel generals seize the atomic weapon. (D.Sokolski and Tertrais 32)

Table 1: The Four Atmospheric Nuclear Tests Conducted in Reggane.

Test	Date	Longitude	Latitude	Type	Yield, W (kt)
Gerboise Bleue	1960-02-13	0°03'26" W	26°18'42" N	Tower, 100 m	40 < W < 80
Gerboise Blanche	1960-04-01	0°06'09" W	26°09'58" N	Surface	W < 10
Gerboise Rouge	1960-12-27	0°07'25" W	26°21'13" N	Tower, 50 m	W < 10
Gerboise Verte	1961-04-25	0°04'24" W	26°19'18" N	Tower, 50 m	W < 10

Source: *Radiological Conditions at the Former French Nuclear Test Sites in Algeria: Preliminary Assessment and Recommendations*, International Atomic Energy Vienna, 2005, p7

Accordingly, the nuclear tests conducted in Reggane between 1957 and 1961 left a lasting impact on various fronts. While these tests allowed France to establish itself as a nuclear power and advance its nuclear weapons program, they also had severe consequences on the local population and the environment. Thus, the release of radioactive materials during atmospheric nuclear explosions led to long-term contamination and health issues for nearby communities.

2. The Effects of the Nuclear Bombs on Reggane (1957-1961)

The detonation of nuclear bombs in Reggane had far-reaching effects on the region, encompassing various aspects of life including the physical, psychological, social, economic and environmental dimensions. These nuclear tests conducted by the French government brought about significant consequences that continued to impact the local population and the surrounding environment for a long time. The devastating power of these explosions released a chain of events that caused immediate destruction and left long-lasting repercussions on the region's landscape, health, economy and social fabric.

2.1 Physical and Psychological Effects

The nuclear tests conducted in the region of Reggane were part of a larger effort by the French government to assert its power and prestige in the face of growing anti-colonial

Chapter II: The Extensions of Nuclear Tests in Reggane (1957-1961)

movements in the region. However, the tests had also unintended physical and psychological consequences on both the local population and the environment. The devastating impact of these explosions not only caused immediate destruction but also left long-lasting effects that continue to this day.

Physically, the nuclear bombs unleashed a tremendous release of energy, resulting in powerful shockwaves, extreme temperature, and intense radiation. The detonation caused massive destruction to the immediate vicinity, flattening structures, uprooting vegetation and altering the landscape. Then, the shockwaves generated by the explosions traveled far, causing damage to infrastructure and structures even outside the epicenter. On the other hand, the release of radiation had also severe health implications for the local populations. Hence, the radioactive fallout contaminated the air, soil and water, posing significant risks to human health. The effects of radiation exposure included acute sickness, burns and long-term health consequences such as cancer, genetic mutations, and other radiation-related illnesses. The local communities residing near the testing sites were exposed to these harmful radioactive materials, leading to long lasting health issues and an increased risk of developing radiation related diseases. (Henni the Funambulist)

Beyond the physical effects, the psychological impact of the nuclear bombs on Reggane cannot be underestimated. The detonations caused fear, trauma and emotional distress among the local population. Yet, witnessing the destructive power of these weapons and experiencing the immediate aftermath of the explosions left lasting psychological scars on individuals and communities. The fear of radiation and its invisible threat further exacerbated the psychological trauma, leading to heightened anxiety, stress and a sense of uncertainty about the future. Therefore, acknowledging and addressing the physical and psychological legacy of the nuclear bombs is crucial for understanding the full extent of their impact and working towards healing and recovery. (Henni the Funambulist)

2.2 Social and Economic Effects

The conducted nuclear tests in Reggane had also profound social and economic effects on the local population and the region as whole. These tests brought significant changes to the social fabric and economic landscape of Reggane, impacting livelihoods, displacing communities and leaving a lasting legacy of social and economic changes.

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Socially, the nuclear bombs had a disruptive impact on the citizens. The detonation caused fear, uncertainty, and the displacement of nearby communities. So, many people were forced to leave their homes and ancestral lands due to safety concerns and the risk of radiation exposure. This displacement resulted in the disruption of social networks, loss of community cohesion and the uprooting of traditional ways of life. However, the nuclear tests also led to social and cultural tensions in the region. The colonial context of Algeria at the time, with France conducting the tests, intensified existing political and social grievances. The testing operations were seen as an infringement on the rights and well-being of the local population, further exacerbating feelings of marginalization and injustice. (Landau Environmental Justice Atlas)

Economically, the detonation of nuclear bombs in Reggane had as well far-reaching effects. The tests disrupted agricultural activities and traditional livelihoods, leading to the loss of crops, livestock, and fertile land. The contamination of soil and water sources with radioactive materials also rendered them unfit for use, impacting the ability of communities to sustain themselves through farming and other primary economic activities. Furthermore, the nuclear tests had an adverse effect on the broader regional economy. The disruption caused by the tests hampered economic development efforts, as resources were diverted towards the testing operations rather than investments in infrastructure, education, healthcare, and other critical sectors. The long-term environmental consequences of the nuclear tests also affected economic opportunities, such as tourism and natural resource exploitation. Thus, addressing these social and economic challenges is crucial for the well-being and development of the affected communities and the region as a whole. (Landau Environmental Justice Atlas)

2.3 Environmental Effects

Moreover, the environmental effects of the nuclear bombs in Reggane were multifaceted. The detonation resulted in the release of radioactive materials into the environment, contaminating the air, soil and water sources. The radioactive fallout settled over a wide area, infiltrating the natural ecosystem and introducing harmful substances that continue to pose risks to both flora and fauna. To explain, the soil in and around the testing sites became contaminated with radioactive atoms, rendering it unsuitable for agricultural use. The disruption of the natural soil composition, coupled with lingering presence of radioactive materials, hindered the regrowth of vegetation and impacted the ecological balance of the

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area. This led to the loss of plant biodiversity and altered the natural habitat for various species. Similarly, water sources in the region were also affected by the nuclear tests. The contamination of rivers, groundwater, and other water bodies with radioactive substances posed a significant risk to both human and animal populations that relied on these sources for drinking, agriculture, and other essential needs. Yet, the long-term effects of radioactive contamination on aquatic life and the broader aquatic ecosystem have been a cause for concern. (Landau Environmental Justice Atlas) (See Appendix 5)

In fact, the environmental consequences of the nuclear tests in Reggane extended beyond the immediate vicinity of the testing sites. Wind and weather patterns carried radioactive particles to neighboring areas, exacerbating the spread of contamination and increasing the geographic extent of the environmental impact. This further heightened concerns about the potential long-term effects on the regional ecosystem and the potential for bioaccumulation through the food chain. So far, these environmental challenges have far-reaching implications for the health and well-being of the local population and the long-term sustainability of the ecosystem. (Landau Environmental Justice Atlas)

3. Reggane's Nuclear Tests in Press Documentation and Oral Narrations

It is important to note that the understanding and perspective on the nuclear tests in Reggane between 1957 and 1961 have contributed to different interpretations and assessments since their occurrence. So, the press coverage and narratives varied depending on the country, media outlet and political stance. However, general overviews were commonly discussed in press documentations and narrations during the period of Reggane's nuclear tests.

In particular, the press coverage often highlighted the nuclear tests as a significant achievement for France. The tests were seen as a symbol of national pride and technological prowess, demonstrating France's ability to join the elite group of nuclear armed nations. Still, the press celebrated the scientific and engineering accomplishment behind the tests. Besides, the nuclear tests in Reggane were portrayed as crucial for France's national defense and security. The French press emphasized that possessing nuclear weapons would enhance France's military capabilities and serve as a deterrent against potential adversaries. The tests were viewed as a means to establish and maintain France's status as a major global power. In addition, the press analyzed the nuclear tests within the context of the cold War. France's

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nuclear ambitions were seen as part of the broader arms race between the United States and the Soviet Union. Press documentation often explored how France's nuclear program would impact the global balance of power and the dynamics between the superpowers. The press also highlighted the scientific and technological advancements associated with the nuclear tests. There was a significant coverage on the research, development and engineering efforts that went into conducting the tests. The press then emphasized the cutting-edge nature of France's nuclear program and its contributions to nuclear science. (Dan Hardoon, BBC)

Additionally, press documentation discussed the international reactions and diplomatic implications of the nuclear tests. Some countries and media outlets criticized France for conducting the tests, expressing concerns about nuclear proliferation and the potential escalation of the arms race. Other viewed France's nuclear program more favorably, considering it a legitimate expression of national sovereignty and defense capabilities. And while the focus was primarily on the military and strategic aspects, press coverage also touched on environmental and health concerns related to the nuclear tests. Some reports raised questions about the potential radiation exposure and environmental impact on the local population and the surrounding areas. (Dan Hardoon BBC)

Conclusion

This chapter highlighted the extensions of nuclear tests in Reggane from 1957 to 1961 which constituted an important turning point in the development of nuclear weapons. These exercises demonstrated the countries' commitment to enhancing their military prowess during the Cold War. However, they also sparked worries about the terrible effects of nuclear weapons and boosted awareness of and work towards arms control and non-proliferation on a worldwide scale. In order to maintain the safety and security of our global community, the legacy of the Reggane tests serves as a reminder of the continuous necessity for responsible management of nuclear technology. In the next chapter, one will draw attention to the different implications and their legacy which continue to be felt in modern Algeria and the fight for French recognition of the nuclear tests in Reggane.

Chapter III:

Modern Algeria and the Fight for French Recognition of the Nuclear Tests in Reggane (1961-21st Century)

Chapter III: Modern Algeria and the Fight for French Recognition of the Nuclear Tests in Reggane (1961-21st Century)

Introduction

This chapter sheds light on the Algerian continuous fight for French recognition of the nuclear tests conducted in Reggane, Algeria, from independence to the 21st century. By highlighting the repercussions of such tests performed in the region of Reggane, one focuses on the aftermath and the negative impact they had on Algerian environment and people's health. Furthermore, in this chapter one puts forward the Algerian struggle to get French recognition of the crimes perpetrated in to the nuclear tests, and the latter's refusal to confess.

1. The World's Involvement in Limiting the Bomb Testing

One of the most crucial and ongoing endeavor is the world's involvement in limiting bomb testing worldwide. Over the years, several significant milestones have been achieved in this regard. The Partial Test Ban Treaty¹ (PTBT) of 1963, signed by the United States, the Soviet Union, and the United Kingdom, marked an important step towards limiting nuclear tests. This treaty prohibited nuclear explosions in the atmosphere, underwater, and in outer space, recognizing the environmental and humanitarian risks associated with such tests. (Partial Test Ban Treaty PTBT, NTI)

The Comprehensive Nuclear-Test-Ban Treaty² (CTBT), adopted by the United Nations General Assembly in 1996, further expanded on the PTBT's objectives. Although the CTBT has not yet entered into force, it enjoys widespread support, with 184 signatories and 168 ratifications. The treaty aims to ban all nuclear explosions, including those conducted

¹ The partial Test Ban Treaty, formally Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space, and Under Water, treaty signed in Moscow on August 5, 1963, by the United States, the Soviet Union, and the United Kingdom that banned all tests of nuclear weapons except those conducted underground. www.britannica.com/event/Nuclear-Test-Ban-Treaty Accessed on 17/06/2023 23:30

² The Comprehensive Nuclear-Test-Ban Treaty which would prohibit all forms of nuclear explosive testing, had been signed by more than 165 states and ratified by more than 100 by the early 21st century but had failed to enter into force because some of the 44 states whose signatures were required for its enactment (including the United States, [China](#), India, Israel, [North Korea](#), and Pakistan) chose not to sign. In 1997, as a result of efforts led by the [International Campaign to Ban Landmines](#) (ICBL), a [treaty](#) prohibiting the use of antipersonnel mines was negotiated; it went into effect in 1999, and, by the early 21st century, nearly 150 countries had signed it, though China, Russia, and the United States had not. www.britannica.com/topic/arms-control/Recent-efforts#ref893158 Accessed on 17/06/2023 23:45

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underground, and establishes a comprehensive verification regime to monitor compliance. (The Comprehensive Nuclear-Test-Ban Treaty, CTBTO)

The reasons behind the decision to limit bomb testing stemmed from the devastating effects of nuclear weapons which became evident through the bombings of Hiroshima and Nagasaki in 1945. The immense loss of life and long-term health consequences highlighted the humanitarian impact of nuclear explosions. As it aimed to prevent further harm to civilian populations and reduce the potential for catastrophic humanitarian disasters. Indeed, nuclear tests release radioactive materials into the environment, posing serious risks to ecosystems and public health. Also, the atmospheric and underwater tests conducted in the early years of nuclear weapons development led to the dispersal of radioactive particles over large areas and by recognizing the environmental damage caused by these tests, efforts to limit bomb testing sought to mitigate these harmful effects and protect the planet. (United Nations)

During the Cold War (1947-1991), the arms race between nuclear-armed states intensified and for that it became an essential aspect of arms control efforts to curb the development and proliferation of nuclear weapons. Thus, by restricting testing, nations aimed to prevent the advancement of nuclear arsenals and promote stability in international relations. Nuclear tests involve inherent risks to the scientists, technicians, and military personnel involved in the testing process and the exposure to radiation during these tests posed significant health hazards. So, nations aimed to protect the well-being of those involved in the nuclear weapons development programs. (United Nations)

Limiting bomb testing also served as a confidence-building measure between nations. It fostered trust and cooperation, reducing tensions and the risk of accidental or intentional escalation of conflicts. Such measures aimed to establish a more stable and secure international environment. These reasons collectively reflect a broader recognition of the potential devastating consequences of nuclear weapons and the need to prevent their proliferation and minimize the risks associated with their development and deployment.

On the French side, neither did the country sign the PTBT in 1963, nor did it sign the CNTBT in 1996. Rather, France did not grant to get involved in the efforts to limit the use of nuclear weapons was more actively engaged in its nuclear weapons program and was conducting atmospheric nuclear tests in the Algerian Desert. However, as it is asserted:

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While France possesses a significant nuclear arsenal and maintains an independent nuclear deterrent, it has not been actively involved in recent efforts to limit the use of nuclear weapons worldwide. Unlike some other nuclear-weapon states, France has not ratified the Treaty on the Prohibition of Nuclear Weapons (TPNW), which was adopted by the United Nations in 2017. France argues that the TPNW fails to consider the unique security challenges it faces and believes that its nuclear deterrence policy contributes to global stability and security." (Treaty on the Prohibition of Nuclear Weapons (TPNW), United Nations)

France's decision to continue atmospheric testing and not sign the PTBT and the CTBT was met with international criticism. It was only later, in 1992 that it announced a definitive end to its nuclear testing program as declared:

France has been actively involved in limiting the use of nuclear weapons worldwide. It is a recognized nuclear-weapon state and has played a significant role in various international efforts aimed at non-proliferation and disarmament. France signed the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in 1992 and has consistently supported its objectives. Additionally, France has participated in multilateral negotiations and initiatives to reduce the global nuclear arsenal and strengthen non-proliferation regimes. (Treaty on the Non-Proliferation of Nuclear Weapons (NPT) United Nations)

Additionally, there were no violations of the Evian Accords³ by France. They were signed on March 18th, 1962 and marked the end of the Algerian War of Independence between France and the National Liberation Front⁴ (FLN) of Algeria. The agreement granted Algeria its independence and established the framework for future relations between France and Algeria. Moreover, These Accords primarily focused on issues related to decolonization,

³ Evian Accords The Évian Accords were a set of peace treaties signed on 18 March 1962 in Évian-les-Bains, France, by France and the Provisional Government of the Algerian Republic, the government-in-exile of FLN (Front de Libération Nationale), which sought Algeria's independence from France. www.menaaffairs.com/the-evian-accords-of-1962-the-end-of-occupation-in-algeria/ Accessed on 17/06/2023 00:00

⁴The National Liberation Front , French **Front de Libération Nationale (FLN)**, the only constitutionally legal party in [Algeria](#) from 1962 to 1989. The party was a continuation of the revolutionary body that directed the [Algerian war of independence](#) against [France](#) (1954–62). It was created by the Revolutionary Committee of Unity and Action (Comité Révolutionnaire d'Unité et d'Action [CRUA]), a group of young Algerian militants, organized in March 1954. www.britannica.com/topic/National-Liberation-Front-political-party-Algeria Accessed on 17/06/2023 00:10

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political and economic cooperation, and the rights and protection of populations affected by the conflict. It did not involve provisions or obligations related to nuclear testing, but it had a hidden clause that would allow France to continue carrying out nuclear tests on Algerian lands. While France conducted nuclear tests in the Sahara Desert during the period of the Algerian War, the Evian Accords themselves did not address or regulate nuclear testing. Therefore, there were no specific violations of the Evian Accords by France concerning nuclear testing. (Smail Fellah, Ennahar Online)

And since the Evian Accords themselves did not directly address the issue of the nuclear tests, the subsequent discussions and demands for recognition and compensation were part of the larger process of coming to terms with the legacy of French colonialism and the impact of its actions in Algeria.

2.Scars Left by Nuclear Tests in Reggane in Contemporary Algeria (21st Century)

In order to wipe out the truth, France began in its failed attempts to remove all signs of the crime, whether on the ground or by insisting on denying the existence of any harmful effect resulting from nuclear explosions. On the ground, the French army began trying to clean up the nuclear test sites, and this was immediately after the independence of Algeria. In addition, it dug several caves in order to hide nuclear waste, as well as polluted cars and planes, and all the files of weapons of mass destruction and the archives of this historical stage of France's dark history, from 1997 onwards, was classified as completely inaccessible. The damage resulting from the nuclear tests did not only affect humans, but also affected animals, plants, soil and air; and it has been proven scientifically and beyond any doubt that radioactive contaminated materials may even harm descendants, meaning that the effects of radiation may extend to the children and grandchildren of people directly affected by these materials, especially with diseases, disabilities and congenital deformities.

2.1. On the Environment

The environmental aftermath of the nuclear tests in Reggane was characterized by profound alterations to the natural landscape. The detonation of nuclear devices resulted in immediate destruction, causing extensive damage to soil, vegetation, and wildlife as asserted by Falk and Krieger:

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The French nuclear tests in Reggane caused significant environmental damage to the region. The tests released large amounts of radiation into the air and soil, contaminating the local ecosystem and posing a long-term threat to the health of the local population. (121)

Radioactive materials released during the tests contaminated and are still contaminating the environment, persisting for years and posing risks to ecosystems. Soil fertility was compromised, affecting agricultural productivity, while surface and groundwater reserves became tainted, threatening both human consumption and local biodiversity. Long-lasting radioactive isotopes in the soil have an impact on soil fertility and slow plant growth. Local ecosystems and agricultural practices are negatively impacted by this contamination in a chain reaction, as claimed:

the tests contaminated the soil, water and air with radioactive particles and the fallout is still there today. This is causing health problems for the local population who continue to suffer from cancers and other diseases related to exposure to radiation. (Lucena Article)

Radioactive residues from the nuclear testing still have an impact on groundwater reserves and surface water bodies. Moreover, contaminated water supplies have negative effects on aquatic life and human and animal health, which have an influence on the local communities that depend on these water sources. There might still be some radioactive fallout from the testing in the environment since weather and wind patterns can spread radioactive particles over a larger area, potentially impacting areas outside of the test sites' immediate proximity. (Benchiha, Abderrahmane Hammouzine) (See Appendix 6)

Therefore, the Algerian government called on France to take responsibility for cleaning up the contamination caused by the nuclear tests. The government has argued that France has a moral and legal obligation to address the ongoing impact of the tests on the environment and the health of people in the region. Algeria has also sought assistance from international organizations, such as the United Nations in addressing the environmental impact of the tests.

2.2. On the Algerian Population's Health

The health repercussions of the nuclear tests in Reggane have had a long-lasting impact on the well-being of Algerians. Immediate exposure to high levels of radiation resulted in cases of acute radiation sickness among individuals in close proximity to the test sites. The long-term effects of radiation exposure are linked to an increased risk of various forms of

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cancer, including leukemia, thyroid cancer, lung cancer, and bone cancer. The genetic and hereditary effects of radiation exposure have also raised concerns, as mutations and DNA damage may be passed on to future generations, potentially leading to a higher prevalence of genetic disorders and birth defects among affected populations. As Dr. Bruno Barillot⁵, who is specialized in diseases of nuclear tests claimed that:

No one can deny that these radioactive materials are the cause of many cancerous diseases and diseases of the heart and arteries and despite the statements of some officers in the French army that the doses used are weak and this is the policy of the French authority. However, this does not preclude the effect of radioactive materials on health. Studies have shown that low doses of toxic materials may lead to disease after ten, twenty or thirty years. (Stambouli 194)

As for human health, modern science in the field of cancerous tumors confirms that exposure to nuclear radiation causes at least 18 types of cancer. Most notably breast, thyroid, adrenal, genital, pituitary, lung, liver, colon, bone, and others. Indeed, the statistics provided by the hospital institutions confirmed the counting of a large number of people infected with these malignant diseases to this day. These radiations also led to the emergence of congenital deformities, whether for adults or children, and even fetuses, with a significant decline in the fertility rate of the population. (Yahyaoui and Brahim France 24 English) (See Appendix 7)

Among the eyewitnesses of these bombings was "Muhammad al-Ragani", who had been working since the late fifties in the field of health care. The day after the operation, he, accompanied by the French doctor, inspected the dispersed residents through the various places of the area. Here the disaster was when they found 30 pregnant women who had lost their fetuses, and people in Coma, while others were suffering from tremors and heart palpitations.

Also, medical conditions that were not known to the residents of the region began to appear, such as heart disease and blood pressure, with the emergence of congenital deformities in newborns, some of whom are still alive, and some of whom have lost their

⁵ Bruno Barrillot was the head of French Polynesia's body looking at the aftermath of France's nuclear weapons tests. He was born in April 9, 194 and died in March 25, 2017 www.dianuke.org/bruno-barrillot-dedicated-opponent-french-nuclear-testing-passes-away-polynesia/ Accessed on 17/06/2023 00:20

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sight. And Muhammad confirmed that through his participation in the Blue Gerbil operation, the French authorities deliberately concealed the truth at the time and is still doing so. Confirming his possession of a document belonging to the French Navy, dated 1965, indicating that, 90 seconds after the explosion, the effect of radiation would disappear, and it aimed through this official document to confuse the world, because it was afraid that soldiers and civilians would refuse to join the nuclear base. (Benchiha, Abderrahmane Hammouzine)

Among the old French soldiers who presented their testimonies to the world, were unanimous about their use of laboratory vocabulary during the French nuclear tests, Burgan, Gaston Morrizo and Lucien Parfait, on whom radiation had caused a major deformation on the level of his face, where a large hole replaced his left eye.(Dr. Louafi p53) (See Appendix 8)

There is no doubt, and it appears clearly that France has succeeded in its nuclear tests, and they are fully aware that the inhabitants of this region will suffer for a period of more than 24,000 years from the impact of nuclear radiation, and France committed its atrocious crime because it was seeking to join the nuclear club secretly and at any cost. Today, the residents of Reggane do not have any archives related to the details of the bombing, except from eyewitnesses who recount the tragedy, and their bodies simulate deadly diseases and severe disabilities. However, the file of the French nuclear experiments still remains with Algerian official requests from eligibility organizations. Thus, the purpose is to uncover waste places and provide compensation to the victims of deaths and citizens with permanent disabilities caused by radiation.

3.The Algerian Combat for French Recognition

French nuclear tests harmed the environment and people in southern Algeria, and birth defects appeared on a large scale in the Algerian desert areas that witnessed the tests. But the French authorities underestimated the popular and even political reaction, through the promotion of the French intelligence of the myth of the clean bomb, which convinced even the French experts, technicians and military who worked in the test sites. Despite that, the French authorities were trying to reassure as France's Minister of Defense Pierre Messmer announced in 1960:

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All precautions were taken so that neither the populations close to nor the populations distant from the site of explosion were exposed to any danger. The successful results from the security measures put in place for the first two explosions in Reggane were noted by the French authorities and confirmed by the American and Indian observations and guarantee the effectiveness of the measures which have been adopted. (Yahyaoui and Brahim France 24 English)

Since that time, the French authorities were hiding the truth even for their military army soldiers and many French former conscripts who performed their military service in Algeria and who were proud of their country's new achievements in keeping pace with the age of nuclear armament at that time. Unfortunately, they are disappointed today, as Gerard Dellac stated, he was one of the first to be compensated by the state after years of tireless efforts largely led by the association of veterans of nuclear tests. (Yahyaoui and Brahim France 24 English)

Thus, it was not until 1974 that both Algeria and France signed an agreement that included a provision for Algeria to receive financial compensation for the damage caused by the tests. However, the amount of compensation provided was widely criticized as inadequate, and in 2009, Algeria launched a new campaign for increased compensation. Algeria has also sought to raise international awareness of the impact of the nuclear tests in Reggane and has sought to put pressure on France to provide adequate compensation and address the ongoing impacts of the tests. (Toumi and Fellidj p1098)

In this context, in France in particular, many lawsuits were filed before the judiciary to demand compensation for the physical and psychological damages that befell the soldiers who were assigned to carry out these nuclear tests. And after the French authorities neglected these requests and the victims insisted on their right to obtain compensation for half a century (1960-2010), France finally complied by issuing the law on compensating victims of nuclear explosions called "*La Loi Morin*" 02-2010 of January 05th, 2010 relating to the compensation of victims of French nuclear explosions limiting them with certain diseases resulting from radioactive contamination resulting from the explosions. (Toumi and Fellidj p1097)

The French nuclear program also provided for the possibility of claiming compensation for the rights holders of the deceased persons who were victims of these explosions. These legal texts put incapacitating conditions and endless restrictions in the path of those claiming

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compensation, and specified diseases that can be considered as a result of nuclear explosions and obligating the victims of nuclear explosions to be present and live in the explosion sites during the testing process. Thus, the absolute majority of the victims or their families were deprived of claiming and obtaining compensation due to the reduction in the number of diseases resulting from nuclear explosions and depriving subsequent generations of compensation, despite scientific assurances of the serious damages incurred by them as a result of these nuclear crimes. (Toumi and Fellidj p1097)

Algeria has made many attempts and significant efforts in order to obtain France's recognition of its crimes perpetrated in Algeria. In December 2011, during the French President Sarkozy's visit to Algeria, he announced that a committee would be established to undertake the task of restoring polluted places to their normal condition. Unfortunately, about 32 compensation files for victims of nuclear explosions in the Algerian desert in 2012 were rejected, on the grounds that the diseases of these victims did not match the list of diseases approved in Law 2010-02. It is clear that the contents of this law came to serve the French authorities only. Thus, the minister of Mujahideen M. Tayeb Zitouni denounced the “*obstructive*” conditions of this law which “*has not allowed the Algerians to benefit from any compensation*”. And on April 2021, the chief of staff of the Algerian Army, Said Chanegriha, asked his French counterpart, former General François Lecointre, for his support “*for the final management of operations to rehabilitate the sites of Reggane and Inneker*”. As he asked for “*topographic maps that allow the identification of landfill sites, not yet discovered, for polluting, radioactive or chemical waste*”. (Algérie Presse Service) (Appendix 9)

As, Algerian Minister of Communication and government's spokesman Ammar Belhimer affirmed, in 2021, that his country adheres to the demand that France recognizes the crimes committed during its 132-year colonization of Algeria, on the occasion of the commemoration of the “National Day of Memory” for the first time in the country. Belhimer said in a message published by the Algeria Press Service (APS) that “*Algeria remains committed to a comprehensive settlement of the memory file,*” based on “*France's final and comprehensive recognition of its crimes (...) and an apology and fair compensation for it.*” Algeria commemorates the 13th of February as the “National Day of Memory.” This coincides with the seventy-sixth anniversary of the massacres of May 8th, 1945.

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During those massacres, the French colonial forces suppressed a demonstration for Algeria's independence, resulting in thousands of deaths in the eastern region of the country. President Abdelmadjid Tebboune approved the commemoration of the painful memory a year ago, and then in June its decree was issued in the Official Gazette, *"in gratitude for the great sacrifices made by the Algerian people in the massacres of May 8th, 1945 and during the outbreak of the liberation revolution on the 1st of November 1954."*

The minister added that the settlement also includes *"taking care of the remnants of nuclear explosions, including the disclosure of maps of the waste sites resulting from these explosions."* (France Press)

In a message he sent on the occasion of the National Day of Memory commemorating the massacres of May 8th, 1945, Algerian President Abdelmadjid Tebboune affirmed the continuation of the same approach regarding the memory file with the French side, and said: *"We have confirmed more than once that we are firmly proceeding in defending the right of the people"*. The Algerian president restated that the state is *"determined to put the file of history and memory on the path in which we can give full transparency, integrity and objectivity, away from any bargaining or concessions,"* noting that Algeria aspires in the same context and in the near term to achieve the hoped-for progress in this path, taking into account the importance of the work entrusted to the Joint Committee of Historians to address all issues, including those related to the recovery of archives, property, remains of resistance fighters, nuclear tests and missing persons.(El- Hayani Alaraby)

4. The French Government's Denial

From the early beginning of French colonialism and after the French nuclear bomb testing, France had been denying its horrific responsibility towards its war crimes and crimes against humanity. The French government has argued that the nuclear tests were conducted within the framework of international law at the time and was a signatory of the 1963 Partial Test Ban Treaty, which banned atmospheric and underwater nuclear tests, but allowed for underground tests. As it argued that the tests were conducted in accordance with safety standards, and that it took steps to minimize the impact on the environment and people in the region. On another side, France asserted that the impacts of the nuclear tests were limited and the levels of radiation in the region were not harmful to human health as General De Bendetti claimed on January 12th, 1961 that:

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The experiments carried in Reggane did not have military aims. In fact, the French government wanted these experiments to be useful not only in the military domain but also in the human domain. These experiments help us learn how mankind can be protected against the new atomic danger. (Yahyaoui and Brahim France 24 English)

However, the French claims have been criticized by some scientists and activists who mentioned that they downplayed the risks and did not take into account the long-term effects of radiation exposure. Additionally, the French government has offered technical assistance to Algeria in addressing the environmental impact of the nuclear tests. It has provided some funding and expertise to support environmental monitoring and clean-up efforts in the region, but the Algerian government has asserted that the assistance provided has been insufficient.

Moreover, the French government has provided some compensation to Algeria for the damage caused by the nuclear tests, but has rejected calls for increased compensation. France has affirmed that the compensation provided under the 1974 agreement was sufficient, and that the issue has been settled legally. It has also pointed the fact that it provided Algeria with technical and financial assistance in the years after the tests to support development and infrastructure projects.

Compared to his predecessors, French president Macron and his government have made the biggest steps toward reconciliation so far: coming clean about torture, calling colonialism what it really is, returning historical artifacts belonging to Algeria, and, most recently, issuing an order to declassify parts of secret archives. Yet time and again, France will not provide reparations or, even less, a formal apology. It seems as though France would rather forget about that period entirely. During Macron's visit to Algiers in 2017, he was confronted to an Algerian bystander who cried amid the crowd: *"France must come to terms with its colonial past in Algeria."* Macron replied, *"But you have never known colonization. Why are you bothering me with that?"* In the Ivory Coast and Burkina Faso, Macron faced similar questions and replied just in kind, objecting that those people had not lived under colonization. Far from showing compassion, Macron's flippant response reveals much about

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France's failure to reckon with its colonial legacy. (Bounab New Lines Magazine) (Appendix 10)

As El- Hayani pointed out that a historian claims that: *“despite what the French side and President Emmanuel Macron shows of some decisions regarding the crimes of French colonialism, and the desire to write a common history, the matter also requires caution in dealing with the French side, since Macron practices politics and is looking for gains, not to mention that he faces a right-wing current that refuses France's recognition of its crimes”* (El- Hayani Alaraby)

The quest for French recognition of the nuclear tests in Reggane has been marked by diplomatic negotiations, legal actions, and international advocacy efforts. Algerian authorities, including President Abdelmadjid Tebboune, have engaged in discussions with French counterparts to address the issue and establish a framework for addressing the consequences. They have also supported the legal actions pursued by victims seeking compensation and recognition. Therefore, on the international stage, Algeria has raised awareness about the impacts of the nuclear tests, emphasizing the need for recognition and reparations. Through forums like the United Nations General Assembly, they have called for international support and attention to the issue. The case has remained a focal point for Algerian advocacy groups, who have tirelessly worked to shed light on the damages caused by the tests.

However, it is important to note that achieving French recognition and reparations for the nuclear tests in Reggane has been a complex and ongoing process. The outcome of these efforts remains uncertain, and progress may depend on various factors, including political will, legal complexities, and evolving diplomatic relations between Algeria and France. To stay informed about the latest developments, it is advisable to refer to recent news sources, official statements from the Algerian government, and any subsequent actions taken by relevant stakeholders. The pursuit of recognition and justice in this matter reflects the broader struggle for historical accountability and the ongoing effects of colonial legacies in contemporary Algeria.

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Conclusion

All in all, one can say that the horrible nuclear tests performed during the French colonial era in Algeria can never be neglected, nor forgotten. The deep scar left in the region of Reggane and in the minds of its people will always remain as a proof of the damages caused by such tests. What makes this even worse is the French lack of responsibility regarding the topic. In addition, the Algerian determination to push the French to take full responsibility for their acts adds more fuel to the fire between both countries. What France needs to do is to come in terms with the long and bloody chapter and recognize its full responsibility in the crimes perpetrated in Reggane. This is the first step into forgiveness and this also might be the first step into bringing peace between both nations.

General Conclusion

General Conclusion

Talking about the crimes of French colonialism in Algeria is identical to exposure to the unfair and dark side of a colonial policy that lasted for a century and a quarter of a century, during which the Algerian people suffered greatly. It even exceeded what Nazism committed against the peoples of the world. France's crimes have surpassed all limits with the perpetration of inhuman acts, where they killed and displaced Algerians and confiscated their lands. To make things worse, this criminal behavior escalated to the point of conducting nuclear tests against the Algerian people. Reggane, as a symbol of the nuclear tests and their far-reaching consequences, encapsulates the enduring pains and sufferings perpetrated upon Algeria. The environmental contamination, health issues, and socio-economic disparities resulted from these tests serve as an influential reminder of the disrespect for human life and the devastating impact of colonial arrogance, as one saw in this research. Therefore, the nuclear tests in Reggane were not conducted for scientific research reason as the French authorities have tried to assert, but in reality they were meant to bring France on equal footing with the other powers and join the nuclear arms race club.

The French nuclear experiments in Reggane revealed the brutality and barbarism of the French colonizer. Despite his awareness of the health and environmental risks of these explosions, France insisted on carrying them out and completing them, disregarding all local and international denunciations and treaties to stop such crime. The oppression that France practiced against the people of the region, whether those who lived through this bitter experience or the subsequent generations, still resound today. The tests caused terrible effects on human health by spreading several diseases among the people of the region, most notably cancer, congenital deformities, and other radiation-related illnesses. On the environment, the tests had devastating consequences polluting the air and waterways, burning plants, killing livestock and injuring trees sterility. Moreover, the bitterest thing is that the effect of these radiations did not disappear with the end of colonialism and still continues to this day.

The deep scar left by colonial oppression in Algeria, symbolized by Reggane's wound, stands as a confirmation to the lasting impact of French colonialism. It prompts reflection on the significant shameful acts perpetrated on the Algerians, the continuous struggles for healing and justice, and the order to address the historical wounds that continue to bleed. Nevertheless, since independence Algeria has been navigating its path towards reconciliation

General Conclusion

and emancipation from the wounds of the past which serve as a powerful reminder of the need to learn from history, confront colonial legacies, and strive for a more inclusive and equitable future. Howbeit, the struggle for recognition and justice regarding the colonial wounds in Algeria persists. The Algerian president Abdelmadjid Tebboun, activists, organizations, and international supporters continue to demand acknowledgment, responsibility, and reparations for the historical injustices inflicted upon the Algerian people. This fight for justice is not only crucial for Algeria but also serves as a broader call for addressing the legacies of colonialism and fostering a more just and equitable world.

Last but not least, one can say that the wound between Algeria and France will never heal unless France acknowledges its responsibility in the bomb testing and accept all the blames. Otherwise, would Algeria's victims of these nuclear experiments be considered less valuable than the victims of the Marshall Islands, Nevada, Australia and Polynesia?

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www.alaraby.co.uk/politics/%D8%A7%D9%84%D8%AC%D8%B2%D8%A7%D8%A6%D8%B1-%D9%81%D9%8A-%D8%B0%D9%83%D8%B1%D9%89-%D9%85%D8%AC%D8%A7%D8%B2%D8%B1-%D8%A7%D9%84%D8%AB%D8%A7%D9%85%D9%86-%D9%85%D9%86-%D9%85%D8%A7%D9%8A%D9%88-%D9%84%D8%A7-%D8%AA%D9%86%D8%A7%D8%B2%D9%84-%D8%A8%D8%B4%D8%A3%D9%86-%D9%85%D9%84%D9%81-%D8%A7%D9%84%D8%B0%D8%A7%D9%83%D8%B1%D8%A9

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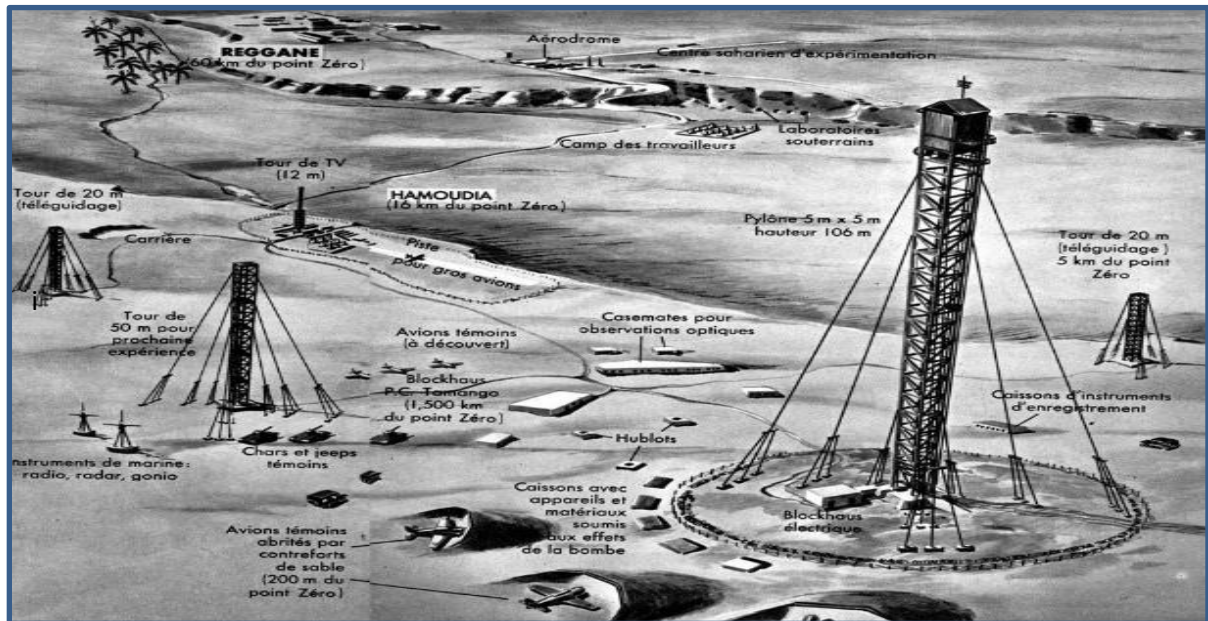
[%D9%85%D9%84%D9%81-](#)

[%D8%A7%D9%84%D8%B0%D8%A7%D9%83%D8%B1%D8%A9](#) Accessed on

18/06/2023 22:30 PM

Appendices

Appendix 1: Overview of the Infrastructure and Spatial Organization of the Saharan Center for Military Experiments, Reggane, Algerian Sahara



Source: www.thefunambulist.net/magazine/14-toxic-atmospheres/toxic-imprints-of-bleu-blanc-rouge-frances-nuclear-bombs-in-the-algerian-sahara-by-samia-henni Accessed on 06/06/2023 12:10 AM

Appendix 2: Algerian Prisoners and Soldiers Fixed on Poles as Guinea Pigs



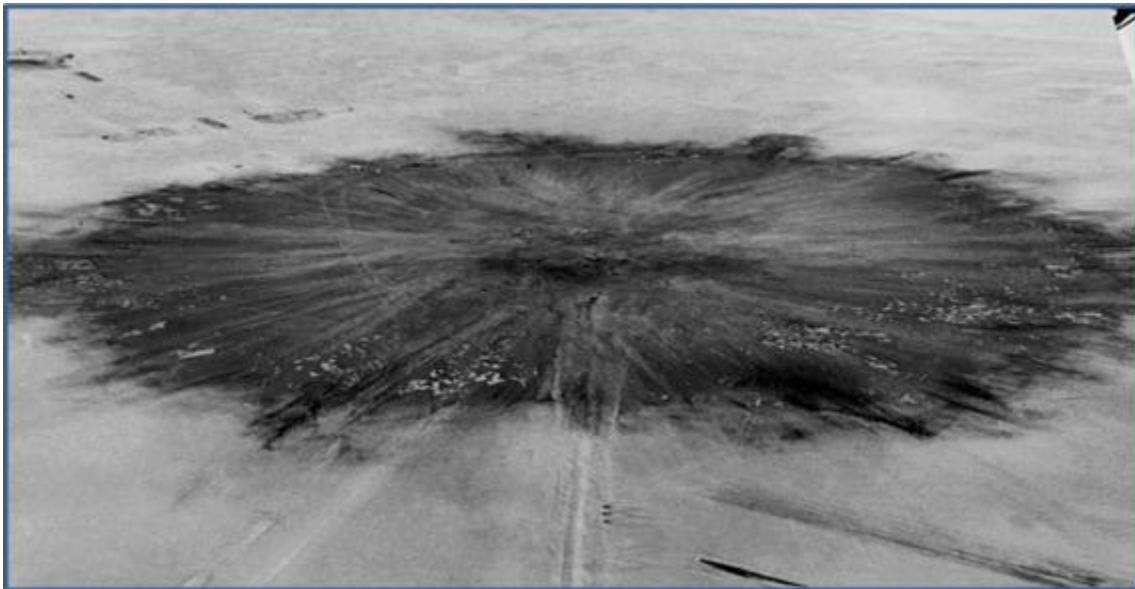
Source: www.ejatlaser.org/conflict/permanent-poison-frances-nuclear-testing-program-in-reggane-algeria/?translate=fr Accessed on 24/06/2023 15:15 PM

Appendix 3: The Blue Jerboa (Gerboise Bleue) Mushroom Detonation



Source: www.atomicarchive.com/history/cold-war/page-11.html Accessed on 24/06/2023 15:15 PM

Appendix 4: The Site of Gerboise Bleue, the First French Nuclear Bomb Test, on Feb 13th, 1960, a Week after Detonation.



Source: www.america.aljazeera.com/articles/2015/3/1/algerians-suffering-from-french-atomic-legacy-55-years-after-nuclear-tests.html Accessed on 06/06/2023 13:30 PM

Appendix 5: Radioactive Material Residues



Source: www.architectural-review.com/essays/nuclear-powers-frances-atomic-bomb-tests-in-the-algerian-sahara Accessed on 24/06/2023 15:15 PM

Appendix 6: Radioactive Material Residues



Source: www.architectural-review.com/essays/nuclear-powers-frances-atomic-bomb-tests-in-the-algerian-sahara Accessed on 24/06/2023 15:15 PM

Appendix 7: Health Diseases and Deformities Caused by Nuclear Radiation



Source:

www.aqwas.net/%D8%A7%D9%84%D8%AA%D8%AC%D8%A7%D8%B1%D8%A8-%D8%A7%D9%84%D9%86%D9%88%D9%88%D9%8A%D8%A9-%D8%A7%D9%84%D9%81%D8%B1%D9%86%D8%B3%D9%8A%D8%A9-%D8%A8%D8%B1%D9%82%D8%A7%D9%86-%D9%85%D8%A3%D8%B3%D8%A7%D8%A9/ Accessed on 24/06/2023 15:20 PM

Appendix 08: Lucien Parfait, on the Left, was Present during the explosion of May 13th, 1960 in the Algerian Sahara. He lost his left eye to facial cancer. AFP



Source: www.lefigaro.fr/actualite-france/2010/02/16/01016-20100216ARTFIG00499-les-soldats-francais-cobayes-des-essais-nucleaires-.php Accessed on 24/06/2023 15:20 PM

Appendix 9: The Chief of Staff of the Algerian Army, Said Chanegriha Meeting with his French Counterpart, Former General François Lecointre,



Source: www.24hdz.com/said-chanegriha-francois-lecointre-homologue-francais/
Accessed on 24/06/2023 15:20 PM

Appendix 10: The Algerian President Abdelmadjid Tebboun with his Counterpart Emmanuel Macron's Visit To Algeria in 2017



Source : www.lalgerieaujourd'hui.dz/le-president-tebboune-recoit-son-homologue-francais-a-la-presidence-de-la-republique/ Accessed on 24/06/2023 15:20 PM