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MEDICINA LEGAL

# **Napalm and Herbicides use during the Portuguese Colonial War**

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“My mother told me to be a lady. And for her, that meant be your own person, be  
independent”

*Justice Ruth Bader Ginsburg*

“Come you masters of war  
You that build the big guns  
You that build the death planes  
You that build all the bombs  
You that hide behind walls  
You that hide behind desks  
I just want you to know  
I can see through your masks”

*in Masters of War by Bob Dylan*

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## **Abstract**

Napalm and Tactical Herbicides (TH) gained worldwide notoriety in the Vietnam War, but this type of weaponry had already been used in previous conflicts and remains today a desired resource to achieve certain military purposes. The Portuguese Colonial War (PCW, 1961-1974) is one of those examples, but the existing information remains scarce. Thus, archives, interviews, photographs, and other sources were used to provide an in-depth description of the use of Napalm and TH during the PCW. From what we were able to ascertain, Napalm was mostly deployed in Guinea-Bissau, whereas TH were sprayed throw-out Angola and Mozambique. At the time, these weapons were not in violation of any international agreement, as they were not explicitly included in the 1925 Geneva Protocol. Since then, the path to achieve international regulation has raised important ethical issues, highlighted in this dissertation. Since Napalm is not considered a chemical but an incendiary weapon, its regulatory process took longer. International regulations currently prohibit the use of Herbicides as a method of war, and the launch of Napalm by air or against civilians. However, the use of these weapons remains a reality in the 21<sup>st</sup> century. Sometimes within the established rules, sometimes violating them.

To gather the opinion and knowledge of the Portuguese population regarding the use of Napalm and TH, a questionnaire was distributed nationwide. From the questionnaires analysed more than a half knew Napalm, and about a third knew what TH are. Respondents shown a general understanding of the negative effect of both weapons on the human health and environment, but regarding specific military characteristics such as cost, precision or conditions of use, respondents showed a lack of knowledge that can be explained by the low number of PCW veterans that participated in the study (4%). Although most of the participants disagreed with the use of Napalm and Herbicides in the PCW, some of them considered the use of Napalm for military purposes legitimate, revealing the underlying ethical dilemma.

**Keywords:** Portuguese Colonial War; Napalm; Tactical Herbicides; International War Conventions; War Ethics

## Resumo

Napalm e Herbicidas, em contexto militar, ganharam notoriedade mundial na Guerra do Vietname, porém este tipo de armamento já tinha sido usado em conflitos anteriores e permanece até hoje um meio para atingir determinados fins militares. A Guerra Colonial Portuguesa (GCP, 1961-1974) é um desses exemplos, mas a informação existente continua a ser escassa. Assim, arquivos, entrevistas, fotografias e outras fontes foram usadas para fornecer uma descrição detalhada do uso de Napalm e Herbicidas, em contexto militar, durante a GCP. Pelo que pudemos apurar, o Napalm foi mais usado na Guiné-Bissau, enquanto que os Herbicidas foram pulverizados em Angola e Moçambique. Na época, essas armas não violavam nenhum acordo internacional, pois não estavam explicitamente incluídas no Protocolo de Genebra de 1925. Desde então, o caminho para a regulamentação internacional tem suscitado importantes questões éticas, destacadas nesta dissertação. Como o Napalm não é considerado uma arma química, mas sim uma arma incendiária, a sua regulação demorou mais. Atualmente, a legislação internacional proíbe o uso de Herbicidas, em contexto militar, e o lançamento de Napalm por via aérea ou contra civis. No entanto, o uso destas armas continua a ser uma realidade no século XXI. Às vezes dentro das regras estabelecidas, às vezes violando-as.

Para recolher a opinião e conhecimento da população portuguesa sobre a utilização de Napalm e Herbicidas, em contexto militar, foi distribuído um questionário a nível nacional. Dos questionários analisados, mais de metade dos participantes sabia o que Napalm é, e cerca de um terço sabia o que são Herbicidas, em contexto militar. Os participantes mostraram uma compreensão geral do efeito negativo de ambas as armas na saúde humana e no meio ambiente, mas em relação às características militares específicas, como custo, precisão ou condições de uso, os participantes mostraram uma falta de conhecimento que pode ser explicada pelo baixo número de ex-combatentes da GCP que participaram no estudo (4%). Embora a maioria dos participantes discordasse do uso de Napalm e Herbicidas na GCP, alguns consideraram legítimo o uso de Napalm para fins militares, revelando o dilema ético subjacente.

**Palavras-chave:** Guerra Colonial Portuguesa; Napalm; Herbicidas; Convenções de Guerra Internacionais; Ética de Guerra



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## List of abbreviations and acronyms

<b>CCE</b>	Companhia de Caçadores Especiais
<b>CO</b>	Carbon Monoxide
	Convention on the Prohibition of Military or Any Other Hostile Use of
<b>ENMOD</b>	Environmental Modification Techniques
<b>EPA</b>	United States Environmental Protection Agency
<b>EU</b>	European Union
<b>FNLA</b>	Frente Nacional de Libertação de Angola
<b>FRELIMO</b>	Frente de Libertação de Moçambique
<b>MPLA</b>	Movimento Popular de Libertação de Angola
<b>NATO</b>	North Atlantic Treaty Organization
<b>PAF</b>	Portuguese Armed Forces
<b>PAIGC</b>	Partido Africano para a Independência da Guiné e Cabo Verde
<b>PCW</b>	Portuguese Colonial War
<b>PIDE</b>	Polícia Internacional e de Defesa do Estado
<b>TH</b>	Tactical Herbicides
<b>UN</b>	United Nations
<b>UNITA</b>	União Nacional para a Independência Total de Angola
<b>UPA</b>	União das Populações de Angola
<b>US</b>	United States
<b>VW</b>	Vietnam War
<b>WHO</b>	World Health Organization
<b>WWII</b>	Second World War

## Introduction

This dissertation falls within the scope of the master's degree in legal medicine. Despite existing countless research works about the PCW, to our knowledge this is the first in-depth research about the use of Napalm and TH by the PAF. Most of the information regarding this subject is still overlooked in the national and international archives. Due to the lack of information available to the general public, it is true to assume that the Portuguese population may not have an understanding about the use of both weapons in general and in one of the most important military conflicts of Portugal's history – the PCW. Also, if information is not available, individuals cannot form their own opinions on a given subject, being paramount to make the information available to everyone.

Thus, this dissertation has two main objectives:

1. Describe the use of Napalm and TH in the PCW, since there is lack of previous knowledge on this topic
2. Discuss the extent of knowledge and opinion of the Portuguese population, regarding the use of Napalm and TH in general and in the PCW

This dissertation it is divided in six chapters. The first chapter gives a general overview of Napalm and TH, to explain, their concept, military advantages, human and environmental consequences, and their use in military conflicts. The second chapter aims to briefly explain the factors that led to the PCW, to describe the war in the three war frontiers and the way it ended. The third chapter includes the analysis of over a thousand archival documents, including photographs, interviews, and books, to describe the use of Napalm and TH in the PCW. The fourth chapter sheds a light on how Napalm and TH international regulation came into fruition and describes their usage in the 21<sup>st</sup> century to reflect on their regulation and consequences, in the form of an ethical discussion. The fifth chapter presents the introduction, methods, results, discussion, and conclusions of the questionnaire distributed to the general Portuguese population. Lastly, the sixth chapter, contains the final considerations, to give an insight of the study's limitations, an idea of future research works and a general conclusion.

## **Chapter I - An overview of Napalm and Tactical Herbicides**

### **Chapter Overview**

This chapter aims to give a general understanding of the two military weapons implied in this research work. Thus, the purpose lies in describing all aspects of Napalm and TH, such as their history, concept, formulas, military advantages, and implications they might have on the environment and human health, as well as their moral significance.

### **Napalm: an introduction**

#### **Napalm's concept and formula**

Napalm is a mixture between a gelling agent and gasoline or diesel, forming a highly flammable sticky gel, that adheres strongly and quickly to most surfaces. It can be used in firebombs or flamethrowers against human and environmental targets. ("Napalm" n.d.; Neer 2015)

The name Napalm came from the junction of its two original constituents: the naphthenic acid and the palmitic acid. However, since its invention the formula suffered several changes. After the Korean War, Napalm's formula did not contain naphthalene or palmitate anymore, instead polystyrene and benzene were mixed with gasoline to form a safer formulation called Napalm-B or NP2. The constituents were different, however, the concept was the same: to mix gasoline and a thickening agent, to give gasoline a more viscous form to adhere more easily to the surfaces while burning. The new version of Napalm was especially advantageous, due to the usage of polystyrene to control the ignition, making it less hazardous. Napalm-B cannot be ignited with a match, or sometimes not even with a hand grenade, instead its use normally implies an ignition with white phosphorous or thermite, which is a mixture of a metal powder (aluminium powder) and a metal oxide (iron oxide), that produces a chemical reaction with a tremendous amount of heat. Thermite has the characteristic of burning without an oxygen source, this means it can also burn underwater, which can add to the devastating effects of Napalm. (Pike 2011; "Incendiary Materials" n.d.; "Thermite Nanoparticle Technologies Combustion Synthesis : Principles and Applications Combustion Synthesis : Principles and Applications," n.d.)



## **Incendiary Weapons throughout history and the origin of Napalm**

The fear of fire is a primitive instinctive of animals and humans. The animals run away from it and humans, who experienced burns know how the pain can be dreadful, even more the pain of being burned alive. It was within this context that fire has been used as a weapon since the dawn of time, due to its efficiency and its psychological effect. (Neer 2015)

The use of incendiary weapons dates to a few centuries BC, being documented its use by Indians and Assyrians that utilized flaming arrows and pots with blazing material. There are also references to this type of weaponry in several ancient myths and iconic books, such as Hercules or Sun Tzu's "Art of War", that explains five ways to attack the enemy with fire. Besides the use of fire, liquid and gel incendiaries also have a long history of (mis)use. The first recorded military attack with liquid fire was suffered by the Romans. The enemy army poured a flaming substance onto the soldiers, that was able to adhere to their bodies, being very hard to extinguish with water. After this episode, several armies incorporated incendiary liquids into their military arsenal. Centuries later the Byzantines developed the "Greek Fire" (a semi-liquid substance, composed with sulphur, pitch, dissolved nitre and petroleum, boiled together and mixed with other materials), an incendiary weapon projected through a tube (siphon) by a pump system. This was subsequently adapted to ships and then to be carried manually by soldiers. Around 1200s liquid fire declined in importance as gunpowder became popular, since it had a better precision in close range. New experiments with incendiary weapons only happened in the 19<sup>th</sup> century and despite of the improvement of its accuracy, other limitations persisted. (Mayor 2003; Tzu 2015)

During the First World War, a substance-like Napalm was used in flamethrowers by Germany and the US. However, it was not very efficient, since it burned out to quickly. The problem was the amount of gasoline used. This substance alone splashes off, during impact and flows away from the target like water. It was needed a thickening agent to prevent the splashing and to adhere better to the target. ("Napalm" n.d.)

In the WWII, US used natural rubber to jell gasoline, which allowed the substance to stick better to the target, burn longer and to be shot through flamethrowers much further and more precisely. However, when the war entered the Pacific, natural rubber was in short supply, so a new solution needed to be found. ("Napalm" n.d.; Neer 2015)

In the same military conflict, Germany launched incendiary weapons against Great Britain (London Blitz). The conclusion was that new incendiaries produced more damage than previous conventional explosives. This information raised the interest of Louis Fieser, a chemistry professor at Harvard University, that was searching for a better and cheaper formula of incendiary gels to be used in military conflicts. (Cox 2000)

The solution for the development of a thickening gel was found, after many failed attempts, on valentine's day of 1942, at Harvard University, when Fieser's research team combined aluminium palmitate, gasoline, aluminium naphthenate and sawdust, to form what would be known as Napalm, in its original formula. This substance was formulated to be used in bombs and flamethrowers, since the two main original constituents, palmitic acid and naphthenic acid, turn gasoline into a thick substance, which burns at high temperatures, more slowly and precisely.

Napalm is an advantageous upgrade from the other incendiary weapons. It spreads further, adheres to the target better, burns for longer periods of time and is safer, meaning it is detonated far below the airplane and does not splash out until it reaches the target. (Fieser 1964; "Napalm in War" n.d.; Baxter 1946)

### **Napalm throughout military conflicts**

Napalm has been present in the most significant military conflicts since the WWII when it was used for the first time by the US Armed Forces against Japan. After this military conflict, the creator of Napalm decided to reveal its formula to the world, since acquiring and mixing the products was very simple and cheap. (Neer 2015)

Even though, Napalm appeared late in the WWII, the allied forces made an extensive use of it in the form of flamethrowers and firebombs. It was used for the first time in combat in Sicily, when the US troops launched Napalm on wheat fields where presumably Germans were sheltered. Attacks with this weapon continued across Europe, especially on German soil, where it is estimated that some 20000 Napalm bombs were dropped. However, Europe was not the only territory victimized by Napalm. (Kleber and Birdsell 2003; Frank and Shaw 1968; Morison 2002)

In 1944, US troops bombed Japanese cities. The firebombs were launched from airplanes, at low altitude, which could damage an area of 2090 m<sup>2</sup>. A great part of Japanese territory was burned by Napalm, due to the fact that most Japanese houses were built with wood, facilitating the spread of fires. ("Napalm in War" n.d.)

The bombings were so persistent, the US Office of Scientific Research and Development concluded, *"(...) indeed if the supply of incendiaries at the bases in the Marianas had not run short, the 21<sup>st</sup> Bomber Command might possibly have brought Japan to surrender before the August raids on Hiroshima and Nagasaki"*. (Baxter 1946; Sherry 1987; LeMay and Kantor 1966; Ortensie and Wolk 2011; Spangrud 1987)

In fact, Napalm was the second most effective weapon in the WWII, only followed by the two atomic bombs launched in Japan. Nevertheless, it stood as a military achievement, since the thousands of Napalm bombs launched during the last two years of

war were about 5000 times less costly than the two atomic bombs used. This was a remarkable accomplishment, since a much cheaper weapon almost brought Japan to surrender. As (Neer 2015) pointed, “*the Bomb got the press, but Napalm did the work*”. (New York Times 1945; Neer 2015)

After the WWII, Greece was the first country to use Napalm, provided by the US, against communist positions. Around two years later, Napalm was used in the Korean War, this time in much greater quantities. This weapon was extremely useful against any kind of improvised shelters, which the enemy used to hide. Despite Napalm’s disadvantages, such as failures of achieving the target, because of extremely low-altitude flights, the bomb not being well armed on the airplane or other technical problem, the advantages of using Napalm surpassed what could go wrong, eventually. (Wittner 1982; Neer 2015; “Napalm in War” n.d.)

After the Korean War Napalm-B was created. The improved version of Napalm made its debut in the VW, where the military usage of this weapon and its negative consequences became known by the entire world. This turned into a symbol of the cruelty of war, with images of burned victims, circulating on newspapers all over the world, putting this weapon on the centre of moral judgement for years to come. It was a motive of protests and the “cherry on top”, to represent everything which was wrong with the VW. From 1963 to 1973 about 388000 tons of US Napalm bombs were used in Indochina. (*The Times* 1964; Buckley 1967; Gravel 1971; Neer 2015)

However, concomitantly to this war and after it, Napalm was used in other military interventions. For instance, Israel used Napalm in the 60s and 80s in Lebanon. European Air Forces made an extent use of Napalm during the colonialism wars, such as France in Vietnam and in Northern Africa and Great Britain in Africa, against a rebellion in Kenya. In the 70s, Brazilian Armed Forces used Napalm to clean-sweep a mountain region. In the 80s, in the Falklands conflict, Argentine delivered Napalm against British positions, at least once. In the 90s, Bosnian Serbs attacked the Bihac from Croatia, using Napalm and the United States Marine Corps utilized Napalm during the Persian Gulf War. In the late 90s, Turkey attacked Kurdish villages in Northern Iraq, with the help of Napalm. (“Napalm in War” n.d.; *The Los Angeles Times* 1970; Shannon 1974)

In 2003, it was reported the use of Napalm, during the Operation Iraqi Freedom, as US Marines were fighting their way to Baghdad. The US Department of Defence denied the use, since Napalm’s formula was not the same as used in previous military conflicts, being mainly composed of kerosene-based jet fuel. Even though, the definition of Napalm stands as: “*powdered aluminium soap or similar compound used to gelatinize oil or gasoline for use in napalm bombs or flame-throwers*” and “*the resultant gelatinized substance*”. Later, Marine pilots and Commanders confirmed the use of Napalm with the new formula

described above. About this situation the director of the military studies group GlobalSecurity, commented saying, "*you can call it something other than napalm, but it is still napalm. It has been reformulated in the sense that they now use a different petroleum distillate, but that is it.*" ("Napalm" n.d.; Buncombe 2003)

### **Military advantages of Napalm**

Napalm is considered a conventional incendiary weapon, which is used to attack military and civilian targets and to serve as a defoliant.

In fact, Napalm can be used as firebombs or as flamethrowers, to clear an entire forest. Its use as a defoliant is important to deny the enemy of coverage and to provide a way of removing the enemy for the Armed Forces to attack. Military conflicts, such as the VW, were fought in adverse territorial conditions, with dense forests. This geographical characteristic hindered the Air Force, due to their lack of visibility on the target and the troops who fought by land, since dense forests with great hiding spots, allowed a hiding place for guerrillas and ambushes. Napalm, due to its incendiary gel characteristics, allows to set fire to a great area of forest quickly, so that the soldiers can then attack. This defoliant characteristic also allows Napalm to be used in flamethrowers and to burn vegetation that is on the way of the soldiers. (Neer 2015; Pike 2011; "Napalm in War" n.d.; Sterling, Hurley, and Minh 2006)

Due to burning at high temperatures, Napalm can be also used as an anti-tank ammunition or to burn enemy's warehouses, coverage, villages and entire cities. When used at these terms, Napalm may have a strong psychological effect on the enemy, because the intuitive human reaction is to run from the fire, causing the enemy to not fight back and to retreat. Some testimonies of US Commanders said they used Napalm for its psychological effects, since the enemy felt defeated right away and surrendered. Napalm was also used to destroy the enemy's crops, in order to starve the population and make them surrender. (Sterling, Hurley, and Minh 2006; Rotc 1961; Futrell 1983; Bullene 1952; Degirmencioglu 2010)

Finally, in a more technical aspect, Napalm does not require extreme precision to be launched as a flamethrower or dropped as a firebomb, since generally the target is a great area and Napalm adheres quickly to it. This particularity can be useful in adverse climate conditions, since the visibility is reduced, the precision does not have to be perfect and it is very hard to extinguish with only water. The last characteristic, that allows Napalm to be used worldwide, is the simplicity of its formula, with ingredients that can be found anywhere and are extremely cheap, when compared with other weapons and when it is taken in consideration the destruction Napalm provides. ("M1 / M1A1 Flamethrower

Portable Infantry Flamethrower” 2018; Bullene 1952; Hollingsworth 1951; Fieser 1964; LeMay and Kantor 1966; Neer 2015)

### **Environmental, Legal Medical Aspects and Moral implications of Napalm**

The great amount of Napalm, used over the years in military conflicts, was not innocuous to the environment. In fact, solemnly on the VW a great quantity was used. A study conducted in the Luói Mountains in Central Vietnam, that provided shelter for the Vietcong and had important routes for their provisions, served as a battleground for about fourteen years. Napalm and its consequent fires, meant that great areas of the forest were affected, causing moderate deforestation and a long-term alteration of the environment. However, the impact of Napalm on biological communities, has limited data and testimonies to know its full extent. (Robert 2016)

On an UN report of 1973 the experts cited the specific effects of fire on the environment. Firstly, large-scale fires may have long-term effects, such as destruction of roots that maintain the soil intact, affectation of the density of the soil, its water storage capacity and aeration. All these factors can promote the incapacity of the soil to acquire and retain its nutrients, which in extreme cases can lead to soil erosion and infertile lands. Another downside of wildfires is the destruction of native plant species and the invasion of non-native plants, which may lead to colonization by different animal species, such as insects, that can introduce new diseases on humans and animals.

Secondly, an uncontrolled fire in a rural area may cause destruction of crops and consequently loss of harvests and with it the livelihood of the population depending on them. However, in the long term, it is hard to predict if damages, such as the soil erosion and crops destruction, which are not the objective of the incendiary weapons, are irreversible. (Aisida et al. 1973; Sterling, Hurley, and Minh 2006)

In terms of human consequences, a group of governmental consultant experts wrote a report in conformity with the UN General Assembly resolution 2852 (XXVI) of 1973, entitled “*Napalm and other incendiary weapons and all aspects of their possible use*”. According to it, Napalm may kill or harm by asphyxiation, poisoning, or immolation. When a Napalm bomb is deployed a combustion reaction happens due to the oxygen in the air. The resulting product is a large amount of CO, which is extremely toxic to humans, due to its high affinity to bind with haemoglobin, the carrier of oxygen in the blood. This substitution of oxygen in the carrier for CO can lead to asphyxiation, due to the lack of oxygen transported to the tissues. This may also mean that small quantities of inhaled CO can provoke death in a matter of minutes. When it is not deadly, the exposure to this substance can lead to impairment of the nervous system and the heart. Also, toxic effects may come

from the substance, which helps to ignite Napalm, such as white phosphorus or thermite. (Aisida et al. 1973)

Furthermore, Napalm burns at a very high temperature, warming up the air between 800°C and 1200°C. Consequently, Napalm victims may experience respiratory burns, due to inhalation of large quantities of hot air and combustion products. The high temperature can damage the respiratory track and lung tissues, which can lead to infections and asphyxiations, due to the destruction of the tissues that regulate the intake and uptake of oxygen and carbon dioxide.

In terms of the burns, most victims do not require medical aid, since they succumb rapidly, due to asphyxiation, poisoning and heavy deep burns. The survivors perish, frequently, between the first thirty minutes and twenty-four hours. Napalm burns are characterized by their combination of depth and multiplicity all over the body. One of the motives for this is the human instinctive reaction to extinguish fire with water or by removing their clothes. Both attitudes aggravate the burns, since Napalm's ignition substance may burn without oxygen, which means that can burn underwater, warming up the water surfaces close to the targeted area. Also, by removing clothes, Napalm spreads all over the body, including the head. Some testimonies from the VW indicate that about 25% of body surface is burned and half of that area has fourth degree burns.

The Napalm burns can create infections and a state of shock, which happens when tissues do not have access to blood circulation, making it difficult to supply oxygen to organs such as the brain, heart, liver and kidneys. Napalm victims may exhibit two types of shock. Neurogenic shock, that happens due to sudden emotional stress after the attack, and hypovolemic shock, when the blood volume decreases due to the loss of plasma in extensive burns, which may result in the need for a transfusion. Additionally, Napalm's victims can suffer from anaemia, due to the destruction of red blood cells on the burn sites and kidney failure.

Moreover, the extensive burns may lead to serious infections and with it the consequent growth of bacteria on the damaged tissues. When the bacteria enter the blood circulation it causes a generalized sepsis, which is one of the main causes of death. In fact, the treatment of a Napalm victim requires a major organization of facilities, supplies and medical personnel, which can be difficult to find in war circumstances. (Aisida et al. 1973; Guldner and Knight 2019)

A person who survives during the first day, may expect a 30 to 40 days of critical condition, where is susceptible to malnutrition, infections, other complications and even death. They will require constant metabolic support, nutritional supplements, skin grafts, additional skin surgeries for reconstruction and rehabilitation. Apart from the physical treatment, the surviving victims must necessitate emotional support through the painful

phase of the treatment and to deal with their deformities and disabilities for the rest of their lives. (Guldner and Knight 2019; Aisida et al. 1973; Neer 2015)

Lastly, Napalm and its moral aspects arose into public conversation mainly during the VW. The public discussion came from the numerous descriptions and photographs of Napalm victims, that provided another proof of the horror of war. The opinion diverged between the people who agreed with the use of Napalm in war conflicts and the people who did not agree. The group who agree with the usage of Napalm acknowledged that in a) war any weapon is valid; b) Napalm is a highly precise weapon; c) its ingredients are common and cheap; d) its use cannot be controlled; e) it is a weapon that causes a negative psychological effect on the enemy, which in some cases may help shorten the war, with the enemy surrender. On the contrary, other people considered Napalm an unethical and inhumane weapon, due to a) its high temperature on deployment; b) the amount of damage done from a single bomb on villages, cities and people; c) the high number of civilian casualties, since it was extremely hard for the Air Force to know if there were no civilian in an area; d) the severity of the wounds, prolonged treatment needed and the indiscriminate pain and suffering caused. The images of burned victims provoked disgust in the population, since people considered being burned alive an extreme cruelty. (Bullene 1952; Neer 2015; Sang-Hun 2008; Stevens 1952; Sheehan 1966; Sullivan and Zaroulis 1985)

## **Tactical Herbicides: an introduction**

### **Tactical Herbicides' concept and formulas**

The TH are chemical compounds, which the main purpose is to provoke disruption of agricultural food production and to damage or kill plants which provide cover or concealment to the enemy. TH are not intended to harm human beings or to destroy human-made structures. ("Disarmament Treaties Database: Convention on Environmental Modification Techniques (ENMOD)" n.d.)

These chemical substances are organized according to selectivity and modes of action. The selectivity is divided in selective, that target specific plant types and nonselective, that target all the plants. The modes of action are divided in four categories: contact, translocated, soil sterilizer and pre-emergence. In the first category are the Herbicides that need a physical contact with the plant to be effective. In the second, the Herbicide acts on the plant when it is absorbed by its leaves or stalk. The third comprehends the Herbicides that sterilize the soil, so that it cannot support life. The fourth type are the Herbicides that damage plants before their germination.

In terms of the delivery system of the TH they can be split between two systems: ground-based and aerial spray. In the first, Herbicides are placed on the exact spot of the target, minimizing the drift by the wind. They can be simply used as hand spray or the spraying equipment can be inserted on a truck to cover the desire areas. However, the wind affects greatly the spread of the Herbicides. The second delivery system happens through aircrafts equipped with thousands of litters of Herbicides, that allows a great area to be sprayed quickly. The great human hazard may go to the pilot of the aircraft, since he needs to fly in low-altitudes and in stable and calm conditions, which is hard in war circumstances. (Corps 1996)

Below it will be presented five Herbicides used in military context, to provide examples of how TH may work. During the VW until the current days, these substances provoked an immense discussion about their long-term effects on human beings and the environment, that will be better explained further on this chapter.

### **Tetrachlorodibenzo-p-dioxin**

Dioxins present identical structure and toxicity, varying on their potency. The dioxin isomer 2,3,7,8-tetrachlorodibenzop-dioxin, known as TCDD is the most toxic dioxin on humans, it is even classified as a carcinogen by the EPA. This chemical substance is formed as contaminant in the synthesis of 2,4,5-trichlorophenol (2,4,5-T), due to the lack of temperature control in 2,4,5-T production (a constituent of Agent Orange, a herbicide heavily sprayed in the VW). The human exposure to dioxins happens mainly towards the food supply system, industrial processes, usage of products contaminated with dioxins and waste disposal of these substances. (Ngo et al. 2006)

In terms of the mechanism of action, the only discovered so far is: when TCDD enters the cell it interacts with an intracellular protein, the ah receptor, which carries TCDD to the nucleus, where this complex can interact with specific sites of DNA, which may have an impact on the regulation of the DNA expression and consequently altering cellular activity and genetic expression. These biological modifications may induce responses, such as cancer or birth defects.(Fallon et al. 1994)

### **2,4-dichlorophenoxyacetic acid (2,4-D)**

This chemical compound is one of the oldest Herbicides in use and it is present on more than a thousand Herbicide mixtures. 2,4-D it is used as a systemic herbicide with the purpose to selectively kill the desired plant, not damaging the others around them, to control



the growth of vegetation on a certain area. This purpose is achieved by the absorption of the herbicide through the leaves. This substance mimics the natural vegetal growth hormone auxin, which results in uncontrolled growth of the plant and ultimately its death.(Song 2013)

Moreover, 2,4-D is easily absorbed by the soil and by the roots and leaves of the plants. In humans, these chemicals are rapidly absorbed orally, but are slowly absorbed through the skin. Several studies even agree that, when inhaled, they have a rapid absorption by human beings. Lastly, like, TCDD, 2,4-D effects are not innocuous. Despite 2,4-D having low toxicity on humans, some studies indicate fertility problems and abnormal sperm in men, to people greatly exposed to this Herbicide and higher cancer risk. (Fallon et al. 1994)

### **2,4,5- trichlorophenoxyacetic acid (2,4,5-T)**

The 2,4,5-T is a synthetic auxin developed during the WWII, to control the growth vegetation, by defoliating them. During the VW and the Malayan Emergency, 2,4,5-T was used extensively in the form of Agent Orange. 2,4,5-T commercial formulation contained TCDD as manufacturing contaminant. During the 70s, the use of 2,4,5-T was forbidden by several departments of the US government, due to the hazardous toxicity of TCDD for the human health and the environment in the long term. (Fallon et al. 1994)

### **Cacodylic acid**

Cacodylic acid is an organoarsenic compound, which works as a non-selective and postemergence contact herbicide. This chemical substance was greatly used during the VW as a defoliant. It was a part of Agent Blue (Phytar 560-G), which is a mixture of cacodylic acid and sodium cacodylate. In terms of the human health, cacodylic acid is extremely toxic by ingestion, inhalation, or through skin contact, since cacodylic acid contains arsenic. This is classified as a carcinogen to humans by the International Agency for Research on Cancer. (Fallon et al. 1994; "Arsenic and Cancer Risk" 2019)

### **4-amino-3,5,6-trichloropicolinic acid (Picloram)**

Picloram is a systemic herbicide used to control broadleaf and woody plants. Picloram together with 2,4-D formed Agent White, commercially known as Tordon 101, an Herbicide used during the VW. Even though large quantities were deployed during this

military conflict, little is known about Picloram's toxicity. Due to the lack of scientific data of human intoxication the symptoms of acute exposure are difficult to characterize. Nevertheless, the occupational exposure is limited due to its moderate toxicity to the eyes and skin. In terms of the environment, this chemical substance is not absorbed by the soil, so it may contaminate groundwater. ("Picloram" 2019; Fallon et al. 1994)

### **Tactical Herbicides throughout history**

The modern-day Herbicidal Warfare research began during the WWII. The early discoveries led to the knowledge of plant growth regulators, also known as phytohormones (low concentration signal molecules), which control all aspects of growth and development of the plant. Throughout the 40s over one thousand Herbicides were synthesized and the research of the defoliant characteristic that allowed removal of heavy vegetation was further investigated in order to be used in military conflicts. The chemical substances with defoliant properties were tested and evaluated for their availability, effectiveness in low dosage, cost, manufacture, toxicity on human beings and animals and their storage and corrosive properties. If the Herbicides passed this phase, they would be tested on vegetation by being launched out of an airplane. This research's goal was to standardize the Herbicides.

Besides this, military personnel had some concerns about the use of Herbicides. Some questions rely on how the aircrafts would pass through enemy occupied areas in low flights to deliver the Herbicides, without being shot down; what was the appropriate Herbicide for a specific vegetation; and what conditions were optimum in order to spray an area with Herbicides. Additional research should be performed. In the early 60s, the areas previously sprayed with Herbicides were re-examined. The results showed almost no signs of regrowth and, although the vegetation in some areas had recovered, visibility had improved greatly. (Chappell 1997; Mauroni 2006; Stoett 2000)

In 1961, the US Department of Defence directed the first field tests in Vietnam, with 2,4-D and 2,4,5-T, the Herbicides that would be disseminated the most in the war. These field tests had the purpose of optimizing the chemical concentrations, methods of delivery and the defoliant concept. However, the results were not conclusive, and the opinions were mixed. Between 1964 and 1965, another test program began in Thailand to evaluate the aerial effectiveness of the Herbicides 2,4-D and 2,4,5-T and other chemicals on a vegetation like Vietnam. The results were promising to defoliate an area, showing that 2,4-D and 2,4,5-T were effective for a more complete and longer defoliation, when used in greater quantities.

Lastly, in different tree species the duration and degree of defoliation varied and the complete defoliation of an entire forest with mixed types of vegetation was not possible. The

British herbicidal research and their use in the Malayan Emergency paved the path for the US to continue the research and development of Herbicides, including Agent Orange that would be later used in the VW and other military conflicts. (Fallon et al. 1994; Stellman et al. 2003)

### **Tactical Herbicides in military conflicts**

The first official deployment of Herbicides in a military conflict happened during the Malayan Emergency. The British Army, which had stocked up on trioxone (an herbicide similar to Agent Orange composed mainly by 2,4,5-T and 2,4-D) deployed it for the first time in 1953, in order to deprive the communist insurgents of cover and food. By this time, the manufacturing process of 2,4,5-T, implied its contamination with TCDD. However, the UK government affirmed those chemical substances were harmless to the human body and the environment. These Herbicides were considered a decisive weapon in countering the insurgency, due to the difficulties of visibility and military machinery operation in the dense tropical jungle. (Weir 2014)

Even though, the US herbicide research initiated in the WWII and proceeded even in the Korean War, the first American military usage of these chemical substances happened during the early 60s in the VW. During the war, US Armed Forces created the herbicidal warfare program "*Operation Ranch Hand*", in which the US Air Force used aircrafts specially equipped with tanks full of Herbicides to be sprayed. Each tank had the capacity to hold 4m<sup>3</sup> of Herbicides and the aircrafts could spray an area of 16km long in less than five minutes. In the ten-year period of the operation about 76000 m<sup>3</sup> of defoliants and Herbicides were sprayed in rural areas of South Vietnam, to deprive the Viet Cong of food and vegetation cover. These chemical substances sprayed were fifty times more concentrated when comparing with the normal agricultural usage. Most Herbicides used in the VW, like Agent Orange, were manufactured by Monsanto Corporation and Dow Chemical. Other greatly used Herbicides include Agent Blue, primarily used in agricultural food crops and Agent White, used often when the Agent Orange was not available. (Stellman et al. 2003; Fallon et al. 1994; Buckingham 1982)

Furthermore, the use of TH it is not exclusive from the 20<sup>th</sup> century. In 2014, the Israel military sprayed the Gaza Strip on its eastern border with Herbicides. A great area of agricultural cultivation was lost and consequently Gaza farmers lost their livelihood. Two years later the Israeli Ministry of Defence officially confirmed the spray in the Israelis security border near the Gaza Strip, and the deployment of Herbicides (glyphosate, oxyfluorfen and diuron) at least thirty times from 2014 until 2018 and during three consecutive days in January 2020. The wind direction can easily transport aerial Herbicides away from the

targeted area, if control drift measurements are not taken into account, jeopardizing, in this case, the Gaza farmlands. (Weizman et al. 2020)

### **Military advantages and the Environmental, Legal Medical Aspects and Moral implications of TH**

The use of Herbicides in a war scenario possess several military advantages. For instance, the Herbicides can be used to kill vegetation on specific sites in order to provide more security, such as landing zones, communications complexes and supply areas. They also may be used to kill a large area of vegetation, so that roads and infrastructures are built for the various military programs.

Moreover, the defoliation of great areas of dense forest is one of the main uses of TH and it is one of the primary means to obtain a better visibility overall. In this case, defoliation enhances security by killing vegetation surrounding roads, trails, allies base camps, airfields, and waterways, reducing possible enemy ambushes and defending against enemy fire. Defoliation can improve military intelligence by enhance air and ground visibility on the targeted area and consequently to plan operations with more accurately maps. Furthermore, in areas where Herbicides are used, they have showed reduced enemy resistance, due to the more exposure of the enemy. Lastly, Herbicides may jeopardize enemies' food crops, adding to their vulnerability and may also be used to improve the movement of ally supplies by defoliating vegetation on surrounding pathways.(Corps 1996)

In terms of the environmental effects, it is difficult to find registry of forest areas that served as battleground or testing areas for TH. Nonetheless, it is known that a higher concentration of Herbicides and its repeated deployment caused, in some cases, the eradication of the vegetation of an area, consequently new plant species populate the forest, making it difficult for the native species to regenerate, in consequence the habitat of several animals changes. Thus, native animals either perish due to direct spraying of Herbicides or migrate to other areas, causing new species to repopulate the targeted area. In addition, areas sprayed with Herbicides had fewer animal species, when compared with the non-sprayed forests. Also, defoliation of the vegetation causes soil erosion, making it very difficult and sometimes impossible the regeneration of vegetation. Besides this, some Herbicides can be absorbed by the soil and settle and sediment there, which is the first step to enter in the food chain through animals. Similarly, they can reach aquifers and rivers contaminating fishes and other animals who feed in those areas. ("Vietnam: War and the Environment" 1993; Sterling, Hurley, and Minh 2006; Robert 2016; Fallon et al. 1994; Furukawa et al. 2004)

In terms of the impact of the Herbicides in the human health, a lot more research needs to be conducted, to understand the true pharmacokinetics of the various types of Herbicides in the human body. However, with the great deployment of Herbicides in general and Agent Orange in particular, with its constituent TCDD, some war veterans and civilian population of the VW began to associate certain diseases, such as several types of cancer, and Parkinson's Disease, due to the use of herbicides in the war. (Fallon et al. 1994; "Diseases Related To Agent Orange" 2020)

However, at the time, few scientific papers contained credible herbicidal exposure measures and few studies exist about the long-term effects of these substances on the human health. In order for war veterans to receive compensation, non-related studies with the VW were used, since the data available on military context was and still is very scarce, regarding the causation between the disease and the herbicidal exposure. (Stellman and Stellman 2018)

Regarding TCDD, laboratory studies conducted in the 70s found it to be teratogenic in mice, in terms of humans is not known the dosage which causes birth defects or even the lethal dosage. Another research paper concluded that the presence of TCDD in breast milk directly from Agent Orange, may not cause transgenerational effects, since evidence showed that TCDD from breastfeeding does not persists in adulthood. Studies note that it is important to confirm the source of contamination with TCDD, since it may occur through other sources, such as industrial activity or waste disposal. (Fallon et al. 1994; Scialli, Watkins, and Ginevan 2015)

Furthermore, the possible herbicidal effects on the military and civilian population in war context needs to be further explored, since the majority of the information available nowadays relies in literature with non-accurate exposure methodologies and misclassification. (Stellman and Stellman 2018)

Lastly, a great moral concern arose in the 60s and 70s regarding the strong use of TH mainly because of the higher quantities used and great journalist coverage worldwide. During the 70s, people began to develop an environmental consciousness. The first march against climate change happened in that period. Adding this to war veterans and civilian population claims of diseases, such as carcinogenic, due to the great exposure to Herbicides in war, made the population aware of the possible short- and long-term effects of war on the environment and the human health. (Fallon et al. 1994; Kolbert 2020)

Despite the focus of the utilization of Napalm and TH and their possible consequences was in the VW. Concomitantly were happening wars that made use of that weaponry. One of them was the PCW, being this military conflict and the use of Napalm and TH in it thoroughly described in the next two chapters.

## **Chapter II – Thirteen years of war in Africa: the Portuguese Colonial War**

### **Chapter Overview**

This chapter aims to provide a general overview of the PCW, by describing the main factors that led to the military conflict, the geographical characteristics and military operations of the three African Colonies (Angola, Mozambique, and Guinea-Bissau), the end of the war, the decolonization process and the alliances forged by Portugal, during the PCW.

### **Before there was a war: the factors that lead to the Portuguese Colonial War**

In 1933, a new Constitution came into force and with-it *Estado Novo*, an authoritarian regime, led by António de Oliveira Salazar, which ended in April of 1974 with the Carnation Revolution.

In the 20<sup>th</sup> century the Portuguese Empire, built since the 15<sup>th</sup> century, was constituted by the colonies in Africa and Asia. Portugal was the country that occupied Africa for the longest time, and this proved to be one of the main reasons why the Portuguese administration, at that time, found paramount to keep its colonies: to maintain alive the past “Golden Era” of the Discoveries Period, in which Portugal colonized several countries. Besides this, Salazar viewed Africa as an economic promise, mainly since Brazil’s independence in the 19<sup>th</sup> century, and because of the under-developed Portuguese economy. It was important, for the regime, to bring back past prosperity and the commercial trades. Lastly, other main reason to keep the colonies was Salazar’s perception of territory. In 1951, he changed the Portuguese constitution to define Portuguese colonies as overseas provinces, as if Portugal was a continuous territory until Asia. In this terms Portugal did not possessed colonies. (Bethencourt and Chaudhuri 1999; Afonso and Gomes 2010; Cann 1997; Rosas 2018)

However, after the end of the WWII, the world’s perception of colonization, was different. The Letter of the UN was signed by several countries and the human rights played a central role worldwide. The countries self-determination and interdependence were growing. Portugal ended up opening itself to foreign investment, such as the US’ Marshall Plan, despite Salazar’s initial doubts. This increased public and private investment to develop the colonies and stabilize their economy. Due to larger territories and resources, Angola and Mozambique received the biggest contribution. Nevertheless, most of the profits obtained in Africa were going directly to Portugal, instead of the colonies. (Bethencourt and Chaudhuri 1999; Antunes 1995; Rosas 2018; Antunes 2013)

In fact, the unsettlement and resentment towards Portugal grew in Africa, due to several reasons. Firstly, the forced labour laws imposed exclusively by Portuguese Government since the 19<sup>th</sup> century, were reaffirmed with *Estado Novo*, in the Colony Work Code. This defended the moral and legal obligation to work. Salazar also wrote the Colonial Act, in which colonial territories are a part of the Portuguese Empire, to possess and colonize their populations. Secondly, the laws implied economical protectionism and reduced autonomy. Thus, the colonies economy was totally dependent of the Portuguese Government, that with their under-developed economy, took advantage of the established laws to explore the colonies' resources and to use cheap, and even free, work force labour. (Rabaçal 2017; Antunes 1995; Afonso and Gomes 2000)

Moreover, the colonies, mainly Angola, were rich in raw materials, such as diamonds, oil, and coffee. This attracted a substantial number of Portuguese emigrants, which caused a more evident racial discrimination. For instance, there were different buses for black and white people and different work laws. In this context, Henrique Galvão a member of the Portuguese government, even wrote, in 1947, the *Galvão* report, which denounced the atrocious working conditions suffered by the population, since the work was involuntary, with a low income or with no income at all. (Rabaçal 2017)

Furthermore, the African population was divided between indigenous and non-indigenous groups. Some of the non-indigenous population were called *Assimilados*, since they were granted full Portuguese citizenship, if they adopted the values of the Portuguese culture, once the government only accepted practices that did not represent a conflict with the Portuguese views. Some of *Assimilados* studied in Portugal, which provided them with a common understanding of the Portuguese population's lack of support towards *Estado Novo* and that Portugal had a more under-developed economy, when compared to other European countries. They truly understood how the Portuguese economy was so dependent on the colony's resources. These factors lead to the crescent revolutionary movements and to the creation of the Liberation Movements<sup>1</sup>. (Rabaçal 2017; Antunes 1995; Afonso and Gomes 2000)

On the contrary, the Portuguese Government continued with the same ideology - the colonies should be kept at all cost. Therefore, negotiations began between Salazar's regime and the leaders of the main Liberation Movements. However, Salazar was completely reluctant and even said (un)famously, "*Portugal will never agree to discuss the self-determination of its overseas territories*". With the rising tension, the continued

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<sup>1</sup> Angola: *Frente de Libertação de Angola* (FNLA); *Movimento Popular de Libertação de Angola* (MPLA); *União para a Independência Total de Angola* (UNITA)  
Guinea-Bissau: *Partido para a Independência da Guiné e Cabo Verde* (PAIGC)  
Mozambique: *Frente de Libertação de Moçambique* (FRELIMO)

discrimination, poor working conditions and a non-negotiation, a military conflict was already on the horizon. This made the Portuguese regime send PIDE, the International and State Defence Police, to the colonies which provoked massive arrests and with them an escalation of violence. (Afonso and Gomes 2010; Antunes 1995; Rabaçal 2017; Mateus 1999, 2004)

Concomitantly, the international pressure for the Portuguese decolonization augmented throughout the years. UN sent several warnings and reports, to Portugal initiate the independence process of the colonies. However, Salazar, was committed to his vision and despite his changes on the constitution. Firstly, to rename the colonies and secondly, by altering the Indigenous status, allowing it to be more liberal. This proved to be too late since the international opinion remained the same. On the other side, inside Portuguese borders, at first, the opinions were unanimous - the colonies should be kept. However, with the beginning of the war, two different types of opinions emerged. The ones who wanted to keep the colonies and the others who thought that could not be possible anymore, since the international pressure and the costs of a war already were and would be tremendous. The unwillingness to negotiate with the Liberation Movements, the arrest of whoever went against the regime views, the international isolation, and the loss of Goa (India) in 1961 intensified the desire to maintain the colonies. There was no turning back. (Rabaçal 2017; Afonso and Gomes 2010; Céu e Silva 2011)

As a result, in the dawn of 1961, after labour protests in Angola, Salazar orders the departure of the Portuguese Military. It was the beginning of a thirteen yearlong military conflict, fought by a small country, with a reduced population and backward economy in three different places, thousands of kilometres away from Portugal's mainland and thousands of kilometres away from each other in an inhospitable and tropical climate. (Rabaçal 2017; AL J Venter 2018; Antunes 1995; Fernandes 2017; Cann 1997)

### **The Beginning of the war: Angola**

As the commitment to the colonies grew, so did the local resistance in Africa. Angola was the colony with the most Liberation Movements (FNLA, MPLA, UNITA). The difficulties of uniting their visions caused internal fights and ranges of violence at the same time the war against Portuguese colonialism was taking place. (Antunes 1995; Bethencourt and Chaudhuri 1999; Mateus 1999)

Besides this, two main factors played a big role against the PAF. The first was the climate. Angola is constituted with a coastal belt; however, most of its territory is mountainous, the weather is tropical and the boarder with its neighbour Belgian-Congo is lengthy and composed by mountains, swamps, jungle and high grass (ideal for guerrilla



forces to hide). Most of the war took place in Eastern Angola and Northern Angola. The first represents a harsh climate, which alters between a dry and hot season, with settlement of dust that damages many equipment and an intense rainy season. Northern Angola has two main climates. The first, has a rainy season, when this ends, green grass covers the entire surface and provides a good hiding place for guerrillas. The second, is the cool season, in which appears as fog after sunset named *cacimbo*, optimal for attacks and escapes. (Cann 1997; Fernandes 2017; AL J Venter 2018; Bispo 2010)

The second adverse factor is the localization of Northern Angola, which borders' countries who were against Portuguese colonialism. This provided a mutual help between the countries. The localization proved to be important with the independence of the Belgian-Congo (actual Democratic Republic of the Congo) in the June of 1960, which instigated the desire of self-determination in Angola. (Rabaçal 2017)

In January 1961, at Baixa do Cassange (Northern Angola) the tensions culminated in cottonfields labour manifestations against Cotonang, a company installed in Angola since 1921, which took advantage of the low-income and free workforce laws of the Portuguese regime. The revolts arose from the gruesome working conditions since the workers could not own land and cultivate any other product than cotton. Also, the cotton collected was sold to the company at a much lower market rate. (Afonso and Gomes 2010, 2000; Cann 2011; Bispo 2010)

Some companies of CCE of the Portuguese Air Force were present in Angola since the independence of the Belgian-Congo. They tried to negotiate with Cotonang to appease the population. However, the manifestations were, already, too intense. Thus, from Lisbon departed more Air Force companies to fight against the revolt and to come to an agreement with the cotton company. From this confrontation resulted hundreds of dead people and many more injured. Despite the later change of the labour legislation, it was already late. (Rabaçal 2017; Afonso and Gomes 2010; Cann 2011; Bispo 2010)

In February occurred the assaults to Angolan Prisons, where hundreds of civilians, police and military personnel died and were injured. In March, another revolt took place at Bacongós territory (Northern Angola). The insurgents with machetes and homemade shotguns, out of anger, provoked again hundreds of casualties, some sources even say it was thousands. Later Holden Roberto declared UPA (turned FNLA in 1961) as the authorship of the attack. (Céu e Silva 2011; Mateus 2011; Rabaçal 2017; Afonso and Gomes 2010)

Since Salazar's unwillingness to decolonize continued all efforts of negotiating auto-determination, with the Liberation Movements, were in vain. Thus, he ordered the dispatch of the Portuguese Military "*To Angola, ahead and strong*", as he said (un)famously. (Antunes 1995; Rabaçal 2017; Afonso and Gomes 2010)

Despite the passing years, the internal rivalries between Angola Liberation Movements did not diminish. In 1966, Jonas Savimbi would leave FNLA to form UNITA. This last, despite being a new and different Liberation Movement, also did not get along with MPLA, which led to more attacks. These rivalries that naturally existed due to different ideologies and power hunger, were also stimulated by the Portuguese presence, which worked in their favour. (Mateus 1999, 2011; Afonso and Gomes 2010)

Nevertheless, most of the war was fought in Eastern Angola, in the border next to Zambia. When the end of the war was close, the war in Angola was in a favourable situation for the PAF. (Rabaçal 2017)

### **The Second War Frontier: Guinea-Bissau**

Not long did it take for the rest of the African Portuguese Colonies to follow the Angolan example, since they were also governed by the same laws of the Portuguese regime.

In 1959, the violence escalated in Guinea-Bissau, when a manifestation against the working conditions erupted in Pidjiguiti, which led to a massacre, with hundreds of casualties. Amílcar Cabral, leader of the Liberation Movement PAIGC, formed in 1956, later declared PAIGC was using war weapons, since the massacre made him lose all faith in a diplomatic resolution for the auto-determination of Guinea-Bissau. (Afonso and Gomes 2010; Mateus 1999)

In January 1963, PAIGC's attacked Tite's Quarter, which initiated the hardest war frontier of the African colonies for the PAF. Guinea-Bissau has geographical characteristics, which complicate the movement of troops and at the same time provides several places for enemy ambushes. The country abounds with rivers, some of which have tidal action (the land is submerged two times a day), river margins with dense vegetation, *bolanhas* (extensive wetlands), *tarrafos* (thick forests) and swampy forests. These conditions played a vital role in the guerrilla success and complicated the job for the PAF, since it demanded short military missions, which resulted in few victories. (Cann 1997; Fernandes 2017; Al J Venter 2013)

Despite the shorter territorial area and smaller population of Guinea-Bissau, they demonstrated more organization and toughness when compared with the other colonies. Portugal struggled a lot to fight back. While in Angola the three main parties did not get along and fought each other, PAIGC was highly organized and had strong military capacities, which made the war on the Portuguese side even more difficult. It is not an admiration that the PAF resorted much more to the help of the Air Force in this colony,

which was almost the only advantage that Portugal possessed, since Guinea-Bissau acquired modern weaponry, which reduced the military inequality, when compared with Angola and Mozambique. Over the years, Amílcar Cabral even used his diplomatic abilities to gather foreign support, for instances by defending the end of colonialism in the UN. (Afonso and Gomes 2010, 2000; Fraga 2004)

In 1973, the Portuguese situation deteriorated even more, when PAIGC laid down the only substantial advantage the PAF had when the party shot down a Portuguese airplane with an anti-aircraft *Stella* missile. It was the end of the Portuguese air supremacy, putting Portugal in the imminence of losing the war. Thus, the last decision made by Salazar before relinquishing power, was to recruit a war veteran, General António Spínola to lead the PAF in Guinea-Bissau. Spínola brought a more liberal approach to the military tactics. For instances, he recruited African population to what was called the African Military Units, and provided better life conditions to the local population. (Fraga 2004; Rabaçal 2017)

However, the constant refusal from the Portuguese regime to negotiate with PAIGC, first from Salazar and then by its successor Marcello Caetano, who famously declared that he preferred to “*leave guinea for military defeat with honour than for negotiated agreement with terrorists*”, led to protests, including from General Spínola. (Antunes 1995)

In January 1973 PAIGC's leader, Amílcar Cabral, was assassinated on an ambush. Despite the assassination his ideas persisted, although the party were not entirely cohesive anymore. Nonetheless, until the end of the war Guinea-Bissau remained the toughest war, that ended with a military defeat for Portugal. (Castanheira 1995)

### **The Third War Frontier: Mozambique**

In June 1960 a great massacre occurred in Mueda, northern Mozambique, when farmer workers protested the terrible life conditions and demanded the right to form cooperatives. The aftermath, according to some sources, resulted in fifty deaths, despite the Portuguese regime only confirming half a dozen. This major conflict inspired Eduardo Mondlane to form FRELIMO in 1962.(Cabrita 2011; Mateus 1999)

The war officially began in September 1964 when FRELIMO launched revolts at Chai in Delgado cape, which extended to other regions such as Niassa, Tete and Central Mozambique. The PAF would suffer their first casualties in November in northern Mozambique.(Rabaçal 2017; Newitt 1997)

In fact, Portugal struggled with the tropical climate and the nomadic and sparse populations, which were hard to patrol. Mozambique also possessed several ethnicities, with different levels of loyalty to Portugal. This imposed a challenge due to the necessity of

adjusting the psychological program to each ethnic group. Also, some of these groups did not support FRELIMO, sometimes due to ethnic rivalries. PIDE used double spies in order to create even more divergences in Portugal's favour. (Cann 1997; Fernandes 2017; Rabaçal 2017)

Opposed to Guinea-Bissau, Mozambique's weaponry was rudimentary, and they could only sustain a war against the Portuguese military with the help of neighbour countries, such as Malawi and Tanzania.

In 1968, FRELIMO's leader Eduardo Mondlane was murdered. However, the party was not weakened by this event, it was the internal party ideological differences that caused ethnic rivalries, which led to expulsions and violent deaths. The fight for power ended with Samora Machel assuming the leadership position of FRELIMO. Since he came from a traditional warrior family, he transformed the party into a disciplined one. (Mateus 1999; Afonso and Gomes 2010)

As expressed before the Portuguese soldiers were not enough to patrol the entire territory, this included Tete region, where FRELIMO settled, and which gained the name "White Cemetery". In December 1972, the population of Wiriamu, in Tete region, would suffer one of the most atrocious massacres in the PCW. The Portuguese Military and PIDE agents massacred about four-hundred inhabitants with tremendous cruelty, with the goal of ending FRELIMO's presence in the region. During the three days that followed the massacre many more people were murdered in Wiriamu, and surrounding villages integrated in an area designated "Wiriamu Triangle". Unfortunately, this massacre was not a one-time event, more proceeded, such as the one in Mucumbura and Inhaminga in March 1974, where about two-hundred Africans died. (Dhada 2016; Afonso and Gomes 2010; Cabrita 2011)

In the last year of the war, FRELIMO attacks continued and were moving south, agitating populations of European origin, since Samora Machel did not have the same degree of mercy to the Portuguese civil population, as Eduardo Mondlane. The situation continued to deteriorate, until January 1974, when the white population of Pery and Beira villages protested the incapacity of the PAF to sustain the situation, now that they could not have more reinforcements. They felt abandoned and demoralized which could be an indicator of the unpopularity of the military conflict. (Newitt 1997; Rabaçal 2017)

### **Fighting for a lost cause? The end of the war and the decolonization**

By 1973 the military conflict did not have an end in sight. In that year the UN recognized Guinea-Bissau's independence, which demoralized even more the PAF. This

demonstrated the tremendous international Portuguese isolation. To add to the equation, Marcello Caetano passed a law-decree in which would delay the promotion of young Captains and prolonged the obligatory military service from two to four years. This caused tremendous bitterness in the military personnel, that led to the creation of the Movement of the Armed Forces, which played a determinant role in taking down the Portuguese government in April of 1974 in the Carnation Revolution. (Afonso and Gomes 2010; Antunes 1995)

After the instalment of a Democracy and a new government, the most important question remained to be answered: what was the future of the colonies? Despite being the main reason for the Carnation Revolution there was no consensus about their future. For instances, when General Spínola was elected President he continued agreeing with a peaceful solution for the war. However, he excluded the self-determination of the colonies in detriment of a federalist solution. This provoked divergence in the country, mainly in the left-winged parties, who saw this solution as a Salazar ideology and not coherent with the current times. (Antunes 1995; Afonso and Gomes 2010; Rabaçal 2017; Mesquita 2011; Alvarez 2017)

Alongside the left-winged parties were the UN, the Organization of African Unity, and the Liberation Movements to generate pressure to Portugal grant the independence. General Spínola increasingly more isolated, gave up fighting for his vision and before resigning he passed the enactment of constitutional law nº7/74 of July 26, which recognizes the “*right to auto-determination (...) of the overseas territories*”. The negotiations followed in the next months with the African parties recognized by the Portuguese Government: PAIGC in Guinea-Bissau, FRELIMO in Mozambique and MPLA, UNITA and FNLA in Angola.(Afonso and Gomes 2010; Rabaçal 2017; “A Descolonização Portuguesa: Uma Cronologia - Descolonização Portuguesa” n.d.)

In fact, the Movement of the Armed Forces declared ceasefire three months after the Carnation Revolution with the Decolonization Law. In August 1974, it was signed between the Portuguese Government and PAIGC the Argel Agreement, to recognize Guinea-Bissau as an independent country on September 10 and withdraw the PAF until the end of October. Even though, the ceasefire was discussed formally, it was already a reality, since PAIGC reached a military victory. The negotiations were fast and non-violent, since Portugal did not have a lot to negotiate, due to Guinea’s lack of recourses and the small European population. Despite Guinea’s independence was declared unilaterally in 1973, it was only in September 1974, that the Portuguese Government recognized it officially. (“A Descolonização Portuguesa: Uma Cronologia - Descolonização Portuguesa” n.d.; Macqueen 1998)

In September 1974, the Portuguese Government and FRELIMO signed the Lusaca Agreement, in which, the independence date was set, and a transitory government was formed. The independence was officially declared in June 25 of 1975 by FRELIMO and there were no elections for the population to choose the government. The aftermath of rushed negotiations left aspects to resolve for the Portuguese government and the escalation of violence led to a massive abandonment of the country of the white population. The next years, with protests and violence, marked Samora Machel's Government in an independent Mozambique. (Newitt 1997; Macqueen 1998; "A Descolonização Portuguesa: Uma Cronologia - Descolonização Portuguesa" n.d.)

In Angola, the independence process was different and more complex when compared with the other colonies. The Alvor Agreements initiated the independence process in January 1975. The signed agreement recognized MPLA, FNLA and UNITA as the official Angolan parties. A transitory government, among the three parties, was formed to ensure elections and the independence date was set for November 11 of the same year. It is important to remember that Angola was rich in resources and it did not take long until the three main parties initiated a war in March of 1975, due to rivalries for power. Because of the escalation of violence, in August, the Portuguese Government installed an "air bridge" to fly the Portuguese community out of Angola. With the beginning of the Angolan Civil War, the transitory government fell through and the Alvor Agreement was suspended, remaining only the independence date. (Macqueen 1998; Afonso and Gomes 2010; Antunes 1995)

When the 11<sup>th</sup> of November arrived, the Portuguese Government had to transfer the Angolan sovereignty. Since, there was no form of government in Angola, they decided to handle the power to the Angolan population. MPLA recognized itself as the government, however MPLA and UNITA confronted each other until 2002, when Jonas Savimbi, UNITA's leader was assassinated. By November 1975, arrived in Lisbon the last military from the PCW, ending a thirteen year-long conflict, which lasted for so long with the aid of forged alliances, by mobilizing about 7% of the active population and by utilizing about 40% of the General State Budget. During the conflict about 8000 Portuguese died and over 100000 were injured.(Rabaçal 2017)

## ***"Proudly Alone": Portuguese International Relations in Times of War***

### **Portugal vs United Nations**

After the end of the WWII the necessity of creating an international organization that would prevent future wars was paramount. In 1945, the Charter of UN came into full force, being their first objective "*to maintain international peace and security*". In 1955, Portugal

was accepted in the UN. Despite Salazar's ideologies did not aligned with more openness and cooperation between foreign countries, the times were changing and an adaptation to the new political scenery was necessary. However, the entrance in the UN brought to the central stage the Portuguese colonies. Evidently, the Letter of the UN previewed the self-determination of the countries. Since this not aligned with Salazar's vision, he decided to change the term colonies to overseas provinces in the Portuguese Constitution. ("Chapter I | United Nations" n.d.; Afonso and Gomes 2010; Rabaçal 2017; Pinto 2016)

In the 60s, several African countries became independent and formed a colligation that pressured and questioned often the non-self-determination of the Portuguese territories. The pressure rose and the UN's General Assembly issued, Resolution 1542, which established the overseas provinces as non-autonomous territories. From that moment, Portugal was obligated to initiate the decolonization process. However, Salazar remained reluctant and his decision was to maintain the Portuguese Empire, no matter the cost. This led to an increased international isolation, which culminated in the UN's resolution 1514 (XV), the Declaration on Decolonization, in 1960. The Portuguese regime decided to ignore all the warnings and possible peaceful negotiations and the military conflict became imminent in 1961. In this year, the UN, specially focused on the Portuguese non-autonomous territories. (Rabaçal 2017; Afonso and Gomes 2010)

During the thirteen-yearlong conflict several resolutions would be issued by the UN General Assembly, testimonies would be heard all over the world, reports and treaties would be written. In the middle of the conflict, the relations with the UN became so poor that Portugal was expelled from some UN organisms, such as the Economical Counsel and the Social Counsel, due to the violation of the Letter of UN. (Rabaçal 2017)

It was expected from foreign nations who withdrew their colonies and signed the UN Letter to stand against Portugal. In fact, the social and economic laws practiced in the colonies were a violation of human rights, not to mention a military conflict to fight for those colonies. In this context Portugal did not have much allies, most of the countries voted against it in the UN resolutions. Nevertheless, Salazar maintained his vision and even (un)famously proclaimed the Portuguese were "*proudly alone*". (Antunes 1995; Rabaçal 2017)

However, the history of the world dictates that a long military conflict cannot be supported without allies, even less a small nation with an under-developed economy. The few forged alliances proved to be crucial to achieve another day in the battlefield and to keep the Portuguese Empire alive another day.

### **The “*Racist Holy Alliance*”: Portugal, Rhodesia and South Africa**

With an increased isolation and a few foreign alliances. Portugal turned to Rhodesia and South Africa, which shared the same political ideologies against the black population. The three countries supported each other through military material and operational aid.

The independence of the Portuguese colonies collapsed the alliance. Since Rhodesia lost an important ally, Ian Smith, the governor, decided to hand the power to the black party. As a result, Rhodesia turned into Zimbabwe. As to South Africa, it took too many more years after the end of the PCW, for the white oppressor government to fall. However, losing allies grew their isolation, being an important factor to consider. (Rabaçal 2017; Newitt 1997)

### **Portugal, NATO and the United States**

It was expected, with the beginning of the Cold War, that the Salazar's regime would insist on keeping Portugal away from communist influences, in order to reinforce its alliances with the US. Thus, after the WWII, Portugal allowed the US to have access to the Military Air Base of Lajes, Azores. In counterpart, Portugal was included in the Marshall Plan, which facilitated the entrance in UN and NATO, in 1949. (Antunes 2013; “Portugal Na NATO - Delegação Portuguesa Junto Da Organização Do Tratado Do Atlântico Norte” n.d.)

Amidst the Cold War, the Kennedy administration feared the African countries would fall under communist influences of the Soviet Union, since they were receiving aid from it. In this scenario, US feared the PCW would reinforce the Soviet Union alliances with Africa, which made Kennedy decide to vote against Portugal in the UN's resolutions, finance some Liberation Movements and even proposing several plans to Portugal proceed with the decolonization, offering large funds. The Portuguese regime did not accept any possible negotiation and Kennedy's insistence with the independence of the colonies and their constant criticism infuriated Salazar. (Antunes 2013; Rabaçal 2017)

However, when President Lyndon Johnson replaced Kennedy, the American position in relation to the Portuguese situation began to shift. The main reason laid in the aggravation of the war in Vietnam. In many terms the PCW resembled the VW, for instances, in geographical terrain, weather conditions and guerrilla tactics. However, since the violence and horror, in Vietnam, were far superior than in Africa, this awakened a bigger understanding of the Portuguese situation. (Afonso and Gomes 2010; Antunes 2013)

In this context, the US administration stood on the Portuguese side in terms of supporting it with UN resolutions, and with arms supply through NATO. Despite forged



alliances with NATO partners, such as UK, France and Germany to provide weapons, the US support was crucial due to the supply of modern equipment that Portugal did not possessed, enabling Portugal to sustain their military superiority, mainly air superiority, in the three war zones. (Antunes 2013; Fraga 2004; Bispo 2010)

The modern aircrafts allowed the Portuguese Air Force to use weapons, such as Napalm and TH. Both weapons were already being used in Vietnam, and were now ready to make their first appearance in the PCW. (Fraga 2004)

## Chapter III - Napalm and Herbicides in the Portuguese Colonial War

### Chapter Overview

The aim with this chapter it is to provide an in-depth description and discussion of the utilization of Napalm and TH, during the thirteen years of the PCW, by the PAF in Angola, Mozambique, and Guinea-Bissau.

### Introduction

Despite Napalm and TH were created during the WWII, their military potential and human and environmental consequences were only known in the 1960s and 70s, becoming a standard image intrinsically linked to the VW. However, this type of weaponry had already been used in previous conflicts and remains today a desired resource to achieve certain military purposes.

The PCW seems to be a perfect example of this. During this conflict Napalm and TH were used, but the existing information remains scarce. In fact, during our research it was only possible to find two research papers on the use of Napalm during the PCW. The first contains four documents that prove its use, while the second, a master's thesis, provides a brief description of archival documents. However, in both cases Napalm is mistakenly classified as a non-conventional weapon. In the case of TH, there are no articles or books dedicated to their use during the PCW, excepting the book "*Os anos da Guerra Colonial*", where their use is briefly described. Thus, appears that most of the information remains forgotten in the military archives. (Araújo and Duarte Silva 2009; Cunha, Menezes, and Gomes 2016)

Considering the above, this chapter will focus on providing an in-depth description of the probable use of Napalm and TH during the PCW, using primary sources such as photographs, testimonies, and international and nacional archives (*The New York Times* archive, *Arquivo da Defesa Nacional*, *Arquivo Histórico Militar*, *Arquivo Histórico da Força Aérea*, *Casa Comum of the Fundação Mário Soares* and *Centro de Documentação 25 de Abril of the University of Coimbra*). Also, secondary sources such as documentaries, books and scientific articles will be used.

## Napalm in the Portuguese Colonial War

**“We made them cotton farmers, clearly by force, and now we are bombing them from the sky”: Were these the first Napalm victims in 1961?**

In chapter II of the present research work, it was explained the labour manifestations at Baixa do Cassange (Northern Angola). In February 1961, the 3<sup>rd</sup> CCE could not prevent the expansion of the revolt and Operation *Baixa do Cassange* was launched, with the 4<sup>th</sup> and 5<sup>th</sup> CCE uniting forces. The aim of this military operation was to stop the disturbance, disarm groups and protect the natives by demanding Cotonang better working conditions.

In fact, some documents and testimonies estimate that the first deployment of Napalm by the PAF happened in February of 1961 at Baixa do Cassange. However, this is not consensual in the historiography since other sources could not confirm these allegations. Thus, there are divergent opinions, regarding the first usage of Napalm in the war, that will be described below. (Nunes 2011; Cann 2011; Afonso and Gomes 2010)

A document from February 1961, allegedly contains real testimonies from the Baixa do Cassange protests. In this, it is reported the deployment of Napalm bombs by the PAF. From this, resulted a great massacre with around 5000 casualties burned by Napalm and consequently seventeen destroyed villages. According to the document the incendiary bombs were launched by PV-2 aircrafts, from NATO's Portuguese base in Montijo. (“Baixa Do Cassange’ - Massacre” 1961)

In contrast, an article published in 2011, at *Revista Militar*, entitled *A Subvelação da Baixa do Cassange*, contains the testimony of José Castelo Branco, military at the 3<sup>rd</sup> CCE, in which he affirms the bombardments with Napalm at Baixa do Cassange began only in January of 1962. Besides this, the author of the article denies the affirmations made by ex-aviator pilot José Ervedosa to a French Journal *Africasia* in 1970, where he spoke about the 5000 casualties made by Napalm. The denial comes from testimonies of military personnel involved in the Operation *Baixa do Cassange*. It is known that José Everdosa an ex-Major of the Portuguese Air Force and a strong opponent to the Portuguese regime was subjected to regular disciplinary measures, due to behaviour problems, and was even exiled in 1964. (Nunes 2011)

In an article by Professor John P. Cann, for *Revista Militar*, he confirms the use of Napalm in Angola. However, according to him this weapon was only brought there by the end of summer of 1961, when the F-84G Thunderjets aircrafts arrived. In addition, the article states that book logs of pilots were reviewed and there is no indication that Napalm was carried to the Operation *Baixa do Cassange*. Both authors of the articles indicate the

casualties of February 1961 were between 200 and 300 and no Napalm was used. (Cann 2011)

Moreover, in the book *Os Anos da Guerra Colonial*, the authors affirm the resulting casualties, of the Operation *Baixa do Cassange*, were between 200 and 300, as both *Revista Militar's* articles confirms. However, the book acknowledges the use of Napalm, carried by PV-2D Harpoon aircrafts. (Afonso and Gomes 2010)

Besides this, an article published in *Revista Porto*, about the Operation *Baixa do Cassange*, confirms the use of Napalm, through a testimony of a doctor serving in the PAF. In this it is explained that Napalm was deployed through PV-Harpon aircrafts, in dense forests and civil concentrations, in early February of 1961.(Silveira 2013; Pádua 1963)

Regarding *Baixa do Cassange*, this research work does not pretend to resolve the question, but to give a more structured contribution to this matter. Thus, it can be confirmed the use of aircrafts in Operation *Baixa do Cassange*, existing authors that affirm that some of the airplanes deployed Napalm, not being consensual in the historiography, due to the lack of concrete evidence. The historiography is more consensual in terms of the casualties which are around 200 and 300.

Furthermore, in March 20 of 1961 the Commander of the 2<sup>nd</sup> aerial region in Luanda received a letter by Chief of Staff of the Air Force, General João de Freitas, which concerned the deployment of Napalm bombs in operations against upheavals in Angola and Mozambique. According to the letter, the usage of Napalm bombs was forbidden without authorization of the Chief of Staff of the Air Force and the permission would not likely be granted. This letter between high ranks of the military, even though only received in March, it was written on 28<sup>th</sup> February of 1961, and it may serve as an evidence that the PAF were not using Napalm in Angola and Mozambique, at least, in the first trimester of 1961. ("Planeamento da Defesa de Angola" 1961)

In May, the newspaper *Pakistan Times* published an article entitled *Wave of carnage in Angola*. In this it is reported several testimonies and descriptions of the war in Angola, given at the headquarters of the Angolan Resistance Movement in Leopoldville, which is located at the actual Democratic Republic of the Congo. In fact, an Angolan said that recent airplane flights, through the forest, deployed firebombs. Moreover, some refugees brought shrapnel of Napalm bombs with them. This piece of information may align with the letter described above, in which, Napalm bombs were not deployed at least in the first trimester of 1961. ("Planeamento da Defesa de Angola" 1961; Silveira 2013)

Furthermore, on the beginning of July a British missionary and his wife witnessed a Napalm attack, some of its victims and shrapnel of the bombs, with the information written in English, meaning as the author of the document implied, that the Napalm bombs were supplied by US through NATO. Adding to this, some Angolan refugees in the Belgian-Congo

were Napalm victims and needed plastic surgery, due to the deep Napalm burns. (Davidson 1961)

However, this information contradicts what Professor John P. Cann wrote in the article described above. According to him, Napalm bombs were not deployed until the end of summer of 1961. In lack of more documents of this period, since April until August, to compare both visions, it cannot be proved with certainty that Napalm was deployed in this time period.

Moreover, an article of the *New York Times* published in August 1961, confirmed the air hegemony of the Portuguese Air Force, since the revolts of March. Also, contained a testimony from a Portuguese pilot, in which he confirms the deployment of Napalm, in enemy's concentrations in an open country. For instances, Napalm was allegedly used in the reconquer of Nambuagongo (a part of the Operation *Viriato*), located in Northern Angola, since the operation allowed well defined enemy's concentrations. (Tanner 1961)

Furthermore, in August, *Indústria Química Manquiteira*, a Brazilian company, offered several war materials to the Air Force Material Service Director. Among them were Napalm bombs from the type M2 200 kg, with igniters for land and water. However, the Portuguese military thought the bombs were expensive and decided to produce Napalm bombs on a cheaper base in Portugal. However, this matter was delayed and, only, by January 1962 Portugal required several samples of Napalm to the Brazilian Company. However, the documents analysed indicate no further decisions were taken regarding this subject. ("Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)" 1961-1964)

In notes from Ronald Waring, a British Army Officer who lectured between 1956 and 1974 at the Institute of High Military Studies, in Lisbon, he recalls contacting friends from France and Italy, who were willing to supply weapons to Portugal. However, between September and October, the material offers, among them Napalm Bombs, were declared of "*no interest*" by the Army Material Service. Nonetheless, Mr Waring affirmed sometimes a war material was considered of "*no interest*" and suddenly requested with urgency, by the military.

In late September, Deputy Secretary for National Defence sent a letter to the Air Force Chief of Staff, informing that Colonel Magalhães, which his corporate of Dr. Makay, who is the owner of an explosives factory in Brazil, contacted the Air Force to supply material, such as Napalm bombs. In early November, the Deputy Chief of Staff of the Air Force replied with an attachment, regarding the offer of Napalm bombs and the information that the Air Force is looking to obtain the supplies of this war material from the US, through the Military and Aeronautical Attaché in Washington.

Lastly, on 31<sup>st</sup> December of 1961, in a personal letter from Mr. Waring, the Air Force informs him they have no interest in Napalm bombs and other materials offered. Mr Waring contacted Colonel Rubim, from the Portuguese Air Force, and he was surprised, since he has not been informed of the war material offered and because Napalm bombs are a top priority. ("Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)" 1961-1964)

Summing up, there is no concrete evidence that Napalm has been deployed in 1961 in Angola. The evidence in its favour are the testimonies of refugees and military personnel. The affirmation by Professor John P. Cann, that Napalm arrived in Angola by the end of the summer of 1961, may only mean that Napalm bombs were in Angolan territory, but cannot be confirmed if they were used. However, when confronted with the letter exchanged through high ranks of the military in the first trimester of 1961, it is known that the use of Napalm was forbidden. In addition, there was an interest by the Portuguese Air Force in Napalm Bombs, that resulted in contacting factories that produce them. However, in 1961, it was not accomplished any official agreement or purchase of Napalm. Lastly, due to the lack of more official documents to prove or disprove the use of Napalm, this cannot be corroborated.

### **The second year of war: possible use of Napalm in Angola**

The war in Angola proceeded. According to José Castelo Branco, military of the 3<sup>rd</sup> CCE, Napalm was not used in Baixa do Cassange until January of 1962. However, there is lack of more documents to corroborate this affirmation. In January 3<sup>rd</sup>, a letter written by PAIGC's members informs PAIGC's Secretary-General, Amílcar Cabral, of the arrival of ships, carrying around 200 Napalm bombs. (Nunes 2011; "Relatório do PAI em Bissau com informações referentes à actividade militar do inimigo e recomendando o contacto com os homens de várias tribos do interior" 1961)

Furthermore, a book by ex-Major José Everdosa, contains several testimonies, some of them regarding the use of Napalm, between 1961 and 1963. The book was even dedicated to the victims of the Napalm bombs launched by Everdosa's airplane in February of 1962. In this, it is described a telephone conversation of Lieutenant Colonel Neto, with a service officer, in which the Colonel orders the preparation of a PV2 airplane armed with Napalm. Also, Everdosa describes a launch of several Napalm bombs in Ucuá, a village in Northern Angola, with an aftermath between 200 and 300 deaths. Moreover, it is described that other types of anti-personnel bombs were not as efficient to be used against great concentrations as Napalm, and this was a main reason for its use, because it allows the Air Force to control the situation. Lastly, the author affirms the Napalm bombs came from the

Montijo Air Base and NATO. Everdosa was an opponent to Salazar's regime, which could mean an exaggeration of certain facts. Thus, in lack of more documents to corroborate the allegations, it is important to take the information, described above, lightly. ("Les Envoyés des Seigneurs" n.d.)

Moreover, in February, Ronald Waring exchanged several correspondences regarding the offering of weaponry, including Napalm bombs. For instances, the Deputy Secretary of National Defence informed the Military Staff of the Air Force of offerings of material and services by Mr Waring, who wanted to give information of a Hungarian company that could produce Napalm bombs for Portugal, since Lieutenant Colonel informed Mr. Waring of a strong necessity of those types of bombs in Angola, that were not easy to acquire, due to the imminent UN's embargo of weapons to Portugal. ("Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)" 1961-1964)

Additionally, in November of 1962, the *New York Times* published an article accounting the several UN reports written, regarding the Portuguese situation, being one in particular about the increase of the utilization of the Air Force and testimonies of indiscriminate Napalm bombing. (O'Kane 1962)

In conclusion, in the second year of war the evidence of the usage of Napalm seems more concordant, since the testimonies of military personnel and civilians in journalistic articles all agree that Napalm was used in Angola in 1962. However, there are completely lack of official information, such as documents of high spheres of the military to corroborate these testimonies. Lastly, there is no evidence of the amount of Napalm bombs used and the concrete missions and victims of its use.

### **The beginning of the war in Guinea-Bissau and Mozambique: 1963-1964**

In 1963, an additional war frontier was added to the PCW, when, by the end of January, PAIGC attacked Tite's Quarter. (Afonso and Gomes 2010)

In this year, there are not officially documents of high ranks of the military, regarding the use of Napalm. However, in July Amílcar Cabral received a letter, accounting Napalm bombardments in Calaque, Dassalam, Cafal, Catés and Como Island. Moreover, the *New York Times* reported in September, a testimony from a Portuguese pilot given in August, describing the bombing of African villages with Napalm, mainly rebel hiding places. Thus, the pilot affirmed he could never be completely sure who was he harming with Napalm. (Garrison 1963; " Fundação Mário Soares / DAC - Documentos Amílcar Cabral " 1963)

Furthermore, in November, several documents belonging to Amílcar Cabral account the use of Napalm. One of those was a telegram sent by Amílcar Cabral to the Organization of African Unity, formed in 1963 in Ethiopia, to unite all independent African countries to

fight the colonialist presence and the consequent appropriation of wealth. In this, PAIGC's Secretary General explains that Portugal it is in despair, due to the lack of victories and intensified the bombardments with Napalm of villages, mainly in liberated areas. Consequently, many people lost their homes, mainly the elderly, women, and children. Therefore, Amílcar Cabral calls the Organization of African Unity to denounce the atrocities committed by the Portuguese Military. In addition, Mr Cabral sent another telegram, describing the same events, to Nikita Kroutchev, the President of Council of Ministers of URSS, appealing for their support and intervention to denounce the crimes, against humanity, perpetrated in Africa. ("Fundação Mário Soares / DAC - Documentos Amílcar Cabral " 1963; " Fundação Mário Soares / DAC - Documentos Amílcar Cabral " 1963)

Moreover, Amália Fonseca, Secretary-General of the Conference of Nationalist Organizations of the Portuguese Colonies (an organization of nationalist movements of the former Portuguese colonies formed in 1961), sent two telegrams, one to the President of International Red Cross, the President of Movement for Colonial Freedom, President of the International Association of Lawyers, the President of the World Peace Council and the Human Rights League and another telegram to Pope Paul VI. Both telegrams described Napalm bombardments, with NATO aircrafts, by the Portuguese Military and appealed to the entities to denounce these criminal acts. ("Fundação Mário Soares / DAC - Documentos Amílcar Cabral " 1963; " Fundação Mário Soares / DAC - Documentos Amílcar Cabral " 1963)

Besides the telegrams, a correspondence between military personnel responsible for the southern region of Guinea-Bissau, acknowledged the use of Napalm, in December in Mato Farova and Catunco, where all houses were destroyed and a bombardment with Napalm in Cameconde, where houses were destroyed and there were three victims. ("Fundação Mário Soares / DAC - Documentos Amílcar Cabral" 1963)

These are the first documents accounting the use of Napalm in Guinea Bissau. Even though, the descriptions given by Amílcar Cabral and Amália Fonseca are concordant with the correspondence between Portuguese military of the southern region of Guinea-Bissau, in terms of Napalm bombardments, the year of 1963 does not register any document of high spheres of the military, to undeniably prove its use. Nonetheless, the account of Napalm use by both sides of the war continues, this time in the new war frontier – Guinea-Bissau.

In April of 1964, Amílcar Cabral issued a statement, about a Portuguese military operation in Como Island, in which Napalm was used. As consequence, crops and cattle were destroyed, resulting in a military set-back to Guianese troops. In September, the war extended to Mozambique when FRELIMO attacked Chai, in Cape Delgado. ("PAIGC - Communiqué" 1964; Afonso and Gomes 2010)



In terms of the use of Napalm in Mozambique, there were testimonies, even before the beginning of the war made by ex-Major José Everdosa, in his previously mentioned book. However, no documents exist from the years of 1963 and 1964 to prove its veracity.

Lastly, in 1964, the *New York Times* published two articles, respecting the use of Napalm in Guinea-Bissau. The first, published in April described a communiqué accusing Portugal of using Napalm to burn several villages, at Como Island. The second article published in July, declared Portugal was losing a lot of terrain and consequently increased the military, which was supported with aircrafts armed with Napalm bombs in order to sustain a war in Guinea-Bissau. All the assumptions of the deployment of Napalm in Guinea-Bissau cannot be corroborated by another source, being impossible to affirm with undeniable certainty the use of Napalm in this time period. (Szulo 1964; *New York Times* 1964)

### **Accounts of the use of Napalm in the late 60s**

The war continued with no end in sight, in three war fronts at the same time. In 1967, more testimonies arose about the use of Napalm, in Guinea-Bissau. In a document entitled *October in Guinea*, written by Mário Pinto de Andrade, founder of MPLA, it is described an attack with Napalm bombs, for thirty minutes, with Fiat 91 aircrafts. From this attack it was recovered fragments of a Napalm bomb shell, with “300KG - 350L M/61 Napalm FCM-1-55 *Made In USA*” engraved on it. (“Octobre en Guinée” 1967)

Furthermore, British historian, Basil Davidson, visited Guinea-Bissau and described the deployment of Napalm bombs. Among the victims was a young man who died in a Napalm attack. Also, a Napalm bomb that did not exploded, was found, and had inscribed “FCM-1-55 NAPALM 300kg – 350L M/6”, which belongs to NATO, according to the author. Furthermore, Mr Davidson accounts, between November and May, of the previous year, the deployment of Napalm in Guianese villages and rice fields. (Davidson 1967)

Besides this, an UN report entitled *Territories under Portuguese administration: working paper prepared by the secretariat (Angola, Mozambique, Bissau)*, mentioned the constant struggle of the Portuguese military in Guinea’s territory, which led to a greater use of the Air Force, and also, the deployment of Napalm. (“Resoluções da ONU” 1966-1974)

In 1967, there is no evidence of the usage of Napalm by the Portuguese military or regime. Both documents described above, are concordant in the deployment of Napalm in Guinea-Bissau and the difficulties of the war for the Portuguese side. Nonetheless, this information should be taken lightly, due to the possibility of propaganda and due to the non-existence of more documents to confirm the allegations.

The concrete and undeniable evidence that the PAF used Napalm in Mozambique in 1968, came in a UN report written by high spheres of the military in 1973. However, in 1968 other documents, regarding testimonies of the use of Napalm arose in newspapers and telegrams of the Liberation Movements.

In August, Amílcar Cabral gave a speech in front of the UN Human Rights Commission, in which he denounced atrocities committed by the PAF in Guinea-Bissau, among them the deployment of Napalm bombs and white phosphorus. In September the Chief of Staff of the Armed Forces received a letter, referring that Amílcar Cabral, sent a telegram to the Special Committee of the UN in August of the same year, accusing Portugal, among other things, of bombardments with Napalm and white phosphorus. The same document affirms that the Portuguese Delegation was informed, by a UN journalist, that the information's described above could be Soviet propaganda to prejudice the Portuguese situation. ("PAIGC" 1968; "PAIGC - "Les Crimes des Colonialistes Portugais face à la Déclaration Universelle des Droits de l'Homme" 1968; "Situação em Angola" 1968-1971; "Utilização Do Napalm e de Outras Armas Incendiárias" 1973-1974)

In 1969, the first concrete evidence of the use of Napalm, at least in Guinea-Bissau, appeared in form of photographs (Figures 1, 2 and 3). (István 1969; Pyhälä 1969)



**Figure 1 - Napalm áldozata (Napalm Victim) in Guinea-Bissau © Bara István**



**Figure 2** – A child holds a fragment of a Napalm bomb in Guinea Bissau © Mikko Pyhälä



**Figure 3** - A family with a fragment of a Napalm bomb in Guinea Bissau © Mikko Pyhälä

Furthermore, in April of the same year, PAIGC issued a communiqué, describing Napalm bombardments, targeting pacific villages in Guinea-Bissau, with aircrafts Sabre and Fiat 91. In the same month, a letter is sent to the Chief of Staff General of the Armed Forces, ordering the return of flamethrowers M2 m/951 from Angola, of American origin and supplied by NATO. This type of flamethrowers was used in the VW and could contain Napalm, however, there is no proof that is the case with the ones supplied to Portugal. ("PAIGC - Communiqué" 1969; "Situação em Angola" 1968-1971)

In October, the *New York Times* published an article describing the pieces of a Napalm capsule, which represented an evidence that Portugal was after all using weapons

supplied by NATO. In the following month, the Head of the 1<sup>st</sup> Division of the General Secretariat for National Defence sent a letter to the Head of the 2<sup>nd</sup> Division, with commentaries to the UN secretariat working document A/AC 109/L.538 of March 19 of 1969. In this letter it is confirmed the use of Napalm and white phosphorus, mainly for well-defined military objectives and in areas of difficult invasion. This commentary by a Portuguese military responds to the affirmation that the Special Committee found evidence of the use of Napalm, especially in Guinea-Bissau in the year of 1968. (W. Apple Jr 1969; "Resoluções da ONU" 1966-1974)

Lastly, in a report written by PAIGC's General Secretary, which was sent to the International Conference of Support to the People of Portuguese Colonies, Amílcar Cabral describes the social-psychological campaign and the consequent burning of crops in several villages of Guinea-Bissau, in 1969. In his opinion, to starve the population. ("PAIGC - Communiqué" 1969)

In conclusion, after the description of testimonies and reports on the account of the use of Napalm in the PCW. The first concrete evidence came in the year of 1969, when photographs were taken of a Napalm victim and fragments of bombs and when high spheres of the military confirmed the accusations of the UN, for the first, regarding Napalm bombardments in Guinea-Bissau.

### **Accounts of the usage of Napalm in the early 70s: 1970-1972**

In early February of 1970 a letter was sent to Chief of the General Staff of the Armed Forces, regarding an article published in *Granma*, a Cuban newspaper, entitled "*Angola: 9 years of armed struggle*". Besides affirming that Portugal needed to resort to the help of NATO and African countries, such as South Africa and Rhodesia, the PAF also bombarded liberated villages with Napalm. Later in the same month, Amílcar Cabral gave an interview to the *New York Times*, in which he affirms that Portugal began to use American-made aircrafts, such as B-26's, Sabre jets and T-6 trainers. Technically, due to a 1961 weapons embargo Portugal could not use American-made weapons. Nonetheless those could come from other suppliers other than the US. According with Amílcar Cabral, these US aircrafts were used by the PAF, to bombard villages with Napalm. He witnessed Napalm deployment in a Guianese school and the murder of at least eight children. On 26<sup>th</sup> February of 1970, Amílcar Cabral had a hearing in the US Congress, in which he exposed the NATO supplied weaponry and the Napalm deployments by the PAF. ("PAIGC - "Report on Portuguese Guinea and the Liberation Movement" 1970; *New York Times* 1970a; "Situação em Angola" 1968-1971)

In May of 1970, Amílcar Cabral sent a letter to the Executive Secretary of the African Liberation Committee, with a list of material he was interested to acquire to PAIGC. Among them were 5000 anti-Napalm vests. Despite there is a possibility of the affirmations made by Amílcar Cabral, regarding the use of Napalm by the PAF, be propaganda, this last document could represent an evidence that Amílcar Cabral knew for certain about the use of Napalm, otherwise he would not demand to buy a large quantity of anti-Napalm vests. ("CNSLCP - Déclaration (Conférence Internationale d'appui aux peuples des colonies portugaises, à Rome, 27-29 juin, 1970" 1970; "Fundação Mário Soares / DAC - Documentos Amílcar Cabral" 1970)

In late July, a letter was sent to the Chief of the General Staff of the Armed Forces, regarding an article published in the newspaper *Times of Zambia*, in which Portugal was accused of killing about thirty Angolans, with Napalm and other weapons. In early August the Chief of the General Staff of the Armed Forces, brigadier Frederico Oliveira sent a letter to General Secretariat for National Defence, respecting the *Times of Zambia* article, in which the Chief of the General Staff, acknowledged the lack of truth in the article and affirmed the statement were propaganda invented by the MPLA. ("Situação em Angola" 1968-1971)

Lastly, during July and August the UN Office of Public Information announced two press releases, containing testimonies of violation of human rights in Southern Africa. The first, has a testimony by Matos Almeida, who witnessed, in Guinea-Bissau, villages and people being burned with Napalm. The second, has a testimony from Anna Wilson, a doctor and MPLA member, which affirmed that Portuguese aircrafts dropped Napalm daily in villages and she even treated a victim, a child who was badly burned, mainly in the arm and stomach. ("Resoluções da ONU" 1970)

On 15<sup>th</sup> July of 1971, the same letter was sent to the Deputy Secretary of National Defence and the Secretary General of National Defence, in which it is described an article published in the left-wing German newspaper *Frankfurter Rundschau*, about the armed struggle in Angola, denouncing the use of Napalm, with visual proof (Figures 4 and 5). ("Situação em Angola" 1968-1971)



**Figure 4** - Napalm bombs at Gago Coutinho airport, in Angola, in July of 1971 © Jochen Raffelberg



**Figure 5** - Napalm bombs at Gago Coutinho airport, in Angola, in July of 1971 © Jochen Raffelberg

In the same month, the Chief of the General Staff of the Armed Forces received a letter about the BBC program *24 hours*, that aired on 6<sup>th</sup> June of 1971, in which it was discussed the armed conflict in Africa. In this the British deputy Ian Sproat discusses the deployment of Napalm in Angola to target indigenous crops. Later, the British deputy was not convinced Portugal resorted to those weapons and must likely was propaganda, since he visited Mozambique and the natives collaborated with the Portuguese military. (“Utilização Do Napalm e de Outras Armas Incendiárias” 1973-1974)

Lastly, the *New York Times* published an article, confirming the Portuguese air hegemony, and the consequent bombardments with Napalm on guerrillas and villages. (Borders 1971)

In April of 1972, Robert Van Lierop, a *New York Times* reporter published an article describing his trip to Mozambique to document the population’s daily struggle to survive in the liberated areas with frequent Napalm bombing by the Portuguese military. The article also informs about the military struggles of the PAF, which obligated the reinforcement with troops of South Africa and military equipment from NATO. (Van Lierop 1972)

Throughout 1972, PAIGC made two communiqués, regarding the destruction of schools, hospitals, villages, and the continuity of Napalm bombardments in Guinea-Bissau in the liberated south, in April and November (in the regions of Tombali and Kinara), by the PAF. Both documents were signed by PAIGC’s General Secretary, Amílcar Cabral. In August, MPLA addressed before the Commission on Human Rights in Brazzaville. The speech entitled *Colonial oppression in Angola* had the aim to assess the current oppression happening in Angola and had a section addressing the genocide with Napalm bombs. In this, MPLA accuses the Portuguese regime of violating Human rights and explains the different bombs, that are used to target the civil population, for instances Napalm bombs,

that reach temperatures between 900 °C and 1300°C and the PRUGEL PT1 Napalm bombs, that reach temperatures up to 2000°C. Also, MPLA recalled an attack with Napalm on 27<sup>th</sup> November of 1967 in Ngalama region, in which the Portuguese Air Force bombarded schools and thirteen children died, sixteen were gravely injured, from which ten succumb to the injuries later. ("Comunicado do PAIGC sobre as acções militares do mês de Abril" 1972; "Comunicado do PAIGC sobre o desenvolvimento da luta armada durante o mês de Novembro" 1972; "L'oppression coloniale en Angola"/Sommaire" 1972)

Lastly, in November the *New York Times* published an article, addressing what President Nixon said at State of the Union, regarding the wars in Africa. In that speech, Nixon affirmed the “*white forces*” were backed with international aid and investment from several sources and those *forces* are deploying Napalm in black populations to keep exploiting them and securing white people’s interests. The article even refers that the Liberation Movements accused Portugal of using Napalm in the three theatres of war.(Gerald Fraser 1972)

Concluding, during the first three years of war in the decade of 1970, foreign press kept acknowledging the deployment of Napalm in the three theatres of war, even with visual evidence, as so MPLA and PAIGC, who conducted several speeches and communiqués, accusing Portugal of the inhumanity of the war and the Napalm deployments. However, when high spheres of the military were confronted with newspaper articles accounting the use of Napalm denied it, affirming it was mere propaganda. Nonetheless, the PAF had previously confirmed the use of Napalm in Guinea-Bissau, when they commented a UN document, regarding a Napalm deployment. The reasons why the PAF kept denying the Napalm use, mainly in Guinea-Bissau, in the early 70s, it is unknown.

### **Napalm use in the last two years of war: 1973 and 1974**

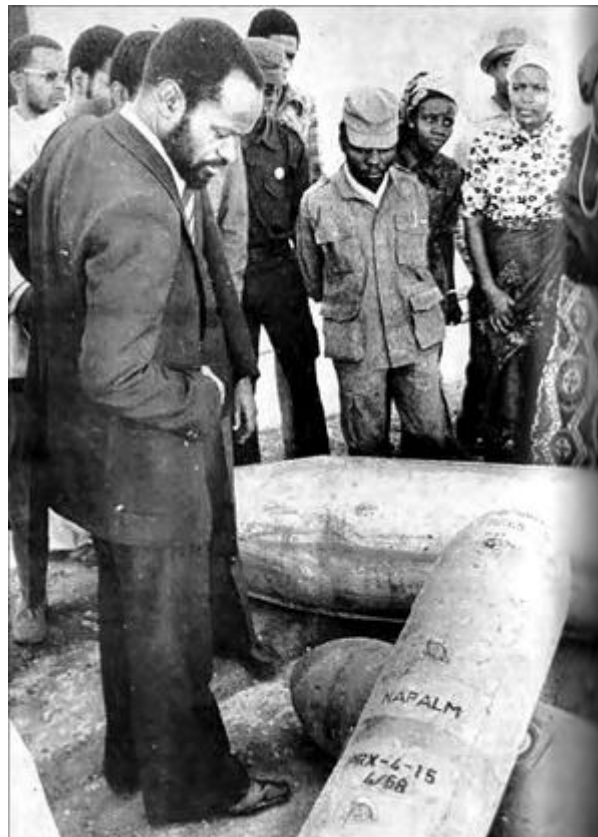
In late March and in early April of 1973, *The New York Times* reported the accusations of Napalm deployments in Angola and Mozambique by experts of UN who travelled to Africa. (*New York Times* 1973a; *New York Times* 1973b)

Also, between March and May, the Chief of General Staff of the Armed Forces of Guinea-Bissau, Mozambique, and Angola, all acknowledged the use of Napalm. Regarding Guinea-Bissau, General António Spínola confirmed the usage of Napalm in the form of 300KG/350L and 80KG/100L bombs and in M/64 incendiary grenade. The General recognized that the targets should be studied carefully to avoid injuring civilians and enumerates Napalm’s military advantages, such as: a) the efficiency in dry weather; b) good at eliminating enemy hiding spots; c) good precision; d) easy to deploy; e) great psychological effect and f) its low cost, comparing with other weapons. In Guinea-Bissau,

Napalm's annual consumption was estimated at 1365 incendiary bombs and 3280 incendiary grenades.

In Mozambique, according to General Kaúlza de Arriaga reports, from 1968 until February of 1973 were dropped 2840 Napalm bombs of 80KG/100L and 820 Napalm bombs of 300KG/350L, mainly against guerrilla camps and bases (Figure 6).

According to General Joaquim Cunha, in Angola the usage of Napalm bombs was extremely restricted since the weapon was ineffective against the desired targets. The Napalm bombs were reserved to occasions when the use of other bombs was prohibitive. ("Utilização Do Napalm e de Outras Armas Incendiárias" 1973-1974)



**Figure 6** - Samora Machel, from FRELIMO, observes a Napalm bomb © Arquivo Global Imagens

At the same time, Amílcar Cabral denounced, again, the Napalm deployments, with Fiat G-91 aircrafts, to the UN and to the Organization of African Unity. With the previous correspondence of General Spínola, confirming the utilization of Napalm in Guinea-Bissau, it becomes clear that Amílcar Cabral it is telling the truth and the accusations were not mere propaganda. ("PAIGC - Operação "Amílcar Cabral" 1973)

In May, comes another correspondence and report, that undeniably confirms the usage of Napalm in the three theatres of war. Deputy Secretary for National Defence Aviator General Pilot Ivo Ferreira sent a letter to Military Mission to NATO in Brussels, regarding a Diplomatic Conference, that would discuss Napalm's regulation. For the Conference, the representative of Portugal needs to be accompanied with a report, explaining the reasons



not to celebrate conventions, which prevent the usage of Napalm and incendiary weapons, in military conflicts.

Briefly describing the content of the report, entitled *Utilization of Napalm and Other Incendiary Weapons*, signed by Lieutenant Colonel José Luís Cunha, this begins by explaining the cruelty of the war and the hardship to attribute degrees of cruelty to weapons. Also, the report accuses the UN to exaggerate the amount of casualties and the cruelty of incendiary weapons, since other weapons cause much more casualties, when used in a subversive war and “*in a war scenario all weapons are meant to hurt and wound and the only thing that can be done is to regulate its use*”. Lastly, the report alludes to the use of Napalm in the PCW, which has been very secret and restricted. Firstly, in Angola, Napalm is not very efficient on the military targets and its use it is very limited. Secondly, Guinea-Bissau is the theatre of operations, where Napalm it is used the most. However, studies of reference and precautions are taken not to harm the civil population. The monthly consumption of incendiary bombs of 300KG, 80KG and incendiary grenades M/64 is 387 units. Thirdly, in Mozambique, the use of Napalm is, also, very restricted as Angola, being the monthly consumption of incendiary bombs and grenades, between 1968 and February of 1973 is 90 units. (“Utilização Do Napalm e de Outras Armas Incendiárias” 1973-1974)

Furthermore, another undeniable evidence of the usage of Napalm in the 70s, came in a form of an invoice from the Portuguese Society of Explosives (Figure 7), dated from May 1973, about the acquisition of 2400 kilograms of “*Napalm – incendiary gelatinizing oil M4*”, with the cost of 308160 Portuguese *Escudos* (about 1500 euros), the Portuguese coin at that time. (Cunha, Menezes, and Gomes 2016)

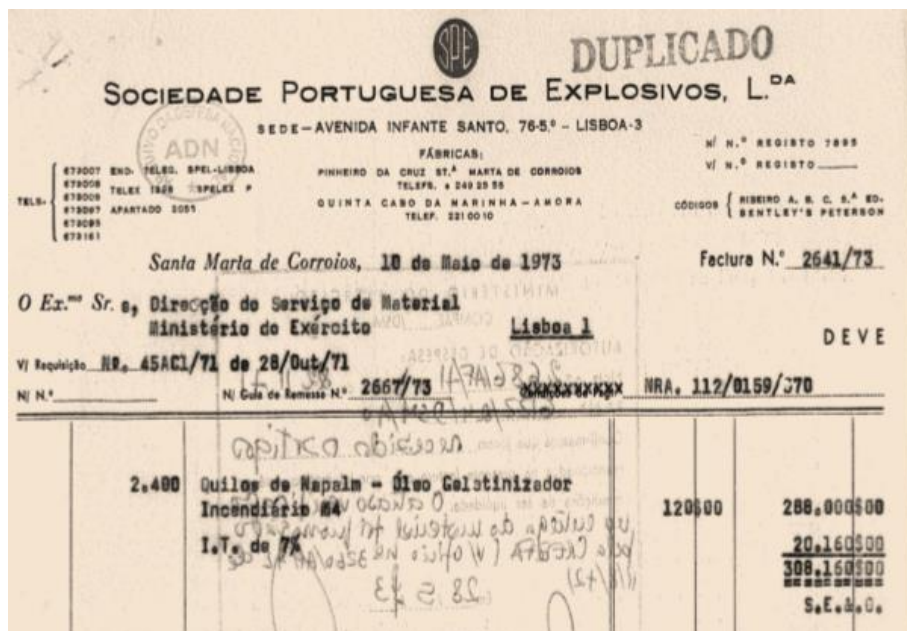


Figure 7 - Invoice of the purchase of Napalm from the Portuguese Society of Explosives © Arquivo da Defesa Nacional

Lastly, between October and November, PAIGC and UNITA accused the PAF of Napalm and white phosphorus' deployments in southeast Guinea-Bissau and of the destruction of villages in liberated areas in Angola. ("Communiqué (PAIGC)" 1973; "PAIGC - Communiqué" 1973; "UNITA - Compte rendu de la Conférence de Presse de Jorge Sangumba chargé des Relations Extérieures de l'Unita" 1973)

In late May of 1974, *The New York Times* published an article about the military situation of Mozambique. Among all the topics described, the reporter acknowledged the use of Napalm in certain occasions. However, there is no exact evidence of the usage of Napalm in this year. At the same time the Commander in Chief of the Armed Forces in Guinea-Bissau, Brigadier Carlos Fabião, sent a transfer certificate, with the subject "*Napalm Bombs*", declaring the transference of the requested material. Moreover, Brigadier Carlos Fabião, also sent a letter regarding the same topic to General Chief of the General Staff of the Armed Forces, giving knowledge of the existence of 1960 Napalm bombs of 350L and 100L in Guinea-Bissau. Besides this, the Brigadier, suggested the removal of the majority of the Napalm bombs to Salt Island in Cape Verde, temporarily, since a large number of bombs could not be easily hidden and Portugal could be the subject of enormous international critics.(Kamm 1974; "Material" 1972-1974)

In conclusion, in the year of 1973 there is irrefutable evidence of the deployment of Napalm in the PCW. The report sent to the UN Diplomatic Conference and the correspondence of the three Commanders in chief, proved beyond reasonable doubt that Napalm, was indeed used this military conflict. Finally, with no more documents regarding Angola and Mozambique, it is truthful to say that Napalm bombs were taken out of Guinea-Bissau in June and without more documents accounting the use of Napalm, this weapon was not used after the first trimester of 1974.

### **The aftermath of the Napalm use: two decades after the end of the war**

Two decades after the end of the war, a Portuguese television channel emitted a documentary/debate with veterans of the PCW, entitled *20 years of silence*. Among the topics debated was the usage of Napalm. The article "*O Uso de Napalm na Guerra Colonial – Quatro Documentos*" describes the debate. However, the authors concluded that the Portuguese military denied the use of Napalm, which is not entirely truthful. In fact, Generals Ricardo Durão, Duarte Silva and Francisco Van Uden denied diligently the usage of Napalm. On the contrary, Lieutenant Colonel Vasco Lourenço affirmed "*It is evident that we used Napalm in the Colonial War. It's a war*" and Lieutenant Colonel António Ramos, interrupted the debate about another subject and said "*If we really want to break the silence we have to be honest with ourselves first of all (...) And I am feeling a deep cynicism here*

when someone says that Napalm was not used, I made assaults, I commanded assaults on enemy positions supported by Napalm, so I assume I saw Napalm", to what somebody answers "depends on the area of each one". (20 Anos de Silêncio 1994; Araújo and Duarte Silva 2009)

As a matter of fact, the military personnel who did not heard of or seen Napalm in the military conflict, could be telling the truth, since in Angola and Mozambique Napalm deployments were restricted to certain areas and short amounts. Guinea-Bissau was by far, the theatre of war with the most use of incendiary weapons. The military personnel who denied Napalm's existence were not deployed in Guinea-Bissau. Another reason for the Armed Forces not being aware of the use of Napalm, may lie in the secrecy used in the correspondence. Only certain military personnel knew of the operations. This hypothesis came from the ultra-secret documents, that prove with a high degree of reliability the usage of Napalm and were only declassified decades later. Nonetheless, with or without confirmation of all war veterans, Napalm was deployed in the three theatres of operations of the PCW.

## **Tactical Herbicides in the Portuguese Colonial War**

### **Accounting of the use of Tactical Herbicides between 1961 and 1969**

The first document found, regarding TH, is from, 14<sup>th</sup> July 1961. It is a correspondence between Ronald Waring, and a German chemical company, named *Badische Anilin & Soda Fabrik*, current BASF. In this letter, Mr Waring enquires the price and method of use of a selective weedkiller to kill the plant *Panicum Spectabile* and about the herbicide dalapon-sodium, produced by the German company. On the 31<sup>st</sup> of July, the Portuguese branch of the German company, sent a correspondence to Mr Waring, advising the use of 15kg of dalapon-sodium per hectare, according to the instructions given in the brochure. Almost a month later, the German company branch in Lisbon established the price of dalapon-sodium to 110 Portuguese *escudos* (about 50 cents), per kilogram. ("Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)" 1961-1964)

The documents described above only regard, Mr Waring's enquire for samples of Herbicides to a foreign chemical company, about cost and method of action. However, they do not represent actual evidence that Herbicides were used, in the PCW. On the 19<sup>th</sup> of August 1961, a message classified as secret was sent from the Broadcasting Center of the General Secretariat of National Defence to Angola, in order to inform about the deforestation of main itineraries, and to reapply Herbicides, in order to stop the regrow of

vegetation. This correspondence entails the first actual evidence, that the PAF were using Herbicides in Angola. However, it is not clear when the use of this weaponry began. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964; “Planeamento da Defesa de Angola” 1961)

Moreover, in late August, the Deputy of the 3<sup>rd</sup> Division, sent a correspondence to the 2<sup>nd</sup> Division, in Angola, regarding the material they had at their disposition. In the end it was suggested a weedkiller to kill *capim* (an African vegetation non-existent in Europe). However more information was required about the topic. During September 1961, Mr Waring and Carlos Cardoso agricultural section (the Portuguese Branch of the German company) exchanged several correspondences regarding several Herbicides. The Herbicides Atrazine and Simazine did not work in *Panicum Spectabile* and *Pennisetum Purpurem* since this type of vegetation it is not encountered in Europe. The Portuguese branch contacted another company, which confirmed the lack of results of the Herbicides mentioned. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

On the 30<sup>th</sup> of September 1961, Carlos Cardoso company sent 3kg of the Herbicide A 1089 to Mr. Waring, for testing purposes. According to instructions of use, more than one spraying should be required for certain resistant types of plants and if it rained in the first 48 hours, following the first spraying. As for its use on aircrafts the company did not possessed any information.

In late September, the Chief of the 3<sup>rd</sup> Division sent a letter to the Chief of the 2<sup>nd</sup> Division in Angola, informing, despite being expensive, the best weedkiller to use on *capim* seemed to be dalapon-sodium. However, taking the price into consideration, the Chief of the 3<sup>rd</sup> Division was apologist of using a non-selective Herbicide on *capim*, since there are great areas with that vegetation, making it very extensive to use a selective Herbicide. The correspondence also contains a description of the advantages of using Herbicides, for instances, to destroy grass close to roads and avoid ambushes, to eliminate a concentration of enemies in fixed positions, to kill weeds close to airports, preventing the approach of enemies and to use aircrafts or helicopters to spray great areas. Lastly, from the correspondence it is understood the secrecy of the subject, since the military would contact foreign chemical companies, to obtain information, regarding Herbicides, pretending to be farmers. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

In October 1961, the Chief of the 3<sup>rd</sup> Division, Colonel Boavida, sent a letter to the Chief of Staff of the 3<sup>rd</sup> Region, informing that they would be sending samples of Herbicides to destroy *capim*, through the Air Force, given by Mr Waring. However, Mr Waring informed that the companies contacted did not produce Herbicides that targeted *capim*, specifically.

He concluded that Herbicide A 1089 produced by a Swiss company and dalapon-sodium, produced by a German company could be efficient against *capim* and he would send samples of both chemical compounds, to Angola, for testing purposes.

On the 24<sup>th</sup> of October, Assistant Secretary of National Defence asks for permission to the Commander of the 1<sup>st</sup> Aerial Region to send four kilograms of Herbicides samples to the 3<sup>rd</sup> Military Region in Luanda, through the Air Force. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

According to documents of 1961, the PAF already knew about several types of Herbicides, mainly because of the information and samples given by Mr Waring. During the first year of war the PAF tested those samples in Angolan vegetation.

In January 1962, the Chief of the Military Cabinet sent a letter to the Head of the 1<sup>st</sup> Division of the General Secretariat for National Defence, regarding the deforestation of *capim*. This correspondence informed that Herbicides were not sprayed through aircrafts, but instead using trucks in several areas of Angola. As for the results, the large plantations of manioc regenerated after, so larger quantities, were needed to prevent the regrowth. Other vegetation, such as *capim*, was destroyed with the Herbicide dalapon-sodium. However, a definite conclusion, in terms of the quantities need for the destruction of vegetation, could not be reached, since the land could not be sterile, and the vegetation could grow back again. The military personnel wanted to wait for the rainy season to test the efficiency of the Herbicides. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

In the same month a secret message was exchanged between military personnel, concerning the deployment of Herbicides with aircrafts and by land, being the results satisfactory. However, they still wanted more suggestions to improve this method. Also, in January the Head of the 3<sup>rd</sup> Office, Colonel Bromicho Boavida, recalled Herbicides were not destroying playing fields and similar places, effectively.

In February, Brigadier Luís Deslandes transcribed the information of the Uige District Public Works and Transport Bureau, about the results of spraying the Herbicide dalapon-sodium on the road Carmona-Negage. In a first look the results were inconclusive, since the plants were from different species and it was hard to know exactly how the chemical substances would affect a certain type of vegetation. On windy days Herbicides could not be sprayed, due to the impossibility of knowing where they would land. Some conclusions were taken regarding spraying Herbicides with a jet, such as the importance of how the pilot regulates and manages the aircraft, so that Herbicides are sprayed into the desired areas. In terms of rainy days, if it would rain before the spraying, there would not be any results. This reduced the spraying during the rainy months. Lastly, the chemical compounds were more efficient when the vegetation was in its early days of growth and the results normally

appeared in first 48 hours. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

It was only found one document of the year 1963, regarding the utilization of Herbicides. A correspondence describing an operation with the aim to destroy manioc plantations on the 2<sup>nd</sup> Areal Region of Angola. It is important to refer, the destruction of manioc might have had a great negative psychological effect in the local populations, since manioc constituted a crucial part of their diet. Lastly, in the end of the letter it is affirmed that the spraying with these agents was not a threat to human life, directly.

On the 4<sup>th</sup> of May 1964, General Alberto Andrade e Silva, Commander-in-Chief of the Armed Forces in Angola, sent a letter to Chief of the General Staff of the Armed Forces, regarding testing with Herbicides. In terms of crops, the chemical substances were effective, in high concentrations. In terms of deforestation, the vegetation closer to the ground was not destroyed as easily, when compared with the vegetation on top of trees, which turned yellow and died. It was also suggested the continuation of researching on the topic to encounter more efficient products to destroy the desired vegetation. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

In late May, Deputy Secretary for National Defence sent a letter to the Portuguese Delegation of the Luso-German Joint Commission, explaining the tests with Herbicides performed by the PAF in Angola, in order to destroy the enemy’s crops and vegetation that serves as concealment. In terms of results, these were not being completely satisfactory in the tropical vegetation.

On the 19<sup>th</sup> of August, a correspondence to President of the Portuguese Delegation, Vice Admiral Joaquim de Sousa Uva, informed that in a certain region the Herbicides were not being used, neither tested. However, it was sent a list of companies and Herbicides, mainly composed by sodium perchlorate, which was extremely cheap. Also, in late August, Vice Admiral Joaquim de Sousa Uva, sent a letter with two booklets of the Herbicides, *Unkraut* and *Ugex* (trichloroacetic acid and 2,4-D), from two different German companies to the Deputy Secretary for National Defence.

Lastly in 1964, the Deputy Secretary for National Defence sent a sample of one kilogram of the herbicide *Vastat* produced by a German company, with the aim to ascertain its efficiency to the Military Office of the Chief Command of the Armed Forces in Angola. On the 4<sup>th</sup> of September, Vice Admiral Joaquim de Sousa Uva sent various samples of Herbicides, also, including a kilogram of *Vastat* to Deputy Secretary for National Defence of the 3<sup>rd</sup> Bureau. (“Oferta de Material Por Intermédio de R. Waring (Herbicidas Para Destruição de Capim)” 1961-1964)

Despite the testing and research of Herbicides had begun in 1961, it was in 1966, that the PAF were fully ready to utilize TH. In the late 60s, the usage of these chemical

compounds had its peak in Angola and Mozambique, mainly to regain control of certain areas and deny access to guerrillas.

On the 26<sup>th</sup> of May 1966 began Operation *Quissonde*, in Northern Angola, with the main aim to destroy crops of the populations supporting guerrillas, to make them run out of food and withdraw their support from the enemy. The spraying of Herbicides was done by land by hired men and by air, with the usage of aircrafts C-47. This was the first great extensive usage of Herbicides by the Air Force, with the aim to deforest the vegetation near isolated itineraries. In this operation, per day were destroyed areas between 30 and 40 hectares. Also, Herbicides were used in Eastern Angola to kill vegetation near a railroad, to prevent vulnerability of the Portuguese military. However, the results were not promising, since the area was enormous and near crops of populations, who could turn against the PAF, in case of destruction of crops. (Afonso and Gomes 2010)

On the 11<sup>th</sup> of May, Colonel Ireneu Mota sent a letter, regarding, among other subjects, the usage of Herbicides by the US military in the VW. The Military Attaché in Washington should be enquired to know for certain, which exact products were being sprayed in Vietnam, since in Africa Herbicides were already being used. (“Organização Logística de Cabo Verde e Guiné” 1965-1966)

The year of 1968 it is marked by some of the earliest condemnations of the use of Herbicides by the Liberation Movements, more specifically by PAIGC. During this year Amílcar Cabral made a speech on the UN Human Rights Commission, where he denounced the utilization of Herbicides in Guinea-Bissau. In a letter directed to the Commander in Chief of Guinea-Bissau, informing of a telegram sent by Amílcar Cabral to the UN Yugoslavia representative, it was referred that Portugal was getting ready to use defoliants against PAIGC military forces. According to the Commander in Chief of the Armed Forces in Guinea-Bissau, General Venâncio Deslandes, Herbicides “*have not been used to restore order in that province, nor are expected to be used*”. On March 1969, the PAF commented a document of the UN, where it is confirmed that in Guinea-Bissau chemical products have not been permitted. (“PAIGC” 1968; “PAIGC - “Les Crimes des Colonialistes Portugais face à la Déclaration Universelle des Droits de l’Homme” 1968; “Resoluções da ONU” 1966-1974)

In conclusion, since the beginning of the war in Angola, in 1961, there is reliable evidence that the PAF tested and studied several types of Herbicides, including their characteristics, mood of action and prices. In fact, high spheres of the military contacted, not only chemical companies in Europe and Africa, but also diplomats in the US to require more information about Herbicides, because they could be used to prevent ambushes, attacks by guerrillas and to destroy the livelihood of populations, who are friendly with the

enemy. Moreover, there is undeniable evidence that Herbicides were used for testing and military operations in Angola and Mozambique.

Lastly, in Guinea-Bissau, despite Amílcar Cabral's accusations that the PAF would spray Guianese areas with Herbicides, the documents of military personnel indicate that Herbicides were not used nor there was any intention of being used, in Guinea-Bissau, possibly due to the extremely wet and humid climate, which would impair their effect.

### **Accounting of the use of Tactical Herbicides between 1970 and 1974**

In February 1970, a Cuban journal, reported the bombardment of an Angolan population with toxic chemicals. However, it was not specified which chemical compounds were used for certain. In July, the health care services of MPLA, issued a report, accusing Portugal of destroying crops in Eastern Angola. Testimonies witnessed the deployment of Herbicides on manioc plantations, with aircrafts C-47 Dakota. In the report the identified Herbicides were 2,4 D, 2,4,5 T, cacodylic acid and *picloram* (all these Herbicides were being used in the VW). These chemical substances allegedly destroyed several plantations, in a large area, jeopardizing cattle and wild animals. In human beings, Herbicides provoked oral haemorrhages, digestive disorders, and pulmonary issues. These accusations led to an UN Resolution in December of the same year, demanding Portugal not to use chemical and biological weapons against Angolan and Mozambican populations. ("Situação em Angola" 1968-1971; Afonso and Gomes 2010)

On the 9<sup>th</sup> of July, the newspaper *Times of Zambia*, published an article accusing the PAF of murdering about thirty Angolans, with Napalm deployments and poisoning of food and water. In early August, the Secretary General of National Defence, received a letter acknowledging the lack of truth in those affirmations and that must be propaganda by MPLA, due to a previous spraying with Herbicides in the region.

In the same month, another article from the newspaper *Times of Zambia*, reported declarations of witnesses, who affirmed that Portugal utilized chemical products to oppress the population, using airplanes to spread the product. The result was destruction of crops, the death of animals and poison of water sources, which killed the population. In late August, the UN released the testimonies, recollected by a group of experts investigating Human Rights in Southern Africa. One of those was from Anna Wilson, a medical doctor and MPLA member, where she affirmed that the Portuguese military sprayed Angolan villages with chemical products from German origin, which caused the death of plantations and led to illnesses in the lungs, mouth and stomach, and could be deadly. ("Resoluções Da ONU" 1970; "Situação Em Angola" 1968)



Lastly, in December the *New York Times* published an article, which affirmed that the US held information's from Luanda's consulate that Portugal was utilizing Herbicides to destroy food crops, in Angola. The article also informs that, previously, Portugal had denied the usage of these chemical compounds and that US did not provide Portugal with any type of Herbicides, despite its utilization in the VW. However, a few days after this article was released, the same newspaper, affirmed the US does not possess any information of Portugal utilizing Herbicides in African crops. (M. Smith 1970; *New York Times* 1970b)

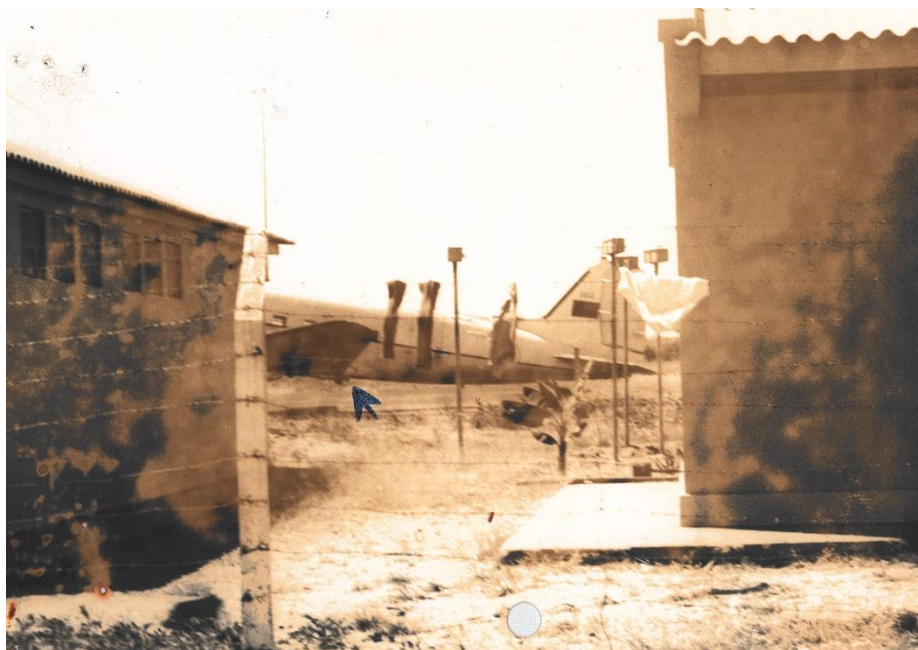
On the 23<sup>rd</sup> of June 1971, a document from the Information & Tourist Bureau for Western Europe was sent to the UN. The aim was to inform of the submission of a UN-sponsored Stockholm Conference on the Human Environment, regarding the ecological problems that treat Southern Africa, due to the Portuguese and South African government. One of the problems described was the chemical warfare by Portugal and South Africa in Eastern Angola. The intent of use, according to several western press sources, including *The Economist*, was to starve the population in liberated zones of Angola. The memo had an attachment with photos of cassava fields destroyed by the spraying of Herbicides by the Portuguese Air Force, in Chiume region, near the bordering area between Angola, Zambia and Congo-Kinshasa. Some of the evidence was collected by MPLA members around a joint air base between Portugal and South Africa.

Furthermore, an Italian film crew was able to film a documentary, in Cazombo region (Angola), in which it is shown the effects of Herbicides sprayed by Portugal and South African Air Forces on mango trees and manioc fields. This film is the first concrete evidence of the usage of chemical warfare in Angola, that was displayed in Western Europe, and the obvious treat to the environment that implies. The memo attached denounces the chemical warfare in Angola, in which was first announced by Medical Assistance Service of the MPLA on the 1<sup>st</sup> of May 1970, when Portuguese aircrafts flew through Luena, in Eastern Angola and sprayed cassava fields. Testimonies say that after that date the spraying with Herbicides intensified. The main target of the spraying with Herbicides are the cassava and manioc fields since they are a crucial part of the Angolan diet. The effects of the chemical compounds, begin to show in the first 24 hours, leaving the leaves dry and the leading to the deterioration of the plant. If a human being eats a plant which has been poisoned, it can suffer respiratory and digestive problems. The most dangerous is the cacodylic acid, which contains arsenic, that is extremely toxic to human beings and *picloram*, which can cause almost permanent damage to a large extension of a forest. ("Utilização do Napalm e outras armas incendiárias" 1973-1974)

On the 9<sup>th</sup> of July 1971, the French newspaper *Le Monde* published an article, regarding the topic described above. The declarations were made by Arslan Humbaraci, the Director of the Information Services of Zambia to Western Europe, in which he accused

Portugal, with the help of South Africa, of spraying plantation fields with Herbicides. In late July, a BBC documentary showed a film with plantation fields destroyed by chemical defoliants. In this Mr Humbaraci referred he had written to the Secretariat of the next UN Conference in Stockholm, about the ecological threats in Angola. Ian Sprout referred he did not believe the Portuguese were utilizing defoliants, since it went against the conquest of the local populations. In the next day, there was a press conference with Mr Humbaraci, representing MPLA, and Sahnou and Polly Gaster, from the Committee for Freedom in Mozambique, Angola, and Guinea-Bissau, to show the ecological damages the Portuguese were doing. (“Utilização do Napalm e outras armas incendiárias” 1973-1974)

On the 15<sup>th</sup> of July, the German newspaper *Frankfurter Rundschau* published a correspondence from Angola by Jochen Raffelberg, in which it is denounced the utilization of chemical products by the PAF. The article also contains a photography (Figure 8) with an aircraft equipped with Herbicides. The journalist was a part of a group of German journalists, who visited Angola and Mozambique between April and May of 1970. (“Situação em Angola” 1968-1971)



**Figure 8** - Aircrafts armed with Herbicides at Gago Coutinho airport in Angola © Jochen Raffelberg

Lastly, Dr François Houtart, Professor of Louvain University, visited Angola and Mozambique and spend time with MPLA and FRELIMO leaders. The professor announced he heard testimonies of people from liberated areas of Angola, which affirmed that the usage of Herbicides was a fact, since the last months of 1970. The professor added that from letters written to him, in 1971, the herbicidal sprays were intensified, with the

destruction of crops in liberated areas and a consequent shortage of food. ("François HOUTART" 1971)

In February 1972, German Social Democrat Lenelotte Von Bothmer, declared that the PAF were using Herbicides in Africa, in large areas, in order to destroy population's crops. To what the Parliamentary State Secretary answer that the Federal Government could not confirm if those allegations were true. Mrs Bothmer enquires if the Federal Government could investigate the matter. Nonetheless, the government already investigated the matter, however, there is not concrete evidence. ("Utilização do Napalm e outras armas incendiárias" 1973-1974)

In August, MPLA gave a speech to the ad-hoc group of the Commission on Human Rights, in Brazzaville, entitled "*Colonial oppression in Angola*". In this it is declared that the Portuguese military initiated the chemical war in 1965 to destroy crops. This type of warfare was intensified in 1970 and it was acknowledged by Mr Humbaraci in a memo dated 6<sup>th</sup> June 1971, in a Human Environment UN Conference, in which were present photographs of destroyed manioc fields. ("L'oppression coloniale en Angola"/Sommaire" 1972)

On the 5<sup>th</sup> of November, the *New York Times* published an article about Democratic Senator George McGovern's study group report on President Nixon's African policy, in which it is affirmed the usage of Napalm and Herbicides in the three different war fronts, in Africa. Also, in the same month the Chief of the General Staff of the Armed Forces received a letter containing an article published in the newspaper *Times of Zambia*, on the 12<sup>th</sup> of September, entitled "*Unborn babies poisoned in Angola*", which contains testimonies from a Swedish doctor and a Swedish journalist. Both confirmed the utilization of defoliants that were responsible for spontaneous abortions and early births on liberated areas. They believe that defoliants have different effects on animals and human beings. They even had a case of a ten-year-old child who died after the exposure to defoliants, after developing vomiting and diarrhoea. ("Utilização do Napalm e outras armas incendiárias" 1973-1974; Gerald Fraser 1972)

On March 1973, the *New York Times* published an article informing about an UN report, accusing Portugal of using Napalm and defoliants to provoke fear in the population. In April, the *New York Times* reported that a group of experts visited countries, which bordered Portuguese territories, where they heard testimonies about the spraying with Herbicides in Angola and Mozambique. This report was discussed in a UN Human Rights Commission by Clarence Clyde Ferguson Jr., a Deputy Assistant Secretary of State for African Affairs, in which he affirmed there were not convincing evidence of chemical substances being used in Portuguese liberated areas. In May another news article, published in Brazzaville by MPLA, affirmed that about 4000 people died poisoned by Herbicides, sprayed by the Portuguese Army, in southeast of Angola. Moreover, according

to the publication thousands of Angolans were victims of starvation. The numbers given by MPLA are not possible to corroborate, due to lack of more documents by other sources. (*New York Times* 1973b; “Fundação Mário Soares/Arquivo Mário Pinto de Andrade” 1973; *New York Times* 1973a)

In conclusion, it was in the 70s that MPLA and FRELIMO denounced the herbicidal warfare in Angola and Mozambique to the world. The UN began to conduct field studies with experts and alerting about the use of defoliants and Herbicides in Africa. Even though, there is a lack of evidence of the usage of these chemicals in terms of documents of the Portuguese military, during the 70s, there are visual proof and testimonies and accounts of sprayings of Herbicides from previous years. As for the accusations made essentially by MPLA that the Portuguese Air Force had intensified the deployment of defoliants and Herbicides, there are no documents to prove or disprove these declarations. Moreover, as for the Herbicides mentioned in a MPLA report, there is no other document or testimony that allows to prove if those exact Herbicides were used. Summarizing, the Portuguese military indeed made tests and utilized Herbicides in military operations, mainly in Angola and Mozambique. As for Guinea-Bissau, no document proved the use of those chemical substances there.

## **Chapter IV - Shedding a light on Napalm and TH Regulations and Ethical Issues**

### **Chapter Overview**

In this chapter it will be discussed how the Conventions for the regulation of Napalm and TH came to fruition. Also, the current use of both weapons in military and non-military contexts will be explained to give rise to an ethical discussion about Napalm and TH and their possible short- and long-term consequences.

### **Hague Conventions of 1899 and 1907 and the 1925 Geneva Protocol**

On the 17<sup>th</sup> of June 1925, the Geneva Protocol, the short version of the *Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare* was drafted and signed, becoming effective on the 8<sup>th</sup> of February 1928. This protocol followed The Hague Conventions of 1899 and 1907, which represent the earliest statements, regarding the international legislation of war. Among the prohibitions settled were, already, the usage of asphyxiating gases. (Maynard, Marrs, and Sidell 2007; "Treaties, States Parties, and Commentaries - Hague Convention (IV) on War on Land and Its Annexed Regulations, 1907" n.d.)

Despite the prohibition of chemical substances in warfare, the First World War had the first large-scale deployment of chemical weapons. For instances, France made use of tear gas and Germany utilized chlorine gas, in a large scale in 1915. After this event, several countries, such as the United Kingdom, US, Russia and Italy also began to use chemical weapons. Due to the sudden interest a great amount of research was performed, and with it thousands of tons of chemical agents were produced and deployed in war zones. Some chemicals were created to harm soldiers on the battlefield, provoking damage on lungs, skin and eyes and other chemicals were created to be completely lethal, such as hydrogen cyanide. The aftermath of a large-scale deployment of chemical substances, provoked millions of casualties in military personnel and civilians. As a result, years after the First World War veterans and civilians continued to perish, due to fibrous lungs, skin and cerebral damages, provoked by the several types of chemicals deployed, during the four years of the military conflict. (Ellison 2007; Boot 2007)

Therefore, beginning with the Treaty of Versailles in 1919, Germany was forbidden of manufacturing and importing chemical weapons. Other treaties followed, banning the usage of chemical warfare by the losing side of the war, without much effect. (Ellison 2007; Boot 2007; "Treaties, States Parties, and Commentaries - Washington Treaty on Submarines and Noxious Gases, 1922" n.d.)

It was within this context that the 1925 Geneva Protocol was drawn and signed. Summing up, the Geneva Protocol entails the condemnation of “*the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices*”. Since these prohibitions had already been put into force by other treaties, the ultimate goal of the 1925 Geneva Protocol was to ensure that the prohibition of this type of warfare was universally accepted and abided by (practically) all nations. The first nation to sign and ratify the Protocol was France, the depositary government and other thirty-seven countries followed. Nowadays, there are 145 State Parties to the Protocol. Throughout the years the UN General Assembly issued several resolutions to uphold the authority of the Geneva Protocol. The most recent is from the 3<sup>rd</sup> of December 2012 (Resolution A/RES/67/35). (Maynard, Marrs, and Sidell 2007; “Disarmament Treaties Database: 1925 Geneva Protocol” n.d.; “A/RES/67/35” 2012)

### **Why do Napalm and Herbicides not fit into the 1925 Geneva Protocol?**

As explained in previous chapters, Napalm and TH were used in several military conflicts since the WWII. By that time, they were a relatively new military weaponry. Despite, incendiary weapons already existed previous to the WWII, they were not used extensively. As for Herbicides, their synthesis to fit military objectives was only achieved in the 40s. Both weapons played an important role in several military conflicts, mainly between the 40s and the 70s. However, it was not until the mid-60s, during the VW, that the international legislators began to pay attention to this new weaponry. (Neer 2015)

According to legislators, Napalm is not by definition a chemical weapon, since its effects are the same as incendiary weapons, despite being composed by chemical compounds. Due to this it is not included in the 1925 Geneva Protocol. Hence all the hardships to find Napalm a regulation that will be described below.

Thus, in April 1965, as the Napalm bombardments increased in Indochina, the international criticism began, firstly by the Soviet Bloc countries. The USSR together with North Vietnam issued a communiqué condemning the usage of Napalm in “*peaceful populations*”. In the following year, the President of North Vietnam protested against the use of Napalm and the Warsaw Pact Nations also condemned the incendiary gel, which provoked deep burns. Due to the division of the world imposed by the Cold War, these implications did not go further, since they were regarded as mere propaganda. (“Respect for Human Rights in Armed Conflict: Existing Rules of International Law Covering the Prohibition or Restriction of Use of Specific Weapons, Survey Prepared by the Secretariat” 1973)

In May 1968 eighty-four states, including the US, participated in the UN's first International Conference on Human Rights, in Teheran. From this came into force the Conference Resolution XXIII, in which delegates regarded "*the use of chemical and biological means of warfare, including Napalm bombing, erode human rights and engender counter-brutality*". Also, UN General Assembly delegates should propose to the Secretary-General an additional study of Napalm, to examine if it was necessary the revision of an existing Convention or draft a new one. In the same year anti-Napalm protests intensified in US university campuses and the pressure to legislate against its use, in certain conditions, proceeded.

In 1969, UN Secretary General U Thant's office affirmed that Napalm deserved to be better studied, due to the results of the Teheran Conference resolution and an international document should be drafted and issued to clarify the situation. According to these measures, between 1969 and 1973 five reports regarding the *Respect for Human Rights in Armed Conflict* were prepared for the UN General Assembly. ("Respect for Human Rights in Armed Conflict: Existing Rules of International Law Covering the Prohibition or Restriction of Use of Specific Weapons, Survey Prepared by the Secretariat" 1973; "Final Act of the International Conference on Human Rights, Teheran" 1968; Neer 2015)

In 1970, the Secretary-General repeated the call to action against Napalm since no actual efforts have been made. On the 20<sup>th</sup> of December 1971 the world gathered at the UN Assembly to declare Napalm as a "*cruel weapon*". In this, UN Assembly members asked the Secretary-General to draft, with urgency and with the help of experts a report regarding Napalm and other Incendiary Weapons. On the 22<sup>nd</sup> of September 1972, the UN received the report "*Napalm and Other Incendiary Weapons and All Aspects of Their Possible Use: Report of the Secretary-General*". This document was extensively described in this present research work (Chapter I). Nevertheless, the qualified consultants concluded, unanimously, that incendiary weapons needed regulation, due to being too powerful and cruel like the weapons of mass destruction (nuclear, chemical or biological weapons).

The necessity of regulation came from the observation of the victims of Napalm, mainly their burns, which were extensive and deep and needed special medical aid. Due to the lack of protection of civil population with special designed anti-napalm equipment, they suffered the most, since were more exposed when compared with the military personnel. Also, the experts concluded that incendiary weapons were not very precise, since they could reach a considerable area, leading to the indiscriminate usage and the destruction of lives and territories of non-combatants. Moreover, too many times the target of a military objective was too close to the civilians and protective measures could not be totally effective. Lastly, the experts advise "*for the prohibition of the use, production, development and stockpiling of Napalm and other Incendiary Weapons*". ("General Assembly Resolution

2852 (XXVI). Respect for Human Rights in Armed Conflicts” 1971; Aisida et al. 1973; Neer 2015)

The result was one hundred countries to back up a resolution to prohibit the deployment of Napalm in combat. Despite no opposition, fifteen countries abstained, such as the US. In late 1972, the UN General Assembly issued Resolution 2932, affirming the deplorable usage of Napalm in all military conflicts. (“Resolution 2932 (XXVII). General and Complete Disarmament” 1972; *New York Times* 1972)

Despite all these reports and reunions, Napalm continued without a proper legislation, since it was not yet forbidden by general international law. One of the hypotheses for this impasse was the lack of definition in terms of how much suffering is unnecessary and superfluous in a war. This concept is very difficult to define and to be transcribed into a legal format, due to its subjectivity. However, other arguments to prohibit Napalm proceeded, such as the large quantities of CO emitted. During the deployment of a Napalm bomb, which may cause permanent injuries to the victim or death by asphyxiation. In this case, Napalm should be considered a cruel weapon, since the victims can be burnt, poisoned and/or asphyxiated and it would imply a violation of the 1925 Geneva Protocol. Once again, these arguments fell through, due to inconclusiveness. (Neer 2015; “Disarmament Treaties Database: 1925 Geneva Protocol” n.d.; “Treaties, States Parties, and Commentaries - Hague Convention (IV) on War on Land and Its Annexed Regulations, 1907” n.d.; “Respect for Human Rights in Armed Conflict: Existing Rules of International Law Covering the Prohibition or Restriction of Use of Specific Weapons, Survey Prepared by the Secretariat” 1973)

Nevertheless, the pressure kept going. In December 1973, the UN General Assembly issued Resolution 3076 (XXVIII), entitled “*Napalm and Other Incendiary Weapons and All Aspects of Their Possible Use*”. A group of experts assembled by the Red Cross to assist the Diplomatic Conference and produced two reports on war legislation with an extensive review of Napalm. The Diplomatic Conference proposed revisions to the Geneva Conventions in 1977, however there were no specific rules, regarding Napalm. The result was a document entitled “*Follow-up regarding Prohibition or Restriction of Use of Certain Conventional Weapons*”. In 1974, UN Resolution 3255 (XXIX) came to fruition, which accounted the reports of the Red Cross and the condemnation of the burns and injuries caused by Napalm. The delegates postponed the Diplomatic Conference to have this information into account. These reports and resolutions, eventually, led to the adoption of legislation entirely dedicated to Napalm. (“Napalm and Other Incendiary Weapons and All Aspects of Their Possible Use: 3076 (XXVIII)” 1973; “Napalm and Other Incendiary Weapons and All Aspects of Their Possible Use: 3255 (XXIX)” 1974)



Regarding TH, there have been different interpretations of the 1925 Geneva Protocol, to understand if the herbicidal warfare is a part of it. Like Napalm, Herbicides were heavily used in the VW to defoliate the vegetation and they raised concerns, since war veterans and the civil population presented several diseases, such as cancer, allegedly due to herbicidal exposure. Also, the 70s brought a general environmental conscience and with it several UN resolutions and condemnations of the use of Herbicides in war. Nevertheless, like Napalm, the 1925 Geneva Protocols did not regulate its use. Firstly, the Geneva Protocol prohibits the usage in the battlefield of “*asphyxiating, poisonous or other gases, and all analogous liquids, materials or devices*”. The signatory states could make reservations and declarations of interpretations. However, none has been made in respect of Herbicides or similar substances. Secondly, TH are not designed to harm humans, since the primary objective it is to spray vegetation areas for defoliation. Despite, Herbicides may have secondary effects on humans, when they are used in crops and water sources used by the population, this is not their aim. (Fallon et al. 1994; “Disarmament Treaties Database: 1925 Geneva Protocol” n.d.; Sterling, Hurley, and Minh 2006)

In 1966, during a UN General Assembly the US declared their support to the 1925 Geneva Protocol, even though they did not ratify it until 1975. However, they maintained their position, affirming that Herbicides were not contemplated in the Geneva Protocol. This position regarding Herbicides was instilled even in the Kennedy Administration, when the use of Herbicides was first discussed. At that time, Secretary of State Dean Rusk informed the President affirming, “*the use of defoliant does not violate any rule of international law concerning chemical warfare and is an accepted tactic of war.*” This position, that the Herbicidal Warfare was not forbidden by the 1925 Geneva Protocol and other international agreement, stood for the US throughout the years. Even when Vietnam demanded cleaning programs and compensations to the US for the harms that Agent Orange caused.

In 1969, the UN General Assembly approved Resolution 2603 (XXIV), recognizing the prohibition in international conflicts of the usage of chemical warfare agents, either as gas, liquid or solid form, which may be “*employed because of their direct toxic effects on man, animals or plants*”. The Resolution aimed to review the 1925 Geneva Protocol and declare that newer substances, such as Herbicides, were not contemplated. The result was the majority of states to abstain from this resolution, since the scope of weapons was not foreseen in the 1925 Geneva Protocol. (Bothe n.d.; “Customary IHL - Practice Relating to Rule 76. Herbicides” n.d.)

The heavy deployment of Herbicides in the VW, mainly in the Operation Ranch Hand, was widely documented with its human and environmental possible negative implications. Thus, a legislation that regulates TH was needed.

## International regulation of Napalm and Tactical Herbicides

### Convention for Certain Conventional Weapons

In 1980, after several failed conventions it was concluded, in Geneva, the *Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects*, or the shorten version, *Convention on Certain Conventional Weapons*. The aim was to provide new rules for the protection of civilians from injury by weapons used in armed conflicts and to protect combatants from unnecessary suffering. The Convention is composed by three Protocols: Protocol I, which included devices that produced nondetectable fragments; Protocol II, that comprehends mines, booby traps and other devices and Protocol III, written specifically for incendiary weapons and their use against civilians. The state members may choose the Protocols they wish to abide for. (Neer 2015; “Disarmament Treaties Database: Convention on Certain Conventional Weapons” n.d.)

Thus, Protocol III bans the use of incendiary weapons not only against civilians, but also prohibits attack to a military objective located near populated areas, except if the attack is not air-delivered and precautions are taken to limit the effects to the military, minimizing any incidental life loss. Also, it was considered illegal to target forests or plants, except when they are covering the enemy or the military objective.

In 1983 the Convention was approved by 125 states and Protocol III was adopted by 115 countries. Portugal signed the Convention in 1981 and ratified it in 1997, so since then is bound to apply the terms of Protocol III. (“Disarmament Treaties Database: Protocol III to the Convention on Certain Conventional Weapons” n.d.)

The United States of America also signed the Convention and bound to Protocol III, but in 2009 decided to declare that they would “(...) *reserve the right to use incendiary weapons against military objectives located in concentrations of civilians where it is judged that such use would cause fewer casualties and/or less collateral damage than alternative weapons, but in so doing will take all feasible precautions with a view to limiting the incendiary effects to the military objective and to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects.*”. In 2010 Portugal opposed to this safeguard reaffirming those were essential parts of the protocol, being the reservation incompatible with the purpose of the protocol. This constitutes an example of how non-consensual Napalm’s legislation still is nowadays, reaffirming the importance of discussing this topic. (“Disarmament Treaties Database: Convention on Certain Conventional Weapons” n.d.)

## **Convention for Environmental Modifications and the Convention on Chemical Weapons**

Despite the non-existence of a specific legislation for TH, there are two Conventions that may be used to regulate TH use. *The Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques* (ENMOD) and the *Chemical Weapons Convention* (CWC).

The first was open for signatures in 1977 and entered in full force in 1978. The aim of the ENMOD was to ensure that environmental modifications techniques may benefit the environment and the relationship between human beings and nature. However, it is also important to realize the military and other uses may be harmful to the environment and human welfare.

According to Article 1, the intent of this convention was to ban the “*use of Herbicides by the military or by other hostile purpose against plants with long-lasting, widespread, and severe means of destruction to another State Party*”. In addition, Article II, defines the term “*environmental modification techniques*” as “*any technique for changing – through the deliberate manipulation of natural processes – the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space*”.

Until 2019 there were 78 state parties to the convention and 48 signatory states. Portugal signed the Convention in 1977, but the ratification never happened. The United States of America signed the Convention in 1977 and ratified it in 1980. (“Disarmament Treaties Database: Convention on Environmental Modification Techniques (ENMOD)” n.d.; “Customary IHL - Practice Relating to Rule 76. Herbicides” n.d.)

In 1992, happened the second review of the Conference of the Parties to the ENMOD Convention. In this it was reaffirmed that the military usage of herbicidal warfare was prohibited “*if such a use of Herbicides upsets the ecological balance of a region, thus causing widespread, long-lasting or severe effects as the means of destruction, damage or injury to another State Party*”. (“Customary IHL - Practice Relating to Rule 76. Herbicides” n.d.)

Secondly, the *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction* or the short version CWC opened for signatures in 1993 and entered in full force in 1997. The aim was to reinforce the 1925 Geneva Protocol, prohibiting a wider range of activities, including the development, production and stockpiling of chemical weapons.

As for Herbicides this convention specifies toxic chemicals effect on humans and other animals, excluding its use in plants. The 7<sup>th</sup> preambular paragraph includes the recognition of the prohibition of “*the use of Herbicides as a method of warfare*”. However,

despite the preambular note, Herbicides are not defined specifically in the Convention and there are no specific declaration or destruction requirements related to them.

Until 2019 there were 193 state parties to the convention and 165 signatory states. Portugal signed the convention in 1993 and proceed to ratification in 1996. Furthermore, the US signed the convention in 1993 and proceed to ratification in 1997. ("Disarmament Treaties Database: Chemical Weapons Convention" n.d.; Lieberman 2017)

Lastly, US considers that the 1925 Geneva Protocol and the CWC do not prohibit the usage of TH. However, US has renounced the usage of those chemical agents in war, making an exception for control of the vegetation on defensive perimeters in US bases and other facilities. The use of Herbicides in war has to have the authorization of the President of the US. ("Customary IHL - Practice Relating to Rule 76. Herbicides" n.d.)

### **The Present Days: Napalm and Tactical Herbicides**

In chapter I of this present research work, the environmental, legal medical aspects and moral implications of Napalm and TH were thoroughly described. Nevertheless, it is important to focus the discussion in the present days, since the main military conflicts described, the VW and the PCW, happened between the 50s and 70s of the last century. Although the 21<sup>st</sup> century has not yet witness the same amount of deployment of Napalm and TH, there are other important issues to be addressed. (Neer 2015; Fallon et al. 1994)

As for Napalm, the 1980 Convention for Certain Conventional Weapons provided a legislation for Incendiary Weapons, prohibiting its usage against civilian concentrations, making it legal to deploy Napalm in military objectives. In this context, this weapon continued to be used in military conflicts, already described in chapter I of this research work. As recent as October of 2019, news resurfaced about Napalm, when the Kurds accused the Turkish military of an alleged deployment of Napalm and White Phosphorus in Syria. Despite, international experts have not found evidence of such weapons, the Kurdish affirm the existence of children victims of Napalm, as shown in a video and photographs. (*France* 24 2019; "Disarmament Treaties Database: Protocol III to the Convention on Certain Conventional Weapons" n.d.; *The New Arab* 2018)

However, these accusations are not new. In 2016, *Human Rights Watch* accused joint Syria/Russia military of deploying incendiary weapons with aircrafts in Operation Began, in civilian areas. If these allegations are true, this could mean a bridge of the Protocol III of the Convention of Certain Conventional Weapons, which legislates incendiary weapons and forbids the use of air-delivered incendiary weapons in civilian areas. Russia is consented to bound to this Convention since 1982. However, Syria never joined the

Protocol. In 2016, countries gathered in Geneva, to discuss Napalm's legislation. It was agreed that the air deployment of Napalm is a violation of Protocol III, and efforts should be made to strengthen the legislation to forbid the usage of ground-launched incendiary weapons in civilians. Finally, Syria (and other countries) should be pressured to join Protocol III. According to *Human Rights Watch*, the use of incendiary weapons in Syria has been reported at least 40 times, by journalists and other entities, but until 2016 there was no visual information to corroborate these accusations. (Shaheen 2015; "Syria/Russia: Incendiary Weapons Burn in Aleppo, Idlib" 2016)

It is therefore evident that although in the 21<sup>st</sup> century the use of Napalm has decreased compared to the previous century, the regulation of incendiary weapons remains a challenge. A real international effort is needed to reach consensus, so that more countries comply with the Convention.

As for Herbicides, the most recent use by a military force happened when the Israel military sprayed an area near the Gaza Strip with Herbicides, such as Glyphosate, which indirectly affected the Gaza crops. This could mean a violation of TH regulations, since the crops were altered, because of chemical substances and the livelihood of the farmers and their families were jeopardized, due to ruined crops and indirect contact with Herbicides. However, it is still too early to know the full extent of damages provoked by the Herbicides in that area. (Weizman et al. 2020)

With the rising of climate change awareness and the improvement in medical research, is important to understand other means of use and exposure to Herbicides, such as agriculture, occupational, domestic and public use, in order to comprehend its long-term effects on human health and ecosystems. For instances, TH were used in greater concentrations and larger amounts, when compared with the agricultural use. Nonetheless, nowadays Herbicides are widely used, in larger quantities worldwide, especially in agriculture, due to a good cost-benefit ratio. It becomes crucial to understand the impact agricultural Herbicides might have on the environment and human health on a short and long term, since the negative consequences might be similar to TH. (Fallon et al. 1994; Petruzzello n.d.)

Taking the example of the Herbicide Glyphosate, allegedly used in the Gaza Strip. This is a broad-spectrum herbicide, designed to kill unwanted plants in agriculture and other landscapes, such as home gardens or public pathways. It achieves its aim by inhibiting the enzyme 5-enolpyruvylshikimate-3-phosphate (EPSP) synthase, causing the reduction of aromatic amino acids production that are vital for protein synthesis and plant growth. Glyphosate is one of the most used broad-spectrum Herbicides, worldwide. It was first registered and sold in the US in 1974 by the Monsanto Company, the same manufactory of the most used Herbicide in the VW - Agent Orange. (Gillezeau et al. 2019; "Glyphosate -

an Overview” 2009; “What Is Glyphosate Herbicide? | Roundup Weed Killer Ingredient” n.d.; Malkan 2020)

In fact, the widely use of Glyphosate began in the late 70s in agriculture. Firstly, it was portrayed as an “eco-friendly” alternative, but these assumptions suddenly changed in the 80s, when the first scientific studies on animals were first published. These studies found evidence of different tumours growing in lab rats and because of this results the EPA classified Glyphosate as a Group C chemical, due to possibility of carcinogenic effects in humans. However, years later EPA reclassified Glyphosate to a Group E chemical, due to lobbying by Monsanto. (“What Is Glyphosate Herbicide? | Roundup Weed Killer Ingredient” n.d.)

The scientific studies proceeded throughout the years and so the usage of Glyphosate in agriculture. Several studies demonstrated that the widespread of Glyphosate causes weed resistance, which means that a higher concentration needs to be used after a certain period. Moreover, humans might be exposed to this Herbicide through diverse routes, such as food, water, and occupational and environmental settings. The Herbicide may be spread through wind, contaminating areas not related with agriculture. (“What Is Glyphosate Herbicide? | Roundup Weed Killer Ingredient” n.d.; Gillezeau et al. 2019; Malkan 2020)

Also, several studies linked Glyphosate with being carcinogenic to humans. In 2015, the WHO classified Glyphosate as “*probably carcinogenic to humans*”. This led to several countries ban the commercial sale of Glyphosate. However, this is not a unanimous opinion since other studies found no relation between the Herbicide and cancer. For instances, in 2019, a Germany’s Federal Institute for Risk Assessment report affirmed that Glyphosate was not carcinogenic. Nevertheless, in February 2020, other scientific studies resurfaced, accusing the laboratories of fraudulent research. According to EU legislation, Glyphosate is approved until 15<sup>th</sup> December 2022, after the authorization being renovated in 2017, due to lack of evidence of its carcinogenic effects in humans. Even so, some European countries, such as Germany, Austria, Italy and Luxembourg imposed restrictions to its usage and even a total ban of the chemical. As for US, the use of Glyphosate is ruled as safe by EPA. In January 2020, after public commentary on Glyphosate, EPA conducted a review in which they did not find any evidence of risks to the human health, if used according to instructions.(Malkan 2020; “Glyphosate | Food Safety” n.d.; “What Is Glyphosate Herbicide? | Roundup Weed Killer Ingredient” n.d.; “Glyphosate | Ingredients Used in Pesticide Products” n.d.)

In fact, Bayer’s website, the owner of Monsanto since 2018, enumerates the role Glyphosate plays in preserving the environment and biodiversity, such protecting bees, the reduction in tillage practices, preserving the soil from erosion and infertility and even

preserving the future harvesting practices for future generations. Furthermore, in a *New York Times* article, several farmers in the US affirmed they will continue to use Glyphosate, due to its efficiency and the cost effectiveness that comes from it, despite its linkage to cancer by certain scientific studies. (“Glyphosate-Based Herbicides, the Environment and Biodiversity” n.d.; Cohen 2019)

However, throughout the years the Monsanto Company has faced about 42000 lawsuits by people who affirm developed cancer, due to the regular use of Glyphosate. In 2017 new questions arose, when an US federal court, provided with new Monsanto documents, regarding Monsanto’s influence in the scientific research conducted by EPA. Also, in 2018 Bayer was condemned to pay more than 250 million of euros to Dewayne Johnson, which convicted Monsanto for his terminal cancer due to years of contact with Glyphosate. This was the first judicial decision in a case involving the effects of the herbicide on human health. Also, an article by Portuguese newspaper *Público* from, June 2020, announced that Bayer would pay about 10 billion dollars in order to close over Monsanto’s one hundred thousand lawsuits, accusing Glyphosate of causing cancer. (H. Carvalho 2020; *Público* 2018)

In Portugal, Glyphosate is the most used Herbicide in agriculture and domestic use. As for 2018, Portugal is the third European country with the most soil contamination with this herbicide. In this context, after the renewal of EU licencing of Glyphosate in 2017, environmentalist groups conducted a study, in which was found levels of Glyphosate above average reference levels in Portuguese agricultural soils. Furthermore, law-decree nº35/2017 restricted even more the utilization of Glyphosate in public spaces, as followed: “*use in public places of particular concentration of certain population groups, should be further restricted, favouring the use of other means of controlling harmful organisms in plants, such as mechanical, biological, biotechnical or cultural control.*”(“Sabe o Que é o Glifosato?” 2016; “Decreto-Lei n.º 35/2017” 2017; Almeida 2019; *Público* 2017)

### **The Ethics of War: Napalm and Tactical Herbicides**

War implies certain decisions, which are perceived as senseless to countries leaving in peace. It is paramount not to forget that the actions taken in a war scenario are too extreme and a complete violation of a normal society legislation. Nonetheless, it is important to perceive ethics in a war context, where too many societal rules do not apply anymore. How can we comprehend ethics in a war context, when human beings deliberately kill and harm each other? Firstly, it is important to understand that a military conflict it is the last resort and happens when a diplomatic agreement fails to be achieved. Also, it is crucial to have in mind the bigger picture, meaning the final aim of the military conflict. This means

that the usage of lethal force may be conducted to avoid a greater harm. This justification also implies that the military should not apply a greater harm as the one they are trying to prevent or rectify, when the other alternatives of a less harm are not doable. (Lucas 2016)

This research work made clear Napalm and TH played a central role in some of the most important wars of the 20<sup>th</sup> century. The main military conflicts discussed were VW and the PCW. At the time, the countries using those weapons were not (technically) violating any international agreement. The weapons were recent and there was no specific regulation, as they were not explicitly included in the 1925 Geneva Protocol. Since then, the path to achieve international regulation has raised important ethical issues, that must be underlined.

So, it makes sense that the first issue discussed is the cruelty of these weapons, especially Napalm. How to objectively describe the pain inflicted on Napalm's victims and how to regulate it? This question entails a difficult answer, since each pain has an important subjective component, but according to a UN report, described previously in this research work, shows the damage Napalm causes is clear. It adheres strongly to the skin, causing deep and extensive burns. It can also induce death by asphyxiation and poisoning due to the emission of CO. Despite the facts the question can be debatable, and a Portuguese General even declared "*in war all weapons are designed to kill or wound and there is no need to discuss this theme*". But the issue is controversial, and excessive violence must always be questioned. (W. Galston 2001; M. Contakes and Jashinsky 2016; "Disarmament Treaties Database: 1925 Geneva Protocol" n.d.; Aisida et al. 1973)

Concerning regulation, should weapons of war be subject to national or international legislation? Should countries pay compensations to a country, war veterans and civil population affected by short- or long-term effects of the war? In this research work, the PCW was discussed, and the use of Napalm and TH was compared with the VW. In both cases, the conflicts took place in foreign countries, thousands of kilometres from Portugal and the US, so the damage caused would not have repercussions on the mother countries. The lower density of forest and wildlife, crops and livestock, in addition to the long term adverse effects on the health (like cancer and birth defects) of war veterans and civilians who came into contact with these weapons were easily overlooked by those who used them, as they did not have to confront the damage, felt for generations. Although the US, years after the conflict, compensated US veterans and implemented clean-up programs in Vietnam, it is important to consider whether this is sufficient and whether the consequences could have been mitigated during the war. In the Portuguese case, we are not aware of any study that has addressed this issue, so the damage caused using Napalm and TH in Angola, Mozambique or Guinea-Bissau is not known or recognized. Therefore, international



regulation seems to be the most appropriate to prevent damage to third parties and, ultimately, to the planet. (M. Contakes and Jashinsky 2016; W. Galston 2001; Neer 2015)

Indeed, in war it is difficult to decide which weapons are ethical or not. In this context what it is paramount it is to question if the military advantages surpass the pain and life-long wounds inflicted in the military, civilians and environment, and if it is necessary to regulate the already existing Conventions. Is that why, despite the standards imposed by international conventions, Napalm and TH continue to be used, often in violation of the rules that so many countries have signed? Should the rules be simplified, or should the use of these chemical compounds be permanently prohibited? What is certain is that the imposition of rules that are not followed does not meet any of the objectives, leaving room for the most frightening scenarios to reoccur. For instances, it was proposed in 2016 that ground launching of Napalm against civilians should also be forbidden. Should international conventions protect more the civilian populations? (“Syria/Russia: Incendiary Weapons Burn in Aleppo, Idlib” 2016)

How advantageous are the usage of Napalm and TH in a war, if they might have severe negative effects on human beings and in the environment, many years after the end of the military conflict?

## Chapter V - Questionnaire

### Chapter overview

This section aims to analyse the data provided by the questionnaire distributed to the Portuguese population, to obtain the knowledge and opinion about the utilization of Napalm and Tactical Herbicides in wars in general and in the Portuguese Colonial War in specific. This chapter will follow the traditional format: introduction, materials and methods, results, discussion and conclusion.

### Introduction

The ethical discussion of the previous chapter referred to the existing misunderstanding regarding Napalm and Herbicides legislation and their utilization. For instances, TH do not have an individual legislation, relaying on two international Conventions about other subjects. As for Napalm, its legislation it is still being discussed, such as a possible prohibition of its ground delivering. In fact, both weapons were used prominently in the 20<sup>th</sup> century. After the worldwide moral judgement of the VW, their use continued, but with more secrecy. This resulted in lack of information and discussion about these weapons for decades and the consequent loss of interest and knowledge by the general public.

Since this academic work is an original in-depth research on the use of Napalm and Herbicides in the PCW, a proper practical application of the theoretical research work would be to gather information regarding on the extent of knowledge, opinions and underlying ethical issues of the Portuguese population on this subject.

Initially, we considered obtaining this information through interviews with PCW veterans. However, after considering: a) the reduced number of interviews; b) subjective content analysis; c) the possible loss of focus of the main theme in the middle of the discussion and d) the lack of anonymity that could lead individuals to not reveal important information, it was decided to apply a questionnaire. This decision was made before the COVID pandemic, but it also proved to be the most appropriate in this circumstance.

According to Cambridge Dictionary a questionnaire “*is a list of questions that several people are asked so that information can be collected about something*”. This method was chosen for a set of advantages, such the efficiency of reaching large groups of people, the anonymity that allows more people to answer without any pressure and the quantitative analysis, that allow more objective results. Also, most of the existing questionnaires about the PCW focus on war veterans’ mental aspects and general knowledge of the war. It was

not possible to find any questionnaires regarding weapons or military equipment, so the present questionnaire (Annex 1) was constructed entirely from scratch. (Magalhães Hill and Hill 2008; Mcleod 2018; "Questionnaire Meaning" n.d.)

Thus, to gather a large amount of people's opinions and knowledge, the initial idea (that was put into practice) was the draft of three different questionnaires for three different populations: 1) a questionnaire dedicated to the Portuguese population in general (that would be distributed online or hand in hand); 2) a questionnaire for the active military of the PAF (that would be distributed through all three branches of the PAF, on an online format); and 3) a third questionnaire for the veterans of the PCW (that would be distributed through the Portuguese association *Liga dos Combatentes*). The aim was to compare three perspectives: that of the Portuguese population with general knowledge *versus* that of the Portuguese military *versus* the perspective of the Portuguese who participated in the PCW.

To fulfil this objective an authorization was requested to the Ethics Committee of the Centro Hospitalar Universitário do Porto (CE CHUP / ICBAS). The project presented with the reference 2020 / CE / P007 (P319 / CETI / ICBAS) obtained a favourable opinion, but unfortunately from the three branches of the PAF contacted, one did not respond and the remaining two decided not to participate, such as the Portuguese *Liga dos Combatente*, which represents veterans of the PCW.

Due to these obstacles, it was only possible to distribute the questionnaire to the Portuguese population in general, a questionnaire to which was added a section intended for PCW veterans who participate casually, to fill out. Due to the COVID-19 pandemic, the distribution of questionnaires was almost exclusively completed online, which made data collection even more difficult. This chapter will present the methodology of the questionnaire, followed by the results and their discussion. Lastly, conclusions will be drawn according to the given results.

## **Methods**

Due to the pandemic, the questionnaire was almost entirely distributed electronically (online or on social networks), and the phenomenon "snowball method" was verified, since the participants were asked to share the questionnaire with other potential stakeholders. Only individuals of Portuguese nationality, aged 18 or over, who agreed to participate were included in the sample. The anonymity of the questionnaire was guaranteed: a) by using uncharacterized envelopes in the paper version and b) by using *Google Form* for the online questionnaire, which does not allow the collection of participants' emails, to guarantee confidentiality.

We expected to have a sample of more than 385 questionnaires, a value obtained after calculation performed with the *SurveyMonkey* software, for a 95% confidence level and a 5% error margin. The calculation of the sample size of the target population (9 344 479 million Portuguese aged 18 or over) indicated that 385 questionnaires would be needed, but only 323 responses were obtained, one of which had to be excluded for not meeting the inclusion criteria of the study. (“Recenseados: Total, Por Nacionalidade e Por Residência” 2019; “Calculadora de Tamanho de Amostra” n.d.)

The questionnaire it is composed by 51 questions for the general population separated by four different sections: sociodemographic data, knowledge about Napalm, knowledge about TH and their legal ethical aspects. Also, the questionnaire has an extra 11 questions, in a fifth section, merely dedicated to the veterans of the PCW.

Most of the questions are in a close ended format. Thus, the results will be presented in graphs, such as pie-charts, bar-charts and tables demonstrating percentages. For this study the close ended format will include: a) scaling questions (or ranking questions), which presents a rank of available answers on a scale of a given range of values (for example for 1 to 10); b) dichotomous questions, which represent two available answers (for example yes or no); c) multiple choice questions, where it is offered to the respondents a limited set of answers from which they need to choose one and d) Likert scale questions, an usually satisfaction 5-point scale that ranges from one extreme attitude to another (e.g. completely disagree to agree completely), including a moderate or neutral option. The close-ended format allows to statistically quantify the data and to obtain people’s opinion or knowledge, even when they do not have a great amount of knowledge on the theme.

Moreover, open-ended questions were also used to recollect participants’ year of birth, place of birth and residency. All this data will be displayed in graphs or tables with percentages.(Magalhães Hill and Hill 2008)

All data was collected on a Microsoft Excel spreadsheet and analysed in the same *software*.

Before the descriptive analysis of the results, it is important to recognize the precision and accuracy of the questionnaire. To ensure this a pre-test was conducted on a small number of people. Due to shortness of time and the impossibility to dislocate due to the COVID-19 pandemic, a larger pre-test did not take place.

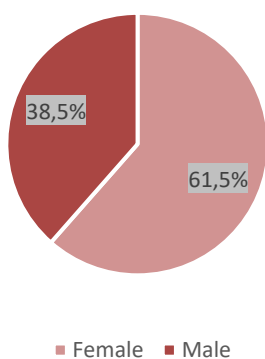
## Results and Discussion

### Section 1: Sociodemographic data

The sample size of this section includes all 322 participants, since all questions were of obligatory response.

Five variables were defined to obtain the characterization of the participants of this study: sex, age, geographic distribution separated by place of birth and county of residence, educational qualifications and professional situation.

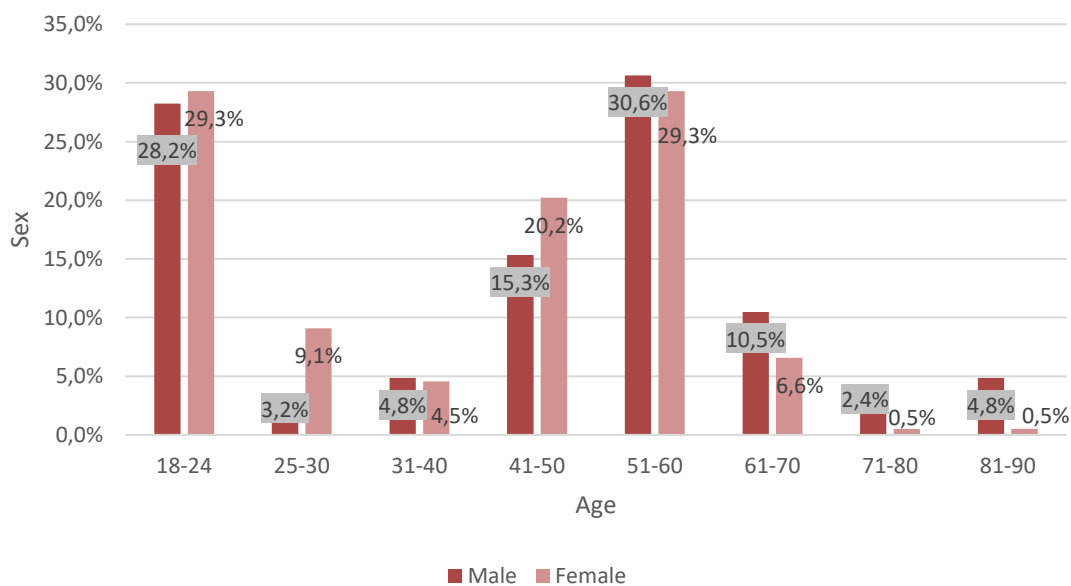
**Graph 1 - Sex distribution of participants**



**Table 1 - Age categories of the participants and its percentages**

Age	%
18-24	28,9%
25-30	6,8%
31-40	4,7%
41-50	18,3%
51-60	29,8%
61-70	8,1%
71-80	1,2%
81-90	2,2%
<b>Total</b>	<b>100%</b>

**Graph 2 - Sex and age distribution of participants**

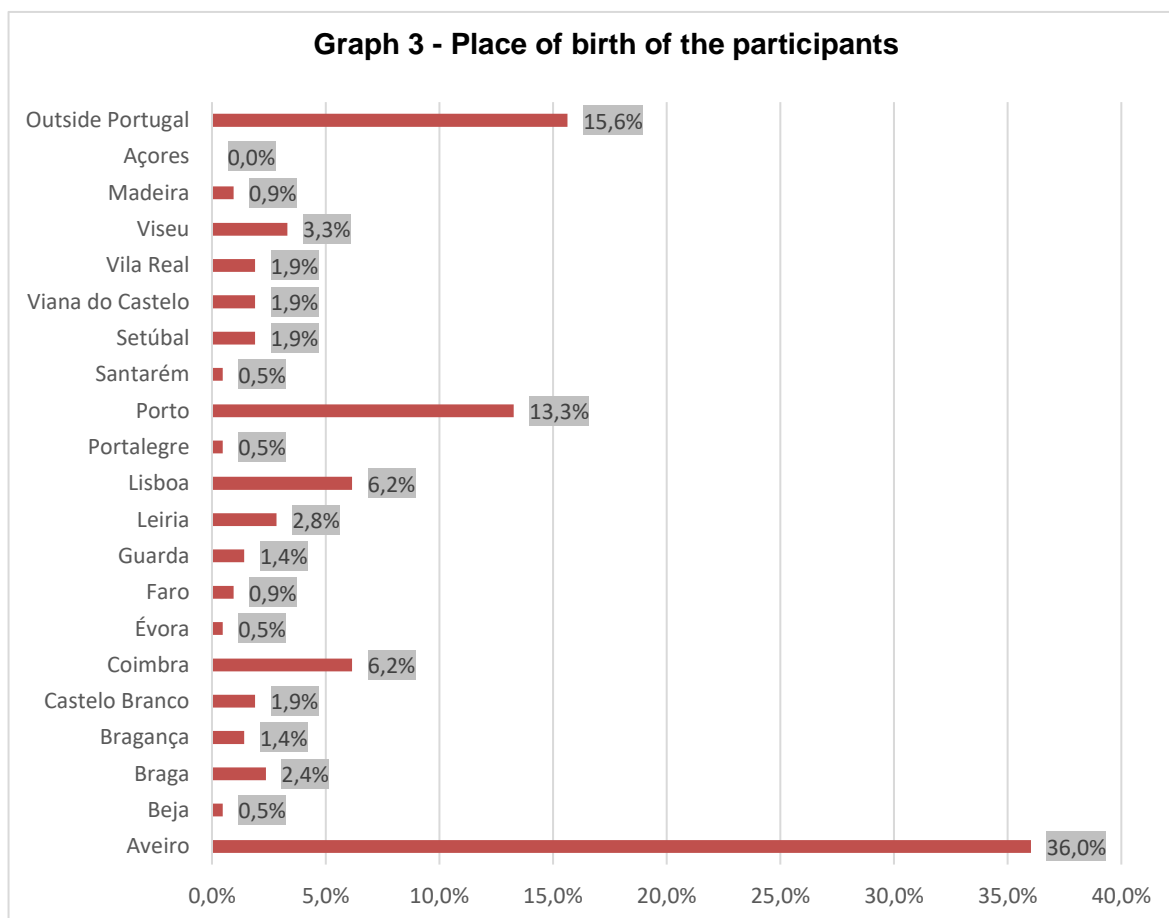


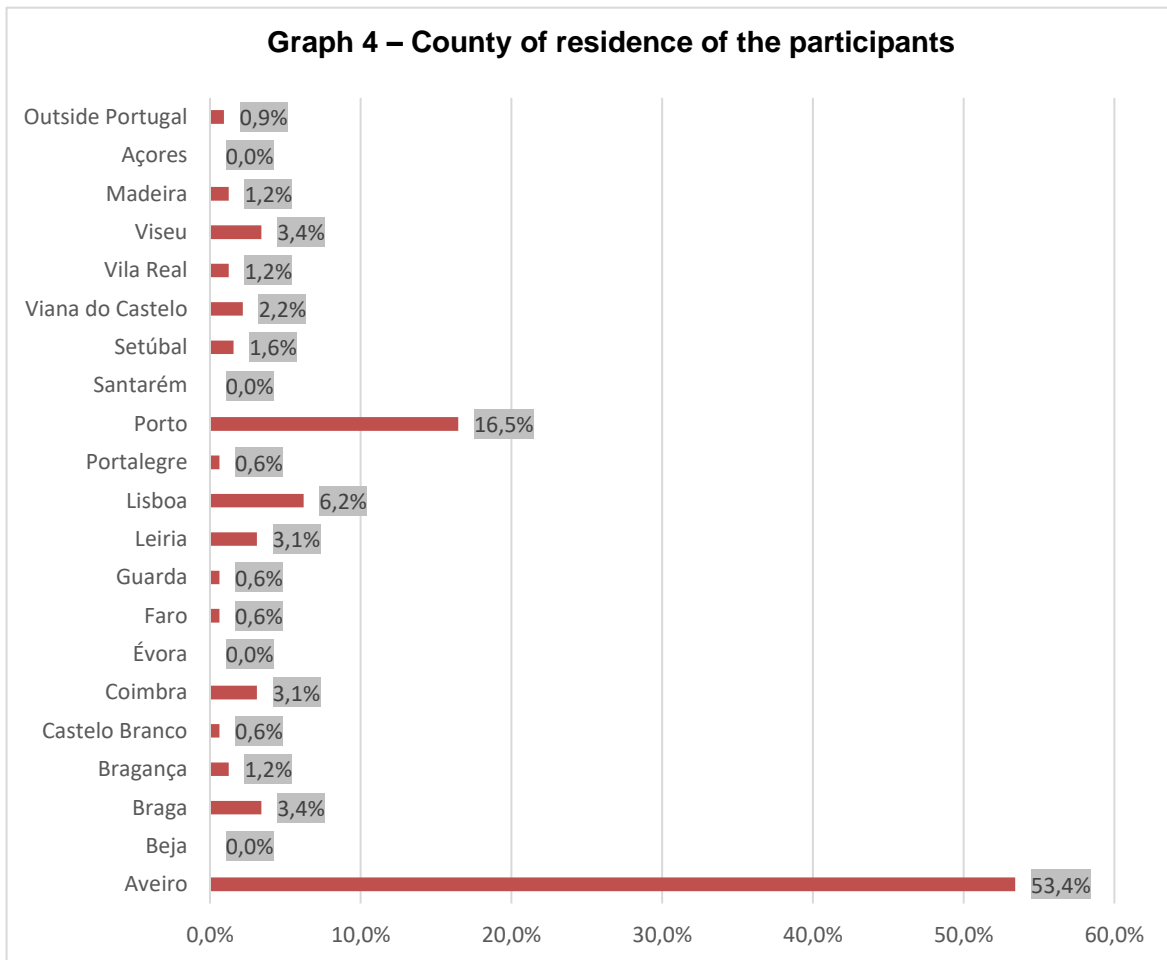
Regarding sex, the distribution was not close to equity, since the data (Graph 1) shows a clear female majority of 61,5% over only 38,5% of male participants.

Concerning age (Table 1), 28,9% of the participants are 18 to 24 years old, 18,3% are 41 to 50 years old and 29,8% have between 51 and 60 years old. This three groups account for 72% of the participants. The age groups between 25 and 30 years old and 31 and 40 years old, account for 11,5% of total number of participants.

Even though, most of the participants filled the questionnaire online, the higher age groups still managed to have a good representation. The participants between 61 and 70 years old were 8,1% of the total and the responders with 71 years old or more accounted for 3,4% of the participants. These results show that 11,5% of the participants are 61 years or older.

Taking a closer look to Graph 2, which relates sex with age, male respondents are in majority from the age of 51 years old onwards, despite the overall female majority. This might have happened due to the answers of the war veterans, mainly in the older categories, since 2,4% of male against 0,5% of female are between 71 and 80 years old and 4,8% of male against 0,5% of female are between 81 and 90 years old.

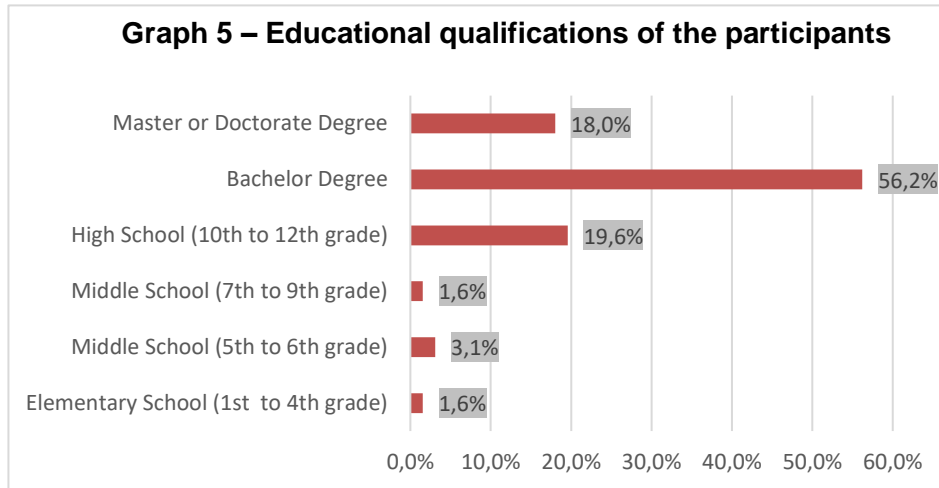




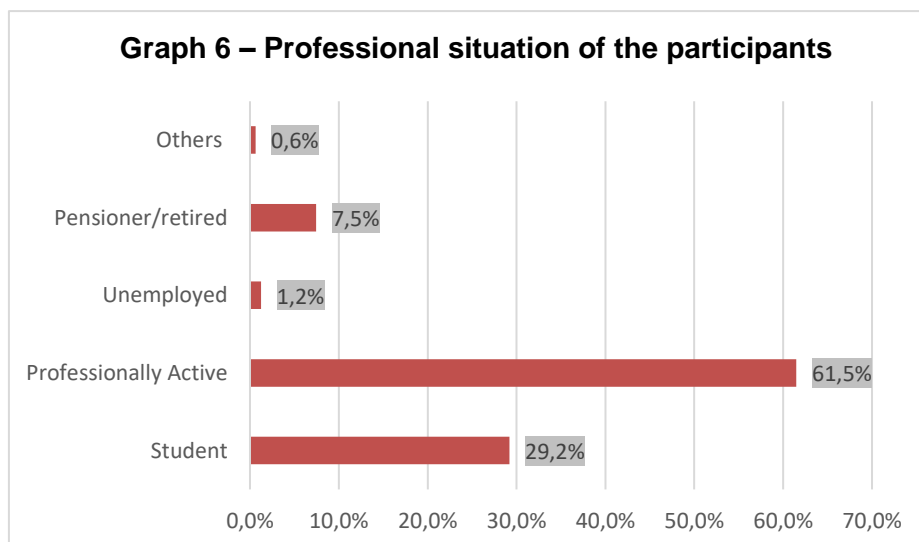
The place of birth (Graph 3) and the country of residence (Graph 4) of the participants were organized in the eighteen Portuguese districts, the two archipelagos and the category “Outside Portugal” for Portuguese people who were born outside of the country or that live abroad now. It is important to note that, on Graph 3, 111 participants were excluded because they answered their nationality, instead of their place of birth, reducing the sample from 322 respondents to 211. With this regard, both graphs show a similar distribution. As for the place of birth (Graph 3), the great majority is from Aveiro (36,0%), followed by Outside Portugal (15,6%), Porto (13,3%). Lisbon and Coimbra, both with 6,2%. Most of the participants were born in the centre and north of Portugal, accounting for 79,2% of the total. As for the south part of the country 62,7% of the participants were born there. Concerning the islands, Azores did not have any data and Madeira has 0,9% of the participants.

Regarding the county of residence, most of the participants live in Aveiro (53,4%), followed by Porto (16,5%), Lisbon (6,2%), Braga and Viseu, both with 3,4% of the respondents and Coimbra and Leiria both with 3,1% of the participants. Most of the

participants live in the centre and north of Portugal (94,9%). This distribution might have been conditioned by the place where the study was conducted, since the university is in Porto and the researchers live in Aveiro and Porto.



Regarding the educational qualifications (Graph 5), most of the participants possess a bachelor's degree (56,2%), followed by a high school diploma (19,6%) and a master or doctorate degree (18,0%). The respondents with a middle school and elementary school diploma account for only 6,3%. It is important to point that 74,2% of the participants have higher education, either an undergraduate or graduate degree.



Concerning the professional situation (Graph 6), most participants are professionally active (61,5%), followed by students (29,2%) and pensioner/retired respondents (7,5%). In



the minor percentage stands the participants who are unemployed (1,2%) and the respondents who answered “others” (0,6%).

## Section 2: Knowledge about Napalm

This section aims to understand the knowledge the general population might have about Napalm. The total of participants included are the ones who answered “yes” to the first question of this section “Do you know what Napalm is?”. The respondents who answered “No” were asked to skip this section and advance to the next.

Answer	Frequency	%
Yes	181	56%
No	141	44%
<b>Total</b>	<b>322</b>	<b>100%</b>

According to Table 2, most of the participants know what Napalm is (56%) against 44% of the respondents that do not know. Thus, the total number of participants of this section will be 181 instead of 322.

Affirmation	Strongly disagree	Partly disagree	Neither agree nor disagree	Partly agree	Strongly Agree
I know the types of bodily damage that Napalm can cause on the human beings	3,3%	7,7%	3,3%	42,0%	43,6%
I know the environmental consequences that can result from using Napalm	4,4%	7,7%	7,7%	41,4%	38,7%
Napalm serves to remove cover from the enemy (vegetation, shelters ...), exposing it	6,1%	9,9%	14,4%	35,9%	33,7%
Napalm causes destruction of vegetation	1,1%	3,3%	7,7%	29,3%	58,6%
Napalm is used to destroy agricultural crops	12,2%	8,3%	22,1%	33,7%	23,8%
Napalm is effective even in adverse weather conditions	5,0%	6,1%	37,0%	23,8%	28,2%
Napalm is used to poison water sources	19,3%	12,7%	30,4%	20,4%	17,1%

Affirmation	Strongly disagree	Partly disagree	Neither agree nor disagree	Partly agree	Strongly Agree
Napalm has military advantages, such as high precision	18,8%	15,5%	27,1%	20,4%	18,2%
Napalm is a type of economic weaponry	13,8%	9,4%	36,5%	20,4%	19,9%

**Legend:** Higher percentage  Lower percentage

According to Table 3, about 85,6% of the respondents know the negative consequences of Napalm on human beings and 80,1% know the negative consequences of Napalm on the environment. This data is the some of the percentages of partially and strongly agree of the first two affirmations. As for the military advantages of Napalm, 69,6% of the respondents either agreed partly or strongly that Napalm might be used to remove enemy cover. Moreover, 87,9% of the respondents know that Napalm may be utilized for deforestation purposes and 57,5% are sure that Napalm may be used to destroy crops.

However, as for the other military advantages, most of the respondents demonstrated lack of knowledge and unsureness, regarding specific Napalm's military characteristics. As for Napalm's effectiveness on adverse weather conditions, the highest percentage of respondents chose a neutral answer (37%), despite 52% leaned to agree with the affirmation. As for Napalm's cost the same thing happened, and 36,5% of the respondents chose the neutral answer, with 40,3% leaning to affirm Napalm is an economic weapon. As for poison of water sources and high precision, the answers despite being in its majority neutral (30,4% and 27,1% respectively), they are similar in each category, demonstrating that the specific details of Napalm escaped the participant's knowledge and comprehension. On contrary, the general consequences that Napalm might have on human beings and on the environment, such as deforestation are generally known.

Affirmation	Not confident	Unsure	Neither little nor very confident	Very confident	Totally confident
Napalm was used by the Portuguese Armed Forces during the Portuguese Colonial War	8,3%	11,6%	33,1%	26,5%	20,4%
Napalm may be used nowadays	26,5%	18,2%	22,1%	17,1%	16,0%
Burns caused by Napalm are easy to treat	77,9%	11,6%	4,4%	2,2%	3,9%

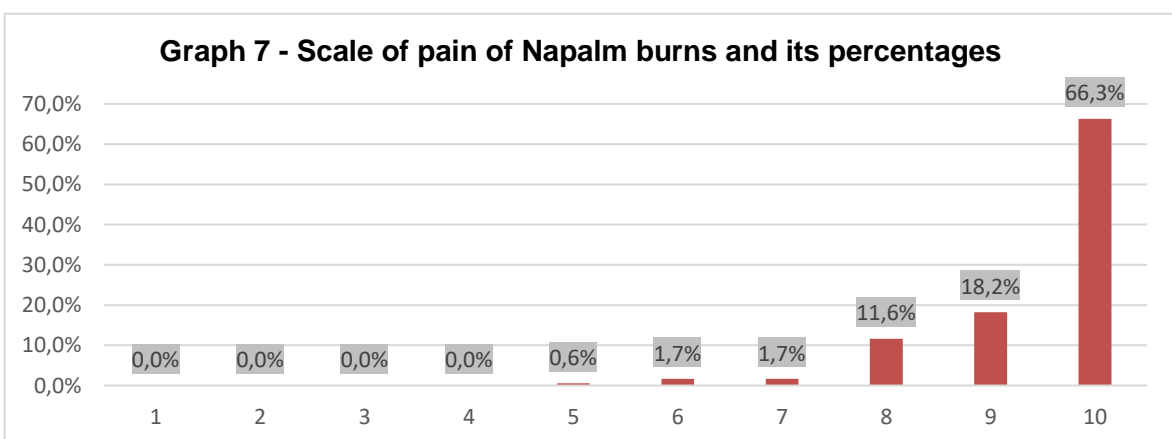
Affirmation	Not confident	Unsure	Neither little nor very confident	Very confident	Totally confident
Napalm causes a particularly negative psychological effect (fear) on the enemy	5,5%	4,4%	9,9%	30,4%	49,7%

**Legend:** Higher percentage  Lower percentage

According to Table 4, 33,1% of the participants do not know if Napalm was used or not in the PCW. Despite 46,9% of the participants answered they are either very or totally confident that Napalm was indeed used. This demonstrates the unsureness of the utilization of Napalm in that military conflict.

In regards if Napalm is used nowadays the results were too similar in each category. In fact, 44,7% of participants are not confident or unsure about if Napalm may be used these days. These participants together with the ones who chose the neutral category do not know Napalm's legislation, since Napalm can indeed be used nowadays, under certain regulations. Despite the affirmations are not made to get the right answer from the participants, this may demonstrate lack of knowledge about Napalm's legislation.

Regarding the treatment of Napalm burns, most of the participants (77,9%) know they are not easy to treat. Lastly, 80,1% is either very or totally confident that Napalm causes a negative psychological impact on the enemy. As for the negative consequences of Napalm on human beings, the participants are again conscious of the damages the weapon provokes. These results are concordant with Table 3.



**Legend:** 0 (no pain) to 10 (excessive pain)

According to Graph 7, about 66,3% of the respondents consider that Napalm burns cause excessive pain, followed by 29,8% of individuals that affirm Napalm burns cause a

lot of pain. Only a minor percentage (3,9%) answered mid pain (options 5, 6 and 7) and there was no register of non or low pain for the Napalm burns on human beings. It is important to note these results are concordant with Table 4, in which most of the participants acknowledge that Napalm burns are not easy to treat.

### Section 3: Knowledge about Tactical Herbicides

This section aims to understand the knowledge the general population might have about TH. The total of participants included are the ones who answered “yes” to the first question of this section “Do you know what TH are?”. The respondents who answered “No” were asked to skip this section and advance to the next.

Answer	Frequency	%
Yes	109	33,9%
No	213	66,1%
<b>Total</b>	<b>322</b>	<b>100,0%</b>

According to Table 5, most of the participants do not know what TH are (66,1%) against 33,9% of the respondents that do know. Thus, the total number of participants of this section will be 109 instead of 322.

Affirmation	Strongly disagree	Partly disagree	Neither agree nor disagree	Partly agree	Strongly Agree
I know the types of bodily damage that TH may cause in human beings	4,6%	5,5%	13,8%	50,5%	25,7%
I know the environmental consequences that can result from the use of TH	2,8%	4,6%	4,6%	45,0%	43,1%
TH serve to remove cover from the enemy (vegetation, shelters...), exposing him	7,3%	8,3%	17,4%	27,5%	39,4%
TH are effective even in adverse weather conditions	1,8%	6,4%	8,3%	26,6%	56,9%
TH cause destruction of agricultural crops	1,8%	5,5%	7,3%	22,9%	62,4%
TH poison water sources	2,8%	4,6%	4,6%	20,2%	67,9%
TH cause the destruction of vegetation	8,3%	14,7%	38,5%	25,7%	12,8%

Affirmation	Strongly disagree	Partly disagree	Neither agree nor disagree	Partly agree	Strongly Agree
TH are economic	4,6%	7,3%	37,6%	29,4%	21,1%
TH have a good precision	21,1%	15,6%	28,4%	22,9%	11,9%

**Legend:** Higher percentage  Lower percentage

According to Table 6, most of the participants (76,2%) know the negative consequences TH might have on the human body and 88,1% know the negative consequences of TH on the environment. These results are similar to Napalm (Table 4), since the participants show understanding of the human and environmental consequences of both weapons.

Concerning the use of TH to uncover the enemy, 66,9% know about this military characteristic. However, most participants (83,5%) that either partly or strongly agreed with the affirmation are sure that TH can be used in adverse weather conditions. This might be a suggestion provoked by the Napalm's affirmations, since the participants have a perception of a military characteristic that is not true. Contrary to Napalm, TH are useless in adverse weather conditions since they lose their chemical effect on the vegetation. These chemical compounds require optimal weather conditions to produce the desired effect.

Regarding other military characteristics of TH, 62,4% strongly agreed that they destroy crops and 67,9% strongly agree the weapon poison water sources. These results were more concordant, when compared with Napalm's knowledge on Table 4, demonstrating a better understanding of TH military advantages.

However, regarding the affirmation about the destruction of vegetation, the answers were not concordant, since 38,5% of the participants chose the neutral answer. This is not coherent with the participant's knowledge that TH may destroy agricultural crops (62,4%) and remove enemy cover by defoliating vegetation (39,4%). The primary aim of TH is to disrupt agricultural crops and to destroy vegetation that may conceal the enemy. This may demonstrate a confusion or lack of solicited knowledge on the TH concept or Herbicides use in general, since on Table 3 58,6% of the participants were extremely sure Napalm causes destruction of vegetation. However, it is important to note that not all participants answered to section 2 and 3 and the sample size of this section is much lower.

Another possible explanation might be related with the possible association with Herbicides use in agriculture, misleading the participants regarding TH destruction of vegetation and forests. Nonetheless, Herbicides are used in agriculture to destroy unwanted vegetation, making the hypothesis that the participants are not completely sure about the concept of TH more likely.

As for the last two military advantages of TH, the highest percentages are all in the neither agree nor disagree category, leaning to agree. For the high precision, the neutral category was chosen by 28,4% of the respondents. However, the answers were ambiguous since all five categories have similar percentages. Concerning TH being a cheap weapon 37,6% of the participants answered in the neutral category. These answers were similar to Napalm, demonstrating a lack of knowledge on this specific military advantages of both weapons.

<b>Affirmation</b>	<b>Not confident</b>	<b>Unsure</b>	<b>Neither little nor very confident</b>	<b>Very confident</b>	<b>Totally confident</b>
TH (e.g. Agent Orange) were used by the PAF during the PCW	10,1%	18,3%	45,0%	19,3%	7,3%
Nowadays the use of TH is allowed	24,8%	26,6%	33,9%	6,4%	8,3%
TH are used for the negative psychological effect they provoke on the enemy	7,3%	6,4%	26,6%	33,0%	26,6%
Exposure to TH may cause carcinogenic effects	0,9%	3,7%	11,9%	25,7%	57,8%

**Legend:** Higher percentage  Lower percentage

According to Table 7, similarly to Napalm (Table 5), the respondents do not know whether TH were used in the PCW or not, since 45% of the respondents gave a neutral answer. Even the percentages for the other options show lack of knowledge, since they are very similar in pairs, the not confident (10,1%), with the totally confident (7,3%) and the unsure (18,3%), with the very confident (19,3%).

Regarding the affirmation of the legislation of TH, 33,9% of the participants answered neither little nor very confident, followed by 24,8% of not confident and 26,6% of unsure. These results were similar to Napalm (Table 4). There is no majority of percentages in any category and most of the answers fell in the neutral and not confident category. This could demonstrate lack of solidified knowledge about TH legislation.

Moreover, 33,0% of the participants are very confident that TH have a negative psychological impact on the enemy, followed by 26,6% that are totally confident and 26,6% on the neutral answer. Once more the lack of knowledge is notorious, despite the results tend to the confident categories. TH are not used to provoke a negative effect of human beings. This effect might happen indirectly, when crops or water sources are poisoned with

these chemicals, provoking fear on the target population. Opposite to Napalm, this is not the aim of TH and these answers might have resulted from suggestion of the previous Napalm affirmations.

Lastly, 57,8% of the respondents are totally confident that TH exposure might cause carcinogenic effects on human beings. This knowledge might come from the possible side effects agricultural Herbicides might have on human beings, possibly due to the widely known lawsuits that have been existing for years, regarding this matter.

#### Section 4: Legal ethical aspects of Napalm and Tactical Herbicides

This section aims to understand the knowledge the general population might have on the legislation and obtain their opinion concerning ethical issues of Napalm and TH. The total of participants included are again 322, since this section was of obligatory response.

<b>Affirmation</b>	<b>Strongly disagree</b>	<b>Partly disagree</b>	<b>Neither agree nor disagree</b>	<b>Partly agree</b>	<b>Strongly Agree</b>
Napalm should be used to deforest areas with a lot of vegetation, to reach military targets	62,7%	12,7%	9,6%	8,1%	6,8%
Napalm causes a more harmful psychological effect than other conventional weapons (such as firearms or bladed weapons)	5,0%	6,5%	14,0%	23,6%	50,9%
Regarding the use of Napalm for military purposes " <i>the operational advantages far outweigh any possible political inconveniences</i> "	41,3%	14,6%	23,9%	11,8%	8,4%
<i>"In war, all weapons are for killing and wounding and it is of little interest in relation to the victims to discuss the level of cruelty of the weapon that hit them"</i>	59,0%	9,9%	8,7%	8,4%	14,0%
The use of Napalm must be prohibited under any circumstance	9,0%	10,2%	10,2%	17,1%	53,4%
The use of Napalm should obey to rules in any circumstance	28,0%	5,0%	10,6%	19,3%	37,3%

Affirmation	Strongly disagree	Partly disagree	Neither agree nor disagree	Partly agree	Strongly Agree
In certain previously defined circumstances, the use of Napalm should not be subjected to rules	77,3%	5,6%	8,7%	2,8%	5,6%
I agree with the current Napalm legislation, which prohibits its use on civilians and their goods, not prohibiting its use on military objectives	25,5%	15,8%	15,8%	19,3%	23,6%

**Legend:** Higher percentage  Lower percentage

This section begins with a text with information about Napalm, from its concept to its military advantages and legislation, so that all 322 participants could respond. According to Table 8, 62,7% of the respondents strongly disagreed with the utilization of Napalm to deforest an area to achieve military objectives. Also, 50,9% of the participants strongly agreed that Napalm causes a greater psychological effect when compared with other conventional weapons.

Regarding Napalm's political inconvenience, 41,3% of the respondents strongly disagreed that the military advantages should surpass any political issues that may exist. As for the level of cruelty, 59% of the participants strongly disagreed that the cruelty of the weapon should not be discussed. So far most of the participants' answers are concordant. However, the same did not happened on the last four statements of Table 8.

Concerning Napalm's legislation 53,4% of the participants strongly agreed that Napalm should not be used at all and 37,3% strongly agreed that Napalm's use should obey to rules every time. However, 77,3% of the participants strongly disagreed with the affirmation about the unrul use of Napalm under some circumstances. These affirmations show incongruence, since a great majority of the respondents (53,4%) agreed that Napalm must be forbidden in any circumstance. However, in the next affirmation the strongly agree category loses strength to 37,3%, when the affirmation says that the use of Napalm must always obey to rules. The respondents might have perceived that in certain circumstances, under regulation, Napalm may be used. Nonetheless, this shows the human dilemma regarding incendiary weapons, being hard to decide in which occasions Napalm should or not be used.

Moreover, when the scenario changes to the unrul use of Napalm in certain well-defined circumstances, the strongly disagree category gains strength (77,3%). These results are concordant with the answers of Table 3 and 4 and Graph 7, since participants are aware of Napalm's negative consequences on the human body, that Napalm burns are



not easy to treat and that Napalm provokes excessive pain. This together with the information provided on the text may lead to participants to disagree with the unregulated use of Napalm under any circumstance.

The last statement about Napalm's actual legislation, elicited mixed responses. The highest percentage fell in the strongly disagree option (25,5%). Nevertheless, the other options have similar percentages: partly disagree (15,8%), neither agree nor disagree (15,8%), partly agree (19,3%) and strongly agree (23,6%). The similar responses in each category demonstrate the lack of consensus, regarding Napalm regulation or whether it needs to be completely forbidden.

<b>Affirmation</b>	<b>Strongly disagree</b>	<b>Partly disagree</b>	<b>Neither agree nor disagree</b>	<b>Partly agree</b>	<b>Strongly Agree</b>
<i>The use of TH causes the destruction of an ecosystem.</i> The use of Herbicides for military purposes is justified.	58,4%	15,8%	8,4%	11,1%	6,2%
<i>The use of TH destroys agricultural production and poisons water sources of populations.</i> The use of Herbicides for military purposes is justified.	71,4%	12,4%	4,3%	5,3%	6,5%
The use of TH in the PCW was justified	55,3%	15,2%	21,4%	5,3%	2,8%
<i>By regulating the use of Napalm, international law would be conditioning a country's weapon choices. This decision must be national and not international.</i> International law should not regulate the use of Napalm.	61,5%	14,9%	13,7%	5,3%	4,7%
<i>The use of Napalm is prohibited in concentrations of civilians, but not against military purposes, that might include people working in the military.</i> The use of Napalm against military objects its justified.	68,9%	12,7%	9,0%	6,5%	2,8%

Affirmation	Strongly disagree	Partly disagree	Neither agree nor disagree	Partly agree	Strongly Agree
The use of Napalm in the PCW was justified	56,2%	13,7%	22,7%	4,7%	2,8%
<i>The "enemy" has a military storehouse with biological weapons and intends to use them against a civilian population. This warehouse is in an isolated location and is only frequented by the military.</i>  In this situation it is justified to use Napalm to destroy the warehouse	34,8%	14,6%	18,9%	18,6%	13,0%
<i>The "enemy" has rocket launchers hidden in a cultivated area with high vegetation and intends to use them against an allied military column. These firearms are protected by the military, next to a thriving agricultural village.</i>  It is justified the use of Herbicides to destroy the vegetation of that area	50,9%	17,4%	15,5%	11,5%	4,7%

**Legend:** Higher percentage  Lower percentage

After Table 8, this section contains another text. In this it is explained TH concept, military advantages and legislation. Thus, Table 9 includes affirmations on both texts. As for TH (Table 9) the respondents strongly disagreed with their use against ecosystems (58,4%), agricultural crops and water sources (71,4%), being concordant with previous answers (Table 6).

Moreover, both texts inform the participants that Napalm and TH were used in the PCW. Regarding this, 55,3% of the respondents strongly disagreed with the use of TH in the war and 56,2% strongly disagreed with the use of Napalm in the war. Also, 61,5% of the participants disagreed with the non-international regulation of the weapons. This last result is concordant with Table 8, since most of the participants agree with the regulation of Napalm, extending, on Table 9, that agreement to both weapons.

Despite the apparent concordance of the affirmations, some incongruences were found. The great majority of 68,9% respondents strongly disagreed with the use of Napalm on military objectives, contrasting with the 25,5% of Table 8 that strongly disagreed with Napalm's legislation, where the use of military objectives is not forbidden. In this line of thought, the last affirmation of Table 8 should have had a greater percentage, for both affirmations to be concordant.

The last two affirmations of Table 9 are meant to gather the participants' perspective on the use of Napalm and TH, using a scenario for civilians and another for military. In the first scenario 34,8% of the participants strongly disagreed with the deployment of Napalm on the isolated warehouse. As for the second example, 50,9% strongly disagreed with the spraying of TH on a vegetation area next to an agricultural village.

In fact, the first example shows incongruences with previous responses. The affirmation should have had a much higher percentage of strongly disagree responses (34,8%), to be concordant with Table 8, where 53,4% of the participants strongly agree with the prohibition of Napalm's use under any circumstance. This shows that under a practical example of the deployment of Napalm, certain convictions lose strength.

The responses are concordant in Napalm's prohibition on civilian populations, however the convictions on the prohibition of Napalm's deployment lose strength in the military case, showing doubt. A possible explanation might have to do with the war circumstances. A military conflict stands as an extreme situation, that may require extreme measures. Depending on the military operation and the target, some people might have different concordance levels about Napalm's use. This perpetuates the human dilemma about the use of Napalm in military objectives and personnel, showing the difficulty of reaching a solution that satisfies, if not all, a great majority.

### **Section 5: Veterans of the Portuguese Colonial War**

This section aims to gather the knowledge and opinions of the PCW Veterans on the use of Napalm and TH in that military conflict. The total of participants included are the ones who answered "yes" to the question "Are you a PCW Veteran?". The respondents who answered "No" finished the questionnaire, while the ones who answered "Yes" were asked to fill in this section.

<b>Answer</b>	<b>Frequency</b>	<b>%</b>
Yes	13	4,0%
No	309	96,0%
<b>Total</b>	<b>322</b>	<b>100,0%</b>

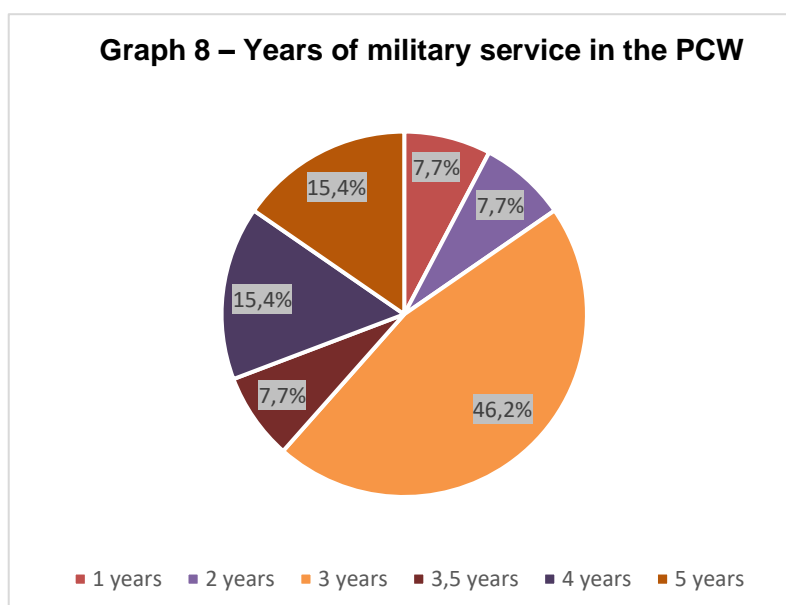
According to Table 10, only 4% of the participants are a PCW veteran against the 96% are not. Thus, the total number of participants of this section will be 13 instead of 322.

<b>Armed Forces Branch</b>	<b>Frequency</b>	<b>%</b>
Army	12	92,3%
Navy	1	7,7%
Air Force	0	0,0%
<b>Total</b>	<b>13</b>	<b>100%</b>

According to Table 11, 92,3% (12 out of 13) of the war veterans of the Portuguese Colonial War served in the Army, followed by the Navy with 7,7% (1 out of 13). The Air Force did not register any answers.

<b>Theatre of operations</b>	<b>Frequency</b>	<b>%</b>
Angola	10	76,9%
Mozambique	2	15,4%
Guinea-Bissau	1	7,7%
<b>Total</b>	<b>13</b>	<b>100,0%</b>

According to Table 12, 76,9% (10 out of 13) of the Portuguese Colonial War Veterans served in Angola, followed by 15,4% (2 out of 13) in Mozambique and 7,7% (1 out of 13) in Guinea-Bissau.



Regarding Graph 8, 46,2% of the Portuguese Colonial War Veterans served 3 years in the war, followed by 15,4% that served 4 years and 15,4% that served 5 years in the war. Moreover, 7,7% of the responders served 1 year in the war, the same percentage for 2 years and for 3,5 years of military service.

<b>Answer</b>	<b>Frequency</b>	<b>%</b>
Yes	2	15,4%
No	11	84,6%
<b>Total</b>	<b>13</b>	<b>100,0%</b>

According to Table 13, 15,4% (2 out of 13) of the PCW veterans served as a doctor or nurse in the military conflict, on contrary to the 84,6% (11 out of 13), who did not serve as a health care provider.

<b>Affirmation</b>	<b>Not confident</b>	<b>Unsure</b>	<b>Neither little nor very confident</b>	<b>Very confident</b>	<b>Totally confident</b>
I witnessed the use of Incendiary Weapons like Napalm in the PCW	8	1	0	0	4
I was exposed to the use of Napalm during the PCW	12	1	0	0	0
I witnessed the use of Herbicides, as Agent Orange, during the PCW	12	0	0	1	0
I was exposed to Herbicides, as Agent Orange, during the PCW	12	1	0	0	0
I have been exposed to environmental hazards such as chemical weapons, ionizing radiation, or potentially toxic substances	13	0	0	0	0
When I returned from military service in the Colonial War, I was examined for exposure to potentially toxic substances	12	0	0	0	1

Affirmation	Not confident	Unsure	Neither little nor very confident	Very confident	Totally confident
I had a health problem that I associated with exposure to chemical weapons, ionizing radiation, or Herbicides during the PCW	13	0	0	0	0

**Legend:** Higher frequency  Lower frequency

For better understanding, due to the very reduced sample size of 13 participants, Table 14 shows the absolute frequencies instead of percentages.

According to it, four war veterans are totally confident they witnessed the use of Napalm. Although this number is not significant, there are four testimonies that recognize the use of Napalm in the PCW. As for TH, a veteran states he is very confident to have witnessed the use of Herbicides. This testimony must be taken into consideration, as this ex-combatant acknowledges having been examined for the exposure to toxic substances, despite apparently not having suffered any associated health problem.

Despite the reduced sample size makes it impossible to withdraw strong conclusions, these testimonies of war veterans are still valid.

## Conclusion

Most of the participants who answered the questionnaire about the use of Napalm and Tactical Herbicides in the PCW were female (61,5%), mainly 51 to 60 years old (29,8%), followed by the youngest age group (18-24 years old, 28,9%) and the middle aged category (41-50 years old, 18,3%). Despite most of the participants were female, male respondents dominated the older age categories from 51 to 90 years old, perhaps because it was the population that experienced the PCW more closely, showing a greater interest in the topic. As for the geographical distribution of the participants, the great majority is currently residing in the centre and north of Portugal (94,9%), and most of the participants have an higher education, either a bachelor's, a master or a doctorate degree (74,2%) and are currently professionally active (61,5%) or students (29,2%).

Most of the participants know what Napalm is (56%) and recognise its consequences on the human body and on the environment, but regarding Napalm's military advantages, the answers were not so concordant. Most of the participants acknowledged that Napalm removes enemy cover and provokes destruction of vegetation and crops, but concerning specific military advantages, such as poison water sources, adverse weather

conditions, cost and precision the responders demonstrated unsureness and lack of knowledge, as the percentages between the various categories were very similar, with neutral responses predominating. Also, participants did not know if Napalm had been used in the PCW and were not entirely confident that Napalm can be used nowadays, revealing a lack of knowledge about Napalm's international regulations. However, participants are concordant that Napalm provokes a negative psychological effect on the enemy and its burns are not easy to treat and provoke extreme pain, a common knowledge that may come from a greater public awareness of the consequences of the use of Napalm in other wars, like that of Vietnam.

As for TH, most of the participants do not know what this weapon is (66,1%). Like Napalm, these respondents were aware of the human and environmental consequences of TH, but 56,9% of the participants agreed that TH may be used in adverse climatic conditions, which is not true, as they lose their effect on vegetation if they are released in unfavourable weather conditions. As for the military advantages with regard to the destruction of agriculture, the participants recognized this purpose, probably in association with the current use of Herbicides. However, when more specific military advantages were mentioned, that knowledge disappeared. Participants did not know whether TH was used in the PCW and whether it can still be used today. However, respondents assume that exposure to Herbicides can cause cancer and that these chemical compounds have a negative psychological effect. This last statement is not true, as this is not a characteristic of TH, but of Napalm, indicating some confusion between the two types of weapons.

Regarding the legal ethical aspects of Napalm, there was inconsistency on the agreement of its use. It is generally accepted that Napalm should not be used on civilians and without any rules. However, opinions differ when the military enter the equation, causing a moral dilemma on the participants, since similar and concordant statements have inconsistent responses. War is an extreme situation, in which many rules of a peaceful society do not apply. The respondent's answers showed how easy it is to be divided, as the decision to be for or against the use of Napalm may depend on certain circumstances of war. As for TH, the answers of this section were concordant with the previous ones. However, it is important to note that most participants did not agree with the usage of both weapons in the PCW.

Lastly, the section of the PCW veterans, which had only thirteen participants. Although the sample is small, it is important to note that four war veterans witnessed the use of Napalm and another witnessed the use of TH, evidence that speaks for itself.

## Chapter VI – Final Considerations

### Chapter overview

This final chapter aims to recognize the possible limitations of this research work and to analyse how they possibly affected this study. This being the first in-depth work on the use of Napalm and Herbicides in the PCW, we hope that others will follow, thus leaving some recommendations for future research. Finally, a general conclusion on the theoretical and practical results of this investigation will be presented.

### Study Limitations

As for the theoretical investigation that was developed in the first four chapters of this dissertation, a possible limitation may lie in the inherent temporal and pandemic restrictions. If more time and resources were available, more archives could have been explored and more documents about the topic of research investigated and described.

As for the practical part of this research work, which comprehends chapter V, the number of questionnaires did not reach the expected 385 responses. The questionnaires gathered were 323, being one excluded for not meeting the inclusion criteria. According to the feedback left by some participants, the questionnaire was long, subjective and with specific questions. This might have compromised the number of people who accepted to fill in the questionnaire and the ones who distributed it for more people. Moreover, the distribution of the questionnaire occurred after the COVID-19 confinement, and with the measures imposed by the Portuguese government it was harder to travel and hand in the questionnaire, as was foreseen. As a result, most people answered the questionnaire in an online format, a format that may have excluded people who do not have access to the necessary technology, such as the population aged over 60, where war veterans are included.

Regarding this subpopulation, the reduced number of responses made it impossible to compare the opinion of the PCW veterans *versus* that of the general population. But besides the obstacles to deliver the questionnaire in paper format due to the pandemic, the national association of war veterans had previously denied the distribution, making it even harder to reach them. In addition, twelve of the thirteen veterans had fought in the Portuguese Army, only one in the Portuguese Navy and there were no participants who fought in the Portuguese Air Force. These testimonies would have been important since Napalm and TH were launched mainly by air, during the PCW. Moreover, only one



participant fought in Guinea-Bissau. This was the theatre of operations with the largest deployment of Napalm, so it would be more enriching for the conclusions to have had more respondents of that battlefield.

Concerning the general population, the geographical distribution was not satisfactory, since some districts were not contemplated and most of the participants reside in the centre and north of Portugal. Moreover, less than half of the participants knew about TH, and although the difference between the participants who knew Napalm and the TH was not large, if the sample was higher it might be possible to draw more conclusions.

Finally, both texts presented on the questionnaire tried to portray an impartial account of Napalm and Herbicides, however participants may have been biased by those text. Also, the affirmations from previous sections might have led to answers with a suggestion, on the fourth section.

### **Recommendations for future research**

Since this is the first in-depth research work on the utilization of Napalm and Herbicides in the PCW, there is plenty of space to improve and continue this line of investigation.

Firstly, an interesting research work would be to conduct questionnaires together with interviews to the war veterans on both sides of the conflict, regarding the utilization of Napalm and Herbicides. The questionnaires encountered about the PCW, this included, only have the Portuguese perspective. Moreover, the interviews would be excellent to complement the research, since in the war veterans' feedback section of the questionnaire one affirmed that the closed ended format did not allowed him to answer about his experience. If conducted, this could be a cutting-edge research, regarding Napalm and TH research during the PCW.

Secondly, it would be a great advantage to develop a questionnaire entirely dedicated to war veterans, with national distribution, concerning weapons (e.g. Napalm and TH) and military equipment. These population is aging, and it would be paramount to obtain their first-hand knowledge on the war, while they can provide it for us. For this more time, resources and the collaboration of national war veterans' associations would be required.

Thirdly, due to lack of more time and resources, not all Portuguese and international archives, including international newspaper were consulted, so it is likely that there will be much more material to further investigate this issue.

Fourthly, according to the questionnaire's feedback, a participant suggested other specific line of investigation, such as studying the impact of war weapons (such Napalm and Herbicides) on the environment, mainly their effect on climate change.

Lastly, other research works concerning military conflicts where Napalm and Herbicides were used should be studied and that information should be revealed to a larger audience, so that piece by piece it could be possible to ensure a specific legislation for the TH and a better understanding of Napalm's legislation and its consequences.

### **Conclusion of this research work**

The PCW was a military conflict fought in Angola, Guinea-Bissau and Mozambique from 1961 until 1974. This military event occurred mainly because Salazar's regime wanted to maintain the Portuguese empire alive and to profit from the colony's resources. Opposing to this were, at that time, the Portuguese African colonies, wanting self-determination due to the exploration of their resources and the atrocious working and social conditions the Portuguese regime imposed.

In fact, the PAF faced countless challenges during the war in Africa, some of them due to the climate and geographic characteristics. All colonies presented tropical climate, high vegetation, dense forests and abundance of rivers. These characteristics were advantageous for a guerrilla war, that sometimes put the PAF in disadvantage. In the gathering of new military tactics and ways to stay ahead in the war, Napalm and TH, two weapons that were being used in Vietnam, joined the military arsenal.

According to over one thousand archival documents, testimonies, newspaper articles and books investigated to conduct this research work, Napalm and TH were indeed used by the PAF in the PCW. Concerning Napalm this was mostly used in Guinea-Bissau, accounting for the average use of 1365 incendiary weapons *per year*. This was the toughest war frontier for Portugal, due to the harsh geography and the highly organized and modern equipped Liberation Movement PAIGC. As for Mozambique, since 1968 until 1973 were launched 3660 incendiary weapons. Regarding Angola, no document accounted the average number of incendiary weapons used, since a high patent of the military affirmed their use was restricted, due to not being effective on most military targets.

Regarding TH, no documents were found accounting their use in Guinea-Bissau, despite some accusations from PAIGC. A document by Portuguese military even justified the lack of use in this colony, saying the humid climate would impair the use of Herbicides. However, the documents prove the testing and use of those chemical substances in Angola and Mozambique. The first extensive herbicidal spraying occurred in Operation Quissonde in Angola, with the main aim to destroy population's crops who were friendly with the enemy. Contrary to Napalm, documents accounting the average numbers and types of Herbicides were not found, apart from the MPLA report with a list of supposedly used Herbicides in

Angola and Mozambique. However, no other documents were found to corroborate those allegations.

Furthermore, the questionnaire conducted on the general Portuguese population to acquire their opinion and knowledge on the topic of this research work, allowed to draw some interesting conclusions. The participants are aware of the general negative consequences of Napalm and TH on the human body and environment and consider Napalm burns painful and difficult to treat. As for TH, the participants consider that they are used to destroy crops and may have carcinogenic effects. However, regarding specific military advantages such as price, precision, weather conditions the participants showed lack of knowledge. Also, the respondents did not know that both weapons were used in PCW despite later they disagreed with their use when that information was given on both text of the fourth section.

The main conclusion to be drawn of the legal ethical section of the questionnaire is that to form an opinion it is needed previous knowledge, and in this case the general knowledge of the participants together with the information on both texts provided incoherent answers regarding the use (mainly of Napalm) in civilians and on the military. When the affirmations concern the general use of Napalm, the answers were coherent with the prohibition. However, when Napalm's use was put in context, the opinions on forbidding the weapon lost strength, revealing the participants dilemma. Regarding civilians, the opinions agreed with Napalm's legislation of forbidding its use. However, they were divided on the use of Napalm on military objectives and personnel, demonstrating an internal conflict that fits in with the human nature.

War stands as an extreme event that requires decisions that would be considered immoral and unethical in peaceful times and divides opinions on whether it is right or wrong the use of certain weapons. There is an inherent subjectivity to this matter, regarding the side people take on a military conflict and their experiences and personality. The results of this questionnaire are not meant to give a final answer on this topic, but rather to open the ethical discussion regarding the use of Napalm and TH.

The main aim of this research work was to describe in-depth a war in which Napalm and TH were used, in order to take a past military event and bring it to the future, to keep discussing the use of Napalm and TH. The general population might still relate both weapons with the VW, not realizing they were used in countless wars before, concomitantly and after it, including today. In the questionnaire a high percentage of the participants was not confident that both weapons could be used nowadays - Napalm's legislation was discussed as recent as 2016 and TH were used as recent as 2019. In fact, Napalm can still be used and TH still lack a specific legislation, being hard to conclude if they are indeed forbidden by the unspecified Conventions where they are inserted, making this discussion

even more pertinent. War and the weapons used in it will always be a difficult issue to deal with, but it is important to be aware that ignorance does not remove reality, it only postpones the evolution of our humanity.

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## QUESTIONÁRIO

A Guerra Colonial Portuguesa é um capítulo importante da nossa história contemporânea. Porém, ao contrário de outros conflitos internacionais que aconteceram na mesma altura, sabe-se muito pouco sobre o uso de armas incendiárias e químicas durante esse período da nossa história.

Assim, no âmbito da tese de Mestrado em Medicina Legal do Instituto de Ciências Biomédicas Abel Salazar - Universidade do Porto (ICBAS-UP) que estou a realizar, gostaria de saber se podia contar com a sua colaboração, preenchendo este questionário anónimo.

Pretendemos com este estudo perceber o conhecimento e a opinião dos portugueses sobre o uso de armas incendiárias e químicas durante a Guerra Colonial Portuguesa e na atualidade.

Este estudo obteve o parecer favorável da Comissão de Ética conjunta Centro Hospitalar Universitário do Porto/ICBAS.

Caso tenha 18 anos ou mais e aceite participar neste estudo, a sua identidade nunca será conhecida. Trata-se de um questionário de natureza confidencial, com um tempo de preenchimento estimado entre 10 a 15 minutos. As respostas que entender dar não são certas nem erradas, e serão utilizadas apenas para fins científico-académicos.

Presume-se que ao preencher/submeter o questionário concorda em participar neste estudo.

Obrigada desde já pela colaboração.

Sara Mira

Margarida Duarte Araújo (orientadora)

## Secção 1 – Dados Sociodemográficos

1.1. Sexo	Masculino	Feminino

1.2. Ano de Nascimento	
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1.3. Naturalidade	
1.4. Concelho de Residência	

1.5. Habilitações literárias	Ensino Primário (1º-4º ano)	Ensino Básico 2º Ciclo (5º-6º ano)	Ensino Básico 3º Ciclo (7º-9º ano)	Ensino Secundário (10º-12º ano)	Licenciatura	Mestrado ou Doutoramento

1.6. Em que situação profissional se encontra?	Estudante	Profissionalmente ativo	Desempregado	Pensionista/ Reformado	Outro (Indique qual)

## Secção 2 – Conhecimento sobre Napalm

2.1. Sabe o que é o Napalm?	Sim	Não

Se respondeu Não vá para a secção 3, por favor

2.2. Leia as afirmações seguintes e indique o seu grau de concordância com cada uma delas.

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
Conheço os tipos de dano corporal que o Napalm pode provocar no Ser Humano					
Conheço as consequências ambientais que podem resultar da utilização de Napalm					
O Napalm serve para retirar cobertura ao inimigo (vegetação, abrigos...), expondo-o					
O Napalm é eficaz mesmo em condições climatéricas adversas					
O Napalm é um tipo de armamento económico					

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
O Napalm em contexto militar causa a destruição da vegetação					
O Napalm é utilizado para envenenar fontes de água					
O Napalm permite atingir alvos militares com elevada precisão					
O Napalm é utilizado para destruir campos agrícolas					

2.3. Leia as afirmações seguintes e indique o seu grau de confiança quanto à veracidade de cada uma delas.

Afirmação	Nada confiante	Pouco confiante	Nem pouco nem muito confiante	Muito confiante	Totalmente confiante
O Napalm foi utilizado pelas Forças Armadas Portuguesas durante a Guerra Colonial					
O Napalm pode ser utilizado nos dias de hoje					
As queimaduras provocadas pelo Napalm são ligeiras, de fácil tratamento					
O Napalm causa um efeito psicológico particularmente negativo (medo) no inimigo					

2.4. Numa escala de dor de 1 (nenhuma dor) a 10 (dor excessiva), onde acha que se situa a dor provocada pelas lesões causadas por uma arma incendiária, como o Napalm?

Assinale com uma cruz ☒ o número que considerar mais adequado:



### Secção 3 – Conhecimento sobre Herbicidas

3.1. Sabe o que são Herbicidas usados em contexto militar (Ex: Agente Laranja)?

Sim

Não

Se respondeu Não vá para a secção 4, por favor

3.2. Leia as afirmações seguintes e indique o seu grau de concordância com cada uma delas.

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
Conheço os tipos de dano corporal que Herbicidas em contexto militar podem provocar no Ser Humano					
Conheço as consequências ambientais que podem resultar da utilização de Herbicidas em contexto militar					
Os Herbicidas em contexto militar servem para retirar cobertura ao inimigo (vegetação, abrigos, etc.), expondo-o					
Os Herbicidas em contexto militar permitem atingir alvos militares com elevada precisão					
Os Herbicidas em contexto militar são económicos					
Os Herbicidas em contexto militar são eficazes mesmo em condições climatéricas adversas					
Os Herbicidas em contexto militar causam a destruição da vegetação					
Os Herbicidas em contexto militar provocam destruição de campos agrícolas					
Os Herbicidas em contexto militar envenenam fontes de água					

3.3. Leia as afirmações seguintes e indique o seu grau de confiança quanto à veracidade de cada uma delas.

Afirmação	Nada confiante	Pouco confiante	Nem pouco nem muito confiante	Muito confiante	Totalmente confiante
Os Herbicidas (Ex: Agente Laranja) foram utilizados pelas Forças Armadas Portuguesas durante a Guerra Colonial					
Ainda é permitido nos dias de hoje o uso de Herbicidas (Ex: Agente Laranja), em contexto militar					
Os Herbicidas em contexto militar causam um efeito psicológico particularmente negativo (medo) no inimigo					



Afirmação	Nada confiante	Pouco confiante	Nem pouco nem muito confiante	Muito confiante	Totalmente confiante
A exposição a Herbicidas em contexto militar pode provocar efeitos cancerígenos					

#### Secção 4 – Aspetos éticos e legais

- ♦ O **Napalm** é um gel espessante altamente inflamável usado em bombas incendiárias. É composto por um agente gelificante (aumenta a viscosidade de um líquido) e um petroquímico volátil (Ex: gasolina)
- ♦ Foi utilizado em vários conflitos militares, incluindo na Guerra Colonial Portuguesa
- ♦ São potenciais vantagens militares do uso de Napalm: 1) elevada precisão - permitindo a destruição de alvos específicos mesmo em condições climáticas adversas; 2) elevada aderência a superfícies, sendo difícil extinguir o fogo; 3) o facto de atingir elevadas temperaturas; 4) baixo preço; 5) eficácia na desflorestação e 6) o facto de ter um efeito psicológico nocivo no inimigo, causando medo nas populações
- ♦ A “Convenção Sobre Certas Armas Convencionais (1980) das Nações Unidas - Protocolo III” proíbe a utilização de Napalm sobre concentrações de civis e seus bens. O uso de Napalm contra objetivos militares não é proibido, desde que sejam tomadas precauções para evitar danos à população civil

4.1. Tendo em conta o texto acima. Leia as afirmações seguintes e indique o seu grau de concordância com cada uma delas.

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
O Napalm deve ser usado para desflorestar áreas com muita vegetação, para atingir alvos militares					
O Napalm causa um efeito psicológico mais nocivo que outras armas convencionais (como armas de fogo ou armas brancas), causando pânico nas populações atingidas					
Relativamente ao uso do Napalm para fins militares <i>“as vantagens de natureza operacional superam largamente os eventuais inconvenientes de ordem política”</i>					
<i>“Em guerra todas as armas são para matar e ferir e em relação às vítimas pouco interessa discutir o nível de crueldade da arma que as atingiu”</i>					
O uso de Napalm deve ser proibido em qualquer circunstância					
A utilização de Napalm só deve ser possível em circunstâncias muito bem definidas					

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
O uso de Napalm não deve estar sujeito a regras. Cada estado deve definir a sua utilização					
Concordo com a legislação atual do Napalm, que proíbe a sua utilização sobre civis e seus bens, não proibindo o seu uso sobre objetivos militares					

- Os **Herbicidas** foram utilizados em vários conflitos militares, incluindo na Guerra Colonial Portuguesa
- Em contexto militar, os Herbicidas são usados para: 1) destruir a vegetação, permitindo uma melhor visibilidade sobre o inimigo; 2) impedir a produção agrícola nessa área ou 3) envenenar fontes de água
- Apesar do Ser Humano não ser o alvo direto dos Herbicidas, estes podem causar-lhe efeitos nocivos a curto (Ex: toxicidade aguda) e longo prazo (Ex: defeitos congénitos, doenças cancerígenas), prejudicando a sua saúde
- A “Convenção de Modificação Ambiental das Nações Unidas (1977)” proíbe o uso de Herbicidas sobre a fauna e flora dos ecossistemas e a “Convenção de Armas Químicas das Nações Unidas (1997)” proíbe o seu uso em Humanos e outros animais

4.2. Tendo em conta os dois textos acima referidos. Leia as afirmações seguintes e indique o seu grau de concordância com cada uma delas.

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
A utilização de Herbicidas causa a destruição da vegetação, permitindo uma melhor visibilidade sobre o inimigo, logo a sua utilização para fins militares é justificável					
A utilização de Herbicidas destrói a produção agrícola e envenena os poços de água de uma população, logo a sua utilização para fins militares é justificável					
O uso de Herbicidas na Guerra Colonial foi justificado					
Ao regulamentar o uso do Napalm o direito internacional estaria a condicionar as escolhas de armamento de um país. Essa decisão deve ser nacional e não internacional. O direito internacional não deve regular o uso de Napalm					

Afirmação	Discordo totalmente	Discordo em parte	Não concordo nem discordo	Concordo em parte	Concordo plenamente
A utilização de Napalm é proibida em concentrações de civis, mas não contra objetivos militares. Logo, é justificável o uso de Napalm em concentrações de pessoas que trabalham no meio militar					
O uso de Napalm na Guerra Colonial foi justificado					
O "inimigo" tem um armazém militar com armas biológicas e tem a intenção de as usar contra uma população civil. Este armazém fica num local isolado e é apenas frequentado por militares. Nesta situação é justificável o uso de Napalm para destruir o armazém					
O "inimigo" tem "lança-foguetes" escondidos numa área de cultivo com vegetação alta, e tem intenção de os usar contra uma coluna militar aliada. Estas armas de fogo estão protegidas por militares, junto a uma aldeia agrícola próspera. Nesta situação é justificável o uso de Herbicidas para destruir a vegetação dessa área					

**Secção 5 – Para Ex-Combatentes da Guerra Colonial Portuguesa**

5.1. Em que ramo(s) das Forças Armadas Portuguesas serviu durante a Guerra Colonial Portuguesa?	Exército	Marinha	Força Aérea

5.2. Em que teatro(s) de operações esteve inserido na Guerra Colonial?	Angola	Moçambique	Guiné-Bissau

5.3. Indique os anos em que esteve ao serviço das Forças Armadas Portuguesas, durante a Guerra Colonial.	_____
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5.4. Durante o período da Guerra Colonial serviu como médico ou enfermeiro nas Forças Armadas Portuguesas?	Sim	Não

5.5. Leia as afirmações seguintes e indique o seu grau de confiança quanto à veracidade de cada uma delas.

Afirmação	Nada confiante	Pouco confiante	Nem pouco nem muito confiante	Muito confiante	Totalmente confiante
Testemunhei o uso de Armas Incendiárias como Napalm na Guerra Colonial					
Fui exposto ao uso de Napalm durante a Guerra Colonial					
Testemunhei o uso de Herbicidas, como Agente Laranja, durante a Guerra Colonial					
Fui exposto a Herbicidas, como Agente Laranja durante a Guerra Colonial					
Estive exposto a perigos ambientais como armas químicas, radiação ionizante ou substâncias potencialmente tóxicas					
Quando regresssei do serviço militar na Guerra Colonial fui examinado para verificar a exposição a substâncias potencialmente tóxicas					
Tive um problema de saúde que associei à exposição a armas químicas, radiação ionizante ou Herbicidas durante a Guerra Colonial					

<p><b>Alguma opinião ou sugestão que gostaria de fazer sobre este questionário</b></p>
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Muito Obrigada pela sua colaboração no preenchimento deste questionário!