

## ENVIRONMENTAL IMPACT OF THE WAR FOR THE BALKANIZATION OF THE BALKANS

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### ABSTRACT

The objectives of this research are to determine the use of weapons of war; to determine the environmental impact of war and to find solution to the problem of environment hazards which war generates. The methodology was based on the use of secondary data. The secondary data were collected from textbooks, journals, magazines, periodicals, internet, etc. The research findings include: first, the effects of military tactics and weaponry extend beyond military targets since they affect civilian populations and their infrastructure; secondly, armed forces directly target forests, jungles, and other ecosystems in order to deprive enemy troops of cover, shelter, and food; and wartime environmental damage has raised the possibility of destruction on a global scale. It is recommended that attempts should be made to constrain the adverse impacts of warfare on civilian populations and the environment. Moreover, environmental issues should be closely monitored during wartime by the international community.

*Keywords:* War, Conflict, Environmental Impact

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### 1. INTRODUCTION

Yugoslavia was a single country inhabited by several different nations, or communities of people who believe they share a common ethnic origin, culture, historical tradition, and language. The country was created as a kingdom after World War I (1914-1918), was destroyed and divided by a German-led Axis invasion during World War II (1939-1945), and was re-created at the end of World War II as a Communist-ruled federation of six republics. Led by Josip Broz Tito, the people who created the new federation believed that federalism provided the best way to resolve tensions among Yugoslavia's diverse nations and their diverse interests (Cowley and Parker, 1996: 47).

The six republics were autonomous, or partially self-governing. Five of them were designated as the homelands of the nations that the Yugoslav government officially recognized and whose names they bore: the Croats, Macedonian Slavs, Montenegrins, Serbs, and Slovenes. The sixth republic, Bosnia and Herzegovina (often simply called Bosnia), had no majority nation and was regarded as the joint homeland of its intermingled Serbs, Croats, and Muslim Slavs (most of whom came to refer to themselves as Bosniaks). In addition, two autonomous provinces were set up within the republic of Serbia: Kosovo, which had an Albanian majority, and Vojvodina, which itself was multinational. These two provinces had more-limited powers than did the republics (Joll and Martel, 1984:13-16).

The Socialist Federal Republic of Yugoslavia (SFRY) was a federation that consisted of six republics— Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Macedonia, and Slovenia—and multiple nationalities. It broke apart in 1991 and 1992. The conflicts consisted of three wars fought from 1991 to 1995 and a fourth war in 1999. These four struggles have been called the wars of Yugoslav succession because they determined what countries succeeded the SFRY (Rusinow, Dennison, 2008).

The first war occurred in Slovenia and lasted ten days in June and July 1991, producing few casualties. The second war was fought in Croatia from July to December 1991 and in the summer of 1995. The third war took place in Bosnia and Herzegovina from 1992 to 1995. The second and third wars resulted in hundreds of thousands of mostly civilian casualties, massive property damage, and more than 2.5 million refugees. The fourth war, sometimes known as the Kosovo war, lasted from March to June 1999. It was an air war conducted by the North Atlantic Treaty Organization (NATO) against the Federal Republic of Yugoslavia a rump Yugoslavia consisting only of Serbia and Montenegro.

Most of the war refugees were victims of ethnic cleansing, the internationally condemned practice of driving out members of other nationalities from territories that had been part of the SFRY. The goal of ethnic cleansing was to create ethnically “pure” nation-states, or independent countries consisting of just one nationality. The wars in Croatia and in Bosnia and Herzegovina were complicated conflicts that combined elements of both civil and international wars. NATO described the Kosovo war as a humanitarian conflict waged to protect the ethnic Albanian majority in the Serbian province of Kosovo (Hellenbroich, 1989:47). Tito, who was head of the Yugoslav Communist Party, dominated the SFRY from 1945 until his death in 1980. Under his rule, tensions among the Yugoslav nations were kept largely in check. A new constitution, adopted in 1974, further expanded the autonomy of the republics and required a consensus among their governments for the exercise of most remaining federal powers. The 1974 constitution also provided that Tito should be succeeded by a collective federal presidency consisting of one representative from each republic and autonomous province, with the position of chairperson rotating annually among the members. Tito’s death in 1980 coincided with the onset of a deepening economic crisis. Tito’s successors were the leaders of republics with conflicting economic and national interests, and they had to agree on almost everything. They could not agree on effective remedies for the economic crisis. Acceptance of the continued existence of Tito’s Yugoslavia declined throughout the country. Old ethnic grievances and conflicts resurfaced and intensified. Politicians within each republic aggravated these conflicts, preferring to blame other Yugoslav republics and nations rather than admit that they could not handle the situation.

By the end of 1990, pressures generated by the collapse of Communist regimes throughout Eastern Europe, and in some cases pressure from liberals in their own ranks, forced the republic Communist parties to agree to multiparty elections in all six Yugoslav republics. The winning parties in all the republics were nationalist in their programs, appeal, and aims. They included the Communists in Serbia and Croat parties in Bosnia. The survival of Yugoslavia became increasingly doubtful (Glenny, 1996).

In a referendum held in December 1990 the Slovenes voted in favor of independence if agreement on a loose confederation could not be reached in the next six months. In May 1991 the Croats also voted for independence. Both Croatia and Slovenia declared their independence

on June 25, 1991, and the stage was set for war. Only Yugoslav Macedonia, where Gligorov was to negotiate the peaceful exit of the Yugoslav army in March 1992, would escape the wars of the 1990s.

## 2. METHOD AND MATERIALS

The data used are secondary. The secondary data were collected from textbooks, journals, magazines and periodicals. In the course of the research, the researcher consulted the internet, Ambrose Alli University Main Library, Law Library of the Faculty of Law of Ambrose Alli University Ekpoma, University of Benin Law Library, The University of Benin Main Library, and the Library of the Centre for Strategic and Development Studies, Ambrose Alli University, Ekpoma. The research design of this study is informed by the very nature of the study. The process of content analysis involved investigating, recording and analyzing past events with a view to discovering generalizations that were significant in understanding of the past and the present in order to predict and deal with the issue under consideration. To this end documented literature was relied on.

## 3. RESULTS AND DISCUSSIONS

### 3.1 THE WARS FOR BALKANIZATION OF THE BALKANS AND NATO OFFENSIVE

War covers confrontation between two or more states, a state and a body other than a state, a state and a dissident faction like in a non-international armed conflict and two ethnic groups within a state. A non-international armed conflict is characterized by fighting between the armed forces and rebel soldiers of the same state. It is not all situations in which arms are used that amount to armed conflict. Situations of civil disturbances like riots, isolated acts of violence are not considered as armed conflicts in law. But, conflicts between two ethnic groups in a state may be classified as a non-international armed conflict provided it possesses the characteristics of intensity, duration and participation. A non-international armed conflict may become internationalized if the object of the conflict touches upon national interest of another state. Where an external power enters an armed conflict upon the invitation of the government of one of the combatants, an internal armed conflict becomes internationalized. In this work, armed conflict refers to both civil war and international war or war involving two or more nations.

War is a contest between two or more states primarily through their armed forces, the ultimate purpose of each contestant group being to vanquish the other or others and impose its own conditions for peace. This definition of war excludes internal war or civil war (Shearer, 1994: 478). Most civil wars have been as serious as war between states. Also, most laws of war apply to both international war and civil war. Once there is evidence of belligerency, both sides are bound to obey the rules of war.

Hall propounded a further traditional definition of war; and it was approved by the court in *Driefontein Consolidated Gold Mines. v Janson* (1900: 339) as follows:

“When differences between states reach a point at which both parties resort to force, or one of them does acts of violence, which the other chooses to

look upon as a breach of the peace, the relation of war is set up, in which the combatants may use regulated violence against each other, until one of the two has been brought to accept such terms as his enemy is willing to grant. War, as used in this work, is a legal condition of internal or international armed hostility between parties or groups accompanied by the commission of acts of violence.”

A combination of various factors has been used as a basis for determining civil war. Ibrahim Elbadawi and Nicholas Sambanis (2000: 244) used indicators from several data sets to operationalise the concept of civil war as follows:

“A civil war is an armed conflict that has caused more than 1000 deaths; challenged the sovereignty of an internationally recognized state; occurred within the recognized boundaries of that state; involved the state as one of the principal combatants; included rebels with the ability to mount an organized opposite; and involved parties concerned with the prospect of living together in the same political unit after the end of the war”.

In this research, the term civil war means an internal armed conflict that challenges the sovereignty of the state in question and having the state as a party in the war. During the Yugoslav civil war, conflicts were not restricted to armed groups within the country. European countries under the aegis of NATO intervened and mounted a series of military assaults. It was the NATO involvement that actually contributed to the worst environmental impact of the war.

### 3.2 THE WAR IN BOSNIA HERZEGOVINA

Bosnia and Herzegovina was an intricate patchwork of ethnic and religious communities and had a history of periodic violence. Many observers had long regarded it as the Yugoslav republic where civil war was most likely and believed that conflict there would be especially bloody if Yugoslavia disintegrated. None of Bosnia's three official nations—Muslim Slavs, Croats, and Serbs—constituted a majority of the population. In the 1991 census Muslim Slavs (or Bosniaks) made up 44 percent of the population of 4.4 million, the Serbs made up 31 percent, and Croats made up 17 percent, while 5.5 percent declared themselves “Yugoslavs.” The remaining 2.5 percent comprised various small minority groups, such as Roma and Jews. Both Serbia and Croatia had historic claims to all or parts of Bosnia (Hellenbroich, 1989:53). By the end of 1991 Bosnian Serbs and Bosnian Croats had already formed “statelets” of their own within Bosnia. In the fall of 1991 the SDP established a separate Bosnian Serb legislature and a network of Serb Autonomous Regions (SARs) in northwestern, eastern, and southern districts that were inhabited primarily by Serbs. Each SAR organized its own armed defenders.

A three-sided armed conflict, with the Bosnian Serb and Bosnian Croat sides enjoying major external support—from Serbia and Croatia, respectively—erupted the same week. The Bosnian Croats, aided by the Croatian government and the army, initially fought alongside poorly armed and unprepared Bosnian government forces, mostly Muslim, against Serb forces. The Yugoslav army transferred most of its troops and weapons in Bosnia to the Bosnian Serb

army before formally pulling out, under international pressure, when Serbia and Montenegro declared themselves the Federal Republic of Yugoslavia. Irregular armed bands from Serbia and Croatia terrorized civilian populations of other nationalities and burned their villages. Some of these bands were mobilized by ultranationalist parties and individuals in Serbia and Croatia; others came simply to plunder and kill. Volunteers from Islamic countries later fought alongside the Bosnian government forces. Many of them were former guerrillas who had fought in Afghanistan in the 1980s following the 1979 invasion and occupation of that country by the Union of Soviet Socialist Republics (USSR) (Perry et al, 1996:890). International efforts to bring about a ceasefire on the resolution of the conflict in Bosnia were numerous but unsuccessful until late 1995.

The UN began imposing sanctions on the FRY in May 1992, in an attempt to halt Serbian support of Bosnian Serb offensives and atrocities. In the spring of 1993 the UN also established six “safe areas” for Bosniaks, towns where troops would protect them from attack. In May 1995 renewed Serb bombardment of Sarajevo was answered by NATO air strikes on Serb forces. The Serbs responded by holding more than 350 United Nations soldiers hostage, and they were released only after protracted negotiations. In Srebrenica they massacred about 8,000 unarmed Muslim men and boys, captured in the presence of a small Dutch contingent that had requested NATO air support but never received it. The United States and NATO reacted to these events with more forceful efforts to end the conflict.

The war in Bosnia ended in late 1995 as a result of a series of partly coordinated developments. In August NATO aircraft launched their first serious attacks on Serb positions in response to a murderous mortar attack on a crowded market in Sarajevo. The Dayton peace accord was formally signed in Paris in December. The central government had almost no powers. The accord included provisions for internationally organized elections and the unhindered return of refugees to their places of origin. Real authority was vested in the international community’s High Representative, selected by the EU, and an official appointed by the UN.

An estimated 100,000 people died in the three-year war in Bosnia. The horrors of the war became even more apparent in its aftermath. The ongoing discovery of mass graves attested to the systematic ethnic cleansing that took place. Dozens of mass graves contained the remains of victims of the July 1995 Srebrenica massacre. That massacre, which the International Criminal Tribunal for Yugoslavia (ICTY) ruled to be an act of genocide, is remembered as the worst mass killing in Europe since World War II (1939-1945).

### 3.3 THE WAR IN SLOVENIA

On June 27, 1991, Yugoslavia’s federal Prime Minister, Ante Marković, a Croat, authorized a few underequipped units of the Yugoslav army to maintain Yugoslavia’s existing borders by trying to take control of Slovenia’s border posts with Italy, Austria, and Hungary (Hellenbroich, 1989:53). The army was thwarted by determined and skilful Slovene armed resistance in a ten-day war in which fewer than 50 combatants in all were killed. The army withdrew from Slovenia in early July 1991, and the first war of Yugoslav succession was over. In January 1992 members of the European Community (EC; after 1993 the European Union,

EU) recognized Slovenia's independence along with that of Croatia. The United States and other countries did so shortly thereafter (Perry et al, 1996:890).

### 3.4 THE WAR IN KOSOVO

Kosovo's Albanian majority periodically rebelled against Serbian and Yugoslav authority ever since Serbia first annexed Kosovo as a result of the Balkan Wars of 1912 and 1913. Yugoslavia's Communist leader Tito granted genuine and broad autonomy to Kosovo after 1968, permitting a large measure of self-rule by Kosovo's ethnic Albanian Communist elite. Tito's measure was designed to reconcile the Kosovar Albanians to remaining within Yugoslavia. However, Kosovo was the poorest region of Yugoslavia, and the positive effects of Tito's strategy were counterbalanced by the effects of Kosovo's continuing poverty. Kosovo's plight frustrated the hopes of the Kosovar Albanians for jobs and better living standards (Hellenbroich, 1989:47). The war in Kosovo in 1999 resulted from a classic case of confrontation between one people's historical claim and other people's ethnic claim to the same territory. Kosovo, a province in southwestern Serbia, is sacred to Serbs, for whom it is the cradle of their culture, church, and statehood. It is also the site of the epic Battle of Kosovo in 1389, which most Serbs consider the most important event in their history. However, by the 19th century the population of Kosovo was predominantly Albanian, and in the late 20th century Albanians accounted for more than 80 percent of its population. Many Kosovar Albanians aspired to a nation-state of their own or to union with neighbouring Albania.

In October 1998 intense diplomatic pressure and a threat of NATO air strikes forced Milošević to agree to withdraw some troops and police and to take part in negotiations with Kosovar Albanian leaders that were aimed at restoring some autonomy to Kosovo. Serbian forces began a major new offensive against Albanian villages in early 1999. NATO leaders interpreted this offensive as the beginning of systematic ethnic cleansing of Kosovo's approximately 1.5 million Albanians. In late March NATO forces, led by the United States, began a campaign of air strikes, by both piloted aircraft and cruise missiles, against military and other targets throughout the FRY. Serbian assaults on ethnic Albanians intensified, with police, paramilitary units, and the Yugoslav army razing villages and forcing residents to flee. Most NATO leaders rejected the idea of a ground invasion of the FRY, so NATO intensified its air strikes in April and May. The targets of the attacks now included bridges, railroads, oil and electricity facilities, and factories throughout the FRY, including downtown Belgrade and other cities (Perry et al, 1996:890).

### 3.5 THE WAR IN CROATIA

In April and May 1990 the Croatian Democratic Union, an anti-Communist and nationalist party founded and led by Franjo Tuđman, won Croatia's first democratic elections. Tuđman, a former Communist general and historian who had been briefly imprisoned for Croatian nationalism in the 1970s and again in the early 1980s, was elected president of Croatia. Relations between the new regime and the Serb minority rapidly deteriorated (Hellenbroich, 1989:53). In May 1991 an overwhelming majority of Croatian voters chose independence in a referendum that was boycotted by almost all Croatian Serbs. On June 25, 1991, Croatia declared

its independence. Armed clashes quickly evolved into full-scale war between Croatian special police and military forces on one side and Yugoslav army and Croatian Serb forces on the other. The Yugoslav army, which was gradually deserted by its non-Serb officers and conscripted soldiers, became an almost exclusively Serb army. The war in Croatia was also characterized by a deliberate strategy of ethnic cleansing, through expulsions and massacres, of Croats and sometimes other non-Serbs from Serb-controlled territories. At times, Croats similarly expelled or murdered Serb civilians in contested districts. However, the focus by the international media on more widespread ethnic cleansing of Serbs, later repeated in Bosnia, further reinforced negative views of Serbs and the role of Milošević's Serbia in the wars of Yugoslav succession (Perry et al, 1996:890).

The wars of Yugoslav succession produced six states in the territory of what had been the SFRY: Slovenia, Croatia, the Former Yugoslav Republic of Macedonia (FYROM), Bosnia and Herzegovina (divided into two separate "entities," a Bosniak-Croat federation and the Serb Republic), Serbia, and Montenegro (Hellenbroich, 1989:46). Kosovo, nominally a part of Serbia, was an international protectorate managed by KFOR and a UN Mission in Kosovo (UNMIK). Fearing discrimination or worse, few refugees from ethnic cleansing in Croatia and Bosnia returned to districts where they would now be a minority. The future of each successor state except Slovenia was clouded by the long-lasting economic, social, and psychological consequences of often devastating war damage.

#### 4 ENVIRONMENTAL IMPACT OF THE WAR AND NATO BOMBARDMENT

War is often defined as armed conflict between nations or between opposing factions within a nation, can have grave consequences for the environment, public health, and natural resources (Lanier-Graham, 2003). War has marked human experience since the beginning of recorded time, and the demands of war have in many ways shaped and advanced the practice of medicine (Gabriel & Metz, 1992). Rhodes (1998: 260) estimated the immense scope of war-related mortality in the 20th century and demonstrated the increasing fraction of civilian deaths. Levy and Sidel (1997) recently reviewed the broad public health consequences of preparing for, coordinating and cleaning up after contemporary wars. War rivals infectious disease as a global cause of morbidity and mortality. In the 1980s health professionals' concern about the effects of war on the environment (Leaning, 1993: 123) focussed on the sweeping ecological consequences of nuclear weapons (Barnaby, 1975: 178).

The environmental impact of the Balkan war breaks down into: direct and indirect damage caused by NATO ordnance; the effects of destruction of infrastructure and industrial installations; damage to the natural heritage; consequences of population displacement. NATO air raids on the FRY began on 24 March 1999 and went on for 78 days. The 1200 NATO military aircraft flew over 34,000 missions, carrying out around 2,300 strikes. The total amount of ordnance used by NATO is put at between 22,000 and 79,000 tonnes. 78 industrial sites and 42 energy installations were destroyed or damaged by bombs or missiles. The bombing subjected ecosystems, surface water, groundwater, soil and air in the Balkans to unprecedented contamination involving over 100 toxic substances (Report of the Committee on the Environment, 2001).

#### 4.2 EFFECTS OF THE USE OF DEPLETED URANIUM

Depleted Uranium (DU) is a byproduct of the production of enriched uranium, which is mainly used as fuel for nuclear power. Depleted uranium is used in antitank weapons and its use can result in some dispersed in the environment. As a result, both soldiers and people not directly involved in combat, either military or civilian personnel, can breathe in uranium dust, or consume depleted uranium in contaminated food or water. After the Persian Gulf War, various environmental and veterans organizations expressed concern that health hazards from the use of DU weapons may have been underestimated. Some claimed that exposure to depleted uranium during the war caused ill health effects, including Gulf War Syndrome that would not have been expected from past studies of uranium toxicity (Bailey, 2008).

Since the 1991 Gulf War, concern over the health and environmental effects of depleted uranium (DU) weapons has continued to grow. An extremely dense metal made from low-level radioactive waste, DU is principally used by the United States, but also by other countries such as Britain, in defensive military armour, conventional munitions, and some missiles (WHO, 2003). Concerns have been raised about the possible hazards of long-term environmental contamination resulting from the use of DU weapons both at firing ranges (such as in the United States and United Kingdom) and in conflicts in the Persian Gulf, the former Yugoslavia, and the ongoing conflict in Iraq. Most of the DU used in battle was fired from aircraft, and most of these rounds missed their targets. Many of these were buried deep in the ground. Scientists are concerned about the possibility that as the penetrators corrode, uranium will enter groundwater and hence crops or even drinking water, especially if the strike was near a well (Bailey, 2008).

A report on DU by The Royal Society, the United Kingdom's national academy of sciences, published in 2002, made several recommendations. The report recommended that areas where DU munitions were used should be cleared of visible penetrators and contamination removed from areas around known penetrator impacts, especially to avoid the possibility that children could be contaminated while playing in those areas. The Royal Society also recommended that water and milk supplies in affected areas should be monitored for several decades. The World Health Organization (WHO) issued similar recommendations. The United Nations Environment Programme (UNEP) has called for a scientific assessment of sites in Iraq where DU munitions have been used (Bailey, 2008).

Many studies have investigated the distribution and retention of uranium in the body after inhalation or ingestion of different chemical forms. Some of these chemical forms, such as uranium trioxide, dissolve rapidly in the lungs, while others, such as uranium dioxide, dissolve very slowly. When soluble uranium—for example, in drinking water—is consumed, a few percent of it is absorbed into the blood. Most of the uranium that enters the bloodstream is excreted rapidly in the urine, with about 10 percent being retained in organs or tissue, such as bone.

Because uranium has been processed on a large scale in the nuclear industries, and its potential hazards (both radiological and chemical) were recognized even in the 1940s, its behavior in and possible effects on the human body have been extensively studied. Most of the study results, especially those relating to uranium that has dissolved and been absorbed into the



blood, should apply to DU just as with any other form of uranium (Bailey, 2008). Studies of health effects from exposure to chemical forms of uranium have shown that one definite hazard is damage to the kidneys. When the concentration reaches about 1 microgram of uranium per gram of kidney tissue, then effects can be detected by biochemical tests on urine, although higher concentrations are needed to produce symptoms of illness (Bailey, 2008).

NATO officials have confirmed the use of ordnance containing depleted uranium ( $U^{238}$ ) in operations in Yugoslavia. On account of its high density, depleted uranium is used in armour-piercing shells, particularly the 30 mm anti-tank shells fired by A-10 Thunderbolt assault jets. According to official information, some 31,000 warheads were used, with a total load coming on for 10 tonnes of depleted uranium. Uranium combustion in high-temperature explosions releases fine particles of uranium oxide. Uranium oxide severely affects the respiratory organs of people within 300m of the explosion, causing severe burns in mucous tissue and consequent malignant tumours. Beside its radioactive effects, uranium is a highly toxic element and a potent carcinogen and mutagen. Uranium oxide particles 0.5 to 5 $\mu$ m in diameter, which formed after a shell explosion, are dispersed by winds and settle on soils and vegetation. These particles, if ingested by humans or animals in contaminated food or water, may cause health damage (including chromosome destruction and severe reproductive disorders). It is impossible to recover particles of depleted uranium from the environment or to neutralise them. Biological accumulation of uranium can cause irreversible health damage to the population of the affected areas (Report of the Committee on the Environment, 2001).

Depleted uranium is probably one of the causes of so-called "Gulf-syndrome", which has affected many former American and British servicemen who took part in combat operations in the Persian Gulf in 1991. About 3,000 have died of cancer and many of the survivors have children with birth defects. Similar effects have been observed in the population of southern Iraq, with a sharp increase in birth defects, leukaemia and other cancers in children in the area. The same problems are seen in Bosnia and Herzegovina, where depleted-uranium shells were used in 1995. As Yugoslavia suffered intensive bombing and missile strikes from March to May 1999 and extensive use was made of warheads containing depleted uranium, there is every reason to suppose that it will experience a steep increase in morbidity. It is very possible that depleted uranium was responsible for the eightfold increase in radionuclide levels (which however did not exceed the maximum allowed concentration) found in Macedonia in May 1999 (Report of the Committee on the Environment, 2001).

#### 4.3 CONSEQUENCES OF MASSIVE USE OF AVIATION

Bombardment of the urban infrastructure, which constitutes the environment for a significant fraction of the world's human population, has always caused forced displacement of survivors. During World War II, when air power for the first time was deployed as the pivotal military technology, the practice of bombing civilian settlements became increasingly prevalent, and hundreds of thousands of people died as a result (Westing, 1986: 9). In the aerial bombardments of Tokyo in March 1945, about 100 000 to 200 000 people were killed. In the fire bombings of 70 German cities, including Hamburg in 1943 and Dresden in 1945, it is estimated that 500 000 to 800 000 people died (Postel, 1986: 73). About 200 000 people died from the acute effects of the atomic bombs in Hiroshima and Nagasaki in 1945 (Committee,

1981: 367). The bombardment of cities and the destruction of forests, farms, transport systems and irrigation networks during World War II produced devastating environmental consequences, and by the end of the war there were almost 50 million refugees and displaced people. In the last year of the war the land of coastal and northern France was torn up, Holland south of the Zuyder Sea was flooded with the destruction of dikes, and many ports were clogged with unexploded ordnance and sunken ships. Great damage had been done to most cities in Europe, with the hardest hit including Warsaw, Berlin, Hamburg, Dresden, Dusseldorf, Boulogne, Le Havre, Rouen, Brest, Pisa, Verona, Lyons, Budapest, Leningrad, Kiev and Cracow (Laquer, 1984: 25).

Between 24 March and 5 June 1999 NATO aircraft flew over 34,000 missions, totaling some 150,000 hours in the airspace of Yugoslavia and neighbouring regions. This concentration of warplanes over a relatively small area resulted in high levels of contaminants in the ambient air and in rainfall (including such fuel additives as ammonium perchlorate, polyvinyl chloride, lead stearate, polybutadine and polyethylene). Jet exhaust gases contain nitrogen oxides (NO<sub>x</sub>), which are ozone-depleting. Fuel discharge by NATO warplanes over neighbouring countries must also be reckoned among the factors directly linked to NATO ordnance use. It should be noted that fuel for F16 and Mirage jet fighters, which were used in NATO air strikes, contains highly toxic hydroxides (Report of the Committee on the Environment, 2001).

#### 4.4 DESTRUCTION OF INFRASTRUCTURE

Additional war-related problems which compound degradation of the natural and human environment include shortages in cooking fuel and waste mismanagement during and after military conflicts. During the most recent warfare in Iraq, individuals were forced to cut down city trees to use as cooking fuel. In Afghanistan, the creation of poorly located, leaky landfill sites resulted in contaminated rivers and groundwater (UNEP, 2003). The degradation of infrastructure and basic services brought on by war can wreak havoc on the local environment and public health. Countries' water supply systems, for example, can be contaminated or shut down by bomb blasts or bullet damage to pipes (Shehan, 2003). In Afghanistan, the destruction of water infrastructure combined with weakened public service during the war resulted in bacterial contamination, water loss through leaks and illegal use (UNEP, 2003). The consequence was an overall decline in safe drinking water throughout the country. Water shortages can also lead to inadequate irrigation of cropland. Agricultural production may also be impaired by intensive bombing and heavy military vehicles traveling over farm soil (ibid). The presence of landmines can also render vast areas of productive land unusable (Office of International Security Operations, 1993).

Between 24 March and 5 June 1999 78 industrial sites and 42 energy installations in Yugoslavia were damaged by bombing or missile strikes. As a result of destruction and fires at industrial facilities, there was severe contamination of air, water and soils by hazardous substances, including dioxins, toxic sulphur and nitrogen compounds in low degrees of oxidation. The contamination was registered not only in Yugoslavia but in the neighbouring countries as well (Report of the Committee on the Environment, 2001).

#### 4.5 WATER POLLUTION

Water pollution is the contamination of streams, lakes, underground water, bays, or oceans by substances harmful to living things. Water is necessary to life on earth. All organisms contain it; some live in it; some drinks it. Plants and animals require water that is moderately pure, and they cannot survive if their water is loaded with toxic chemicals or harmful microorganisms. If severe, water pollution can kill large numbers of fish, birds, and other animals, in some cases killing all members of a species in an affected area. Pollution makes streams, lakes, and coastal waters unpleasant to look at, to smell, and to swim in. Fish and shellfish harvested from polluted waters may be unsafe to eat. People who ingest polluted water can become ill, and, with prolonged exposure, may develop cancers or bear children with birth defects.

The repeated, intensive and destructive air attacks on the Pancevo complex caused a risk of explosion of tanks containing toxic substances. An explosion would have released huge quantities of toxins, causing widespread air contamination and heavy human casualties. To avoid that, the operators of the facility had to discharge large volumes of toxic solutions into the Danube (including 1,400 tonnes of ethylene dichloride, 800 tonnes of 33% hydrogen chloride solution, 3,000 tonnes of lye, 1,000 tonnes of sodium hydroxide (NaOH) and an unspecified amount of mercury (the plant routinely stocks around 100 tonnes of mercury for use in its technology). Bombing of other facilities resulted in discharges of about 200 tonnes of ammonia (NH<sub>3</sub>) into the Danube. In the Danube area of Ukraine, from March to July 1999, ambient levels of formaldehyde and phenols were found to be 2 to 4 times the permitted maxima. In the city of Novi Sad, air strikes resulted in massive oil discharges which contaminated the Danube. The oil slick (15km long and up to 400m wide) was observed on the river for two weeks in April, between kilometre 1,255 and kilometre 1,052. In May 1999, oil patches were observed along the whole of the river between Vidin and Ruse (Bulgaria) as well as downstream, near Reny (Ukraine). Near Bor and Mojcovac, bombing destroyed the dams of storage ponds for liquid industrial waste. The waste releases caused contamination of soil, surface water and groundwater. Serbia has groundwater resources of European importance and contamination of them might have very adverse impacts far from Yugoslavia. The problem is worsened by the fact that groundwater is much less self-cleaning than river water (Report of the Committee on the Environment, 2001).

#### 4.6 AIR POLLUTION

Air Pollution is the addition of harmful substances to the atmosphere resulting in damages to the environment, human health, and quality of life. One of many forms of pollution, air pollution occurs in homes, schools, and offices; in cities; across continents; and even globally. Air pollution makes people sick—it causes breathing problems and promotes cancer—and it harms plants, animals, and the ecosystems in which they live. Some air pollutants return to Earth in the form of acid rain and snow, which corrode statues and buildings, damage crops and forests, and make lakes and streams unsuitable for fish and other plant and animal life.

Pollution is changing Earth's atmosphere so that it lets in more harmful radiation from the Sun. At the same time, our polluted atmosphere is becoming a better insulator, preventing heat from escaping back into space and leading to a rise in global average temperatures. Scientists predict that the temperature increase, referred to as global warming, will affect world food supply, alter sea level, make weather more extreme, and increase the spread of tropical diseases.

During the period from April 18 to April 26 1999, the maximum allowed concentrations of sulphur dioxide, nitrogen oxides and ammonia in the air were recorded in south-west Romania, in Timis County. On April 20 1999, Romanian border guards had poisoned symptoms and respiratory difficulties due to high sulphur dioxide and ammonia levels in the air. At Pancevo and other areas affected by air strikes, burning oil, grease and synthetic construction materials generated temperatures of up to 1200°C that caused large releases of pyrotoxins. Toxic substances released into the air (in particular highly toxic dioxins) may be wind-carried huge distances. For example, air concentrations of dioxins in northern Greece were 10 times over environmentally acceptable levels (maximum allowed concentrations) in April 1999 and 15 times over in May 1999 (Report of the Committee on the Environment, 2001).

#### 4.7 DIRECT DAMAGE TO PROTECTED AREAS, FORESTS, LANDSCAPES AND SOILS

According to experts, the explosion of a 240kg bomb creates a crater 4m deep and up to 50 m<sup>2</sup> in area. Such craters are visible in aerial photos, taken after the cessation of military operations, from nature reserves affected by bombardment (Fruska Gora, etc.). Experts fear that the three-month military campaign and associated noise, pollution and destruction have disrupted the natural migration routes of wild birds and animals, directly affecting their reproduction (important migration routes to Southeast Europe cross Yugoslavia). Not less than 250 hectares of forest were destroyed by fires. Several thousand hectares of arable land have become unfit for agricultural use on account of contamination or physical destruction. Near the Romania-Yugoslavia border (in the area adjacent to the conflict zone), soil concentrations of heavy metals are 50 times higher. This contamination is directly linked to fallout of wind-borne and cloud-borne pollutants from destroying industrial facilities in Yugoslavia.

Restoration of soil fertility and natural biochemical circles in the areas struck might take several thousand years: formation of 2 cm of fertile soil takes more than 100 years in natural circumstances. Destruction of fertile upper layers of soil in a bomb crater area means destruction of associated flora and fauna. Protected areas in Yugoslavia were of prime importance for biological diversity in Europe. It is impossible to assess damage to them, even approximately. In the border areas of Bulgaria, high soil concentrations of lead, copper and cadmium have been found (3, 1,400 and 30 times higher respectively than average values recorded over a period of many years). Until recent events Yugoslavia was relatively unpolluted. Up to 4% of the country (400,000 hectares) is protected areas or nature reserves (there are 1,800 such protected zones), containing rare plant and animal species. Bombing raids and missile strikes affected not less than 13 national parks and nature reserves, including such well known ones as Targa (which is on the Unesco Global Heritage List), Kopaonik, Fruska Gora, Sarplanina and Vrsacke Planiny (Report of the Committee on the Environment, 2001).

#### 4.8 ENVIRONMENTAL CONSEQUENCES OF POPULATION DISPLACEMENT

The crisis triggered an unprecedented flight of refugees, mainly to Albania and Macedonia, neither of which had the resources or infrastructure to cope with hundreds of thousands of fugitives. Many refugee camps were set up in protected areas or on farmland without any consultation with the local authorities. All the refugee camps (especially tent camps) suffered from inadequate or non-existent sewerage, unauthorized rubbish dumps and felling of trees to obtain wood for cooking and heating. In the majority of cases, discharges of household wastewater and infiltration of liquids from waste dumps resulted in contamination of groundwater aquifers. Large amounts of waste water and household waste were discharged into rivers and other surface water bodies. Action by local authorities and international relief organisations achieved only limited control of the situation.

#### 4.9 PROBLEMS OF DAMAGE REPAIR

Disposal of debris (from destroyed buildings, bridges, etc) poses a major problem. Available technologies make it possible to recycle up to 80% of it (though processing will inevitably involve hazardous discharges into air and water). For the other 20%, burial is the only option. Accumulation of rubbish and household waste is becoming a serious environmental problem, many months after the air strikes and the deployment of the peacekeeping force in Kosovo. The scale and long-term nature of the environmental damage necessitate special measures, with monitoring programmes and environmental-rehabilitation programmes both in Yugoslavia and neighboring countries. This will involve considerable unforeseen expenditure. Albania and Macedonia do not have the equipment and institutional capability to carry out long-term monitoring and implement the measures needed to localise the consequences of the conflict. Romania also faces some organisational, logistical and financial difficulties. Given the intensity, diversity and nature of the environmental impacts and the impossibility of restoring the environment to its pre-war state on account of the long-term effects of damage (especially chemical damage), it is not realistic to hope to remove the conflict's environmental consequences in Yugoslavia. All we can do is seek to contain and lessen the direct and indirect environmental damage. The scale of environmental contamination and the task of alleviating the effects of military operations far exceed Non-Governmental Organisations' (NGOs) capacities and their traditional structure and working methods. At the same time, it is very important to avoid impairment or collapse of Yugoslavia's present environment NGOs (which have been fairly active in recent years). Their environmental work is important in itself, but NGOs also have wider importance, as key actors in civil society and so in the general democratic process. NGOs' effectiveness in post-totalitarian reorganization has been demonstrated many times in former communist countries.

Health monitoring in regions affected by the adverse factors we have described requires special attention, specialized equipment, organization and additional funding. Unfortunately monitoring, treatment and prevention in Yugoslavia are a major problem because of the many

health care facilities destroyed by military action. Unfortunately, environmental problems are not a priority in plans for restoration action in Yugoslavia and programmes of international technical and financial aid to the country. The approach is very similar to the restoration approach used in Bosnia – an indication that international organisations and national governments underestimate the environmental implications of military conflicts. For objective reasons the authorities in Yugoslavia cannot, on their own, carry out the necessary measures. The situation is bound to affect Yugoslavia's environmental non-governmental organizations. Like other "third sector" organizations in southeastern Europe, these NGOs required external assistance even in more favourable circumstances. The shift in donor organisations' and agencies' priorities towards assistance for rebuilding industrial and social infrastructure is liable to greatly reduce the technical and financial resources available to NGOs. Because of the radical change in operating conditions, many non-governmental environmental programs have been abandoned (Report of the Committee on the Environment, 2001).

## 5. CONCLUSION

War and military activities have obvious detrimental impacts on the environment. Weaponry, troop movements, land mines, creation and destruction of buildings, destruction of forests by defoliation or general military usage, poisoning of water sources, target-shooting of animals for practice, consumption of endangered species out of desperation etc., are just some of the examples of how both war and peacetime military activities harm the environment. From a legal standpoint, environmental protection during times of war and military activities is addressed partially by international environmental law. International environmental law is the appropriate focus here (Donovan, 1996). National laws dealing with environmental degradation caused by military activities during peacetime are also not very strong. Many countries regard military activities as sacrosanct, permitting environmental destruction in the name of country protection. However, there are indications in some countries that national governments are taking their environmental responsibilities more seriously in relation to military activities and it is perhaps from these national experiences in controlling excesses that future international controls may be better modeled and implemented.

A comprehensive environmental impact assessment of the NATO military action in the region is still in progress. Some data are contradictory and require substantiation or adjustment. However, we now have enough firm evidence to record some general findings and draw broad conclusions about the environmental impact in Southeast Europe of military operations in the FRY. Damage evaluation and environmental rehabilitation in the region should take priority in the design and implementation of programmes to assist reconstruction in Southeast Europe.

There is an obvious need to provide all possible international assistance to environmental non-governmental organisations in Yugoslavia so as to help them clarify their role in the post-war restoration work. Quite apart from the question of the appropriateness of tackling the Kosovo problem militarily, it should be stressed that the use of military means to stabilise crisis situations must be selective and cautious if severe damage to the environment is to be avoided. The attacks on industrial facilities in Yugoslavia, aimed at depriving the government of its economic base, destroyed vital infrastructure and caused severe – in some cases irreversible – environmental damage. This will have serious and lasting effects on

people's lives in Yugoslavia, effects which the authorities do not have the resources to deal with. The environmental impact of the Kosovo crisis is transboundary: there have been environmental consequences in adjacent areas of neighbouring countries, and the Danube basin, transboundary waterways and groundwater have all been affected.

The military operations violated the rights of Yugoslav citizens and people in neighbouring countries, first and foremost the right to a healthy environment. That the military action would have grave environmental consequences was highly predictable and the consequences were fairly evident right from the start of the air strikes, so the militarily inflicted environmental damage can be presumed to have been deliberate. The use of military force and special-purpose weaponry with lasting, non-containable effects has endangered both the present population and generations to come. Destruction of the petrochemical installations close to Belgrade (Pancevo is a suburb of it) directly threatened the lives and health of almost 2 million people.

The military operations masterminded and conducted by NATO in Yugoslavia contravened Principle 24 of the 1992 Rio Declaration on Environment and Development, as well as the spirit and letter of resolutions, conventions and declarations which conferences of the United Nations and other international organizations have adopted over several decades in order to develop international co-operation on questions of environmental protection and liability for environmental damage. At the same time, the conflict has revealed the inability of contemporary international law to prevent similar occurrences in future.

The Kosovo crisis has demonstrated the urgent need for a special European convention on prevention of environmental damage in military action and on measures to defuse emergencies. The convention would develop and supplement the provisions of existing international legal instruments. Such a convention would be in accord with the spirit of the Council of Europe's high humanitarian objectives. Its relevance was brought home by the recent military operations in Chechnya, which also caused environmental damage due to the destruction of oil refineries and oil storage installations (Report of the Committee on the Environment, 2001). There is an inadequacy of the resources available to the countries of Southeast Europe to address the environmental consequences of the Kosovo war and economic and social reconstruction programmes in the region must take full account of the environmental dimension. The international rules on environmental protection in the event of armed conflict should be strengthened, and proposes that a convention be drawn up to this end (Report of the Committee on the Environment, 2001).

The military operations conducted by NATO against the Federal Republic of Yugoslavia during the 1999 Kosovo crisis caused serious damage to the country's natural environment. The damage extended to several other countries of Southeast Europe. Efforts by NATO air forces to destroy industrial sites and infrastructure caused dangerous substances to pollute the air, water and soil. These substances will have a lasting impact on the health and quality of life of the populations of the countries concerned. In particular, the use of ammunition containing depleted uranium is likely to increase the incidence of cancer and congenital disease among the inhabitants of the areas affected, as well as among the members of the armed forces serving in these areas. In modern times, environmental security has become one of the major factors in social development models. A kind of "environmental imperative" is developing that requires a stable balance to be struck between political expediency, economic necessity and

environmental protection in approaches to global and regional problems. The supranationality of natural resources and technology's growing environmental impacts compel us to develop and enforce international legal rules for the prevention of activities incompatible with strict environmental standards (Report of the Committee on the Environment, 2001).

In recent years, environmental law has developed appreciably as an interdisciplinary field with a set of legal standards governing social relations insofar as protection and rational use of natural resources are concerned. The constitutions of many European countries establish environmental human rights, chief among them the right to a healthy environment; the law in these countries lays down penalties for environmental offences. As environmental crisis deepens, international environmental activity develops and environmental law machinery is set up, so environmental aspects of regional and local conflicts are attracting more attention.

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