

# DEFENCE SYSTEM AND ECOLOGY – THE NORTH ATLANTIC TREATY ORGANIZATION ROLE

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## Summary

*A systematic research of direct and indirect influences of mankind on the environment started with the ecology. Accordingly, with the human's negative influence on the environment, the modern concepts of national security were broadened to include environmental threats. The military system was also put under this scrutiny because of its negative impacts on the environment. The result may be seen in the regulation of its activities and influences on the environment by international conventions and international agreements. However, the impact of the defence system on the environment, as a laboratory for training the armed forces and as the ultimate goal of the armed forces' activities, has not been studied sufficiently. Initial studies and research have been conducted by military experts only, but besides military experts international organizations, non-governmental organizations and academics are nowadays also involved in the studies of the consequences of defence system activities on the environment. NATO's Committee on the Challenges of Modern Society (CCMS) is taking a leading role in this area of research with its pilot studies on reducing aircraft noise, environmental restoration and clean-up of military bases etc. Development in this field indicates that of a new discipline of ecology e.g. the military ecology is being established.*

*Keywords:* defence system, ecology, military ecology, NATO, military bases

## INTRODUCTION

A traditional concept of national security, which emphasizes national security as a defence of national territory from outside enemies, became obsolete after the fall of the Berlin wall and disintegration of the Warsaw Treaty Organization. With the end of the Cold War the traditional security concept had to be modernized to include contemporary threats such as international terrorism, pollution and de-

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gradation of the natural environment, international migration, international organized crime, drug and human trafficking, etc. Jessica Tuchman Mathews (1983: 162) in the article *Redefining Security* addresses the narrow concept mentioned above and stresses that "global development demands the need for extending the traditional concept of national security to natural resources, environment and growth of human population". Barry Buzan (1998: 8) evolved a military-political concept of national security even further by identifying five sectors of national security: military, political, economic, societal and environmental security, which supports local and global biosphere and essential subsystems that mankind depends on. National security sectors are interconnected and are not isolated from one another; however, each possesses its own national security "point-of-view". The relationship between five security sectors forms a complex matrix at the local, regional, national and international level. In this respect national security cannot be perceived without understanding the international interdependence.

A broader concept of national security was widely accepted in early 1990s by members of the North Atlantic Treaty Organization (NATO) as well because they needed to adapt to the new dynamics of international relations in which Central and Eastern European countries were confronted with a difficult transition of political system and market liberalization. NATO survived the Warsaw Treaty Organization because of a democratic decision-making process, developed institutionalization and the capacity for reforms necessary to respond adequately to the contemporary national and international security threats. Moreover, Wallander, Keohane and McCalla (v Walt, 1997: 167) emphasize the evolution and transformation of the North Atlantic Alliance from a collective defence organization to a cooperative security organization, whose main objective besides the collective defence is the management of various security threats.

A degradation of natural environment is not mentioned among important security threats in the traditional concept of national security, as human influences on the environment were not systematically observed at the time. Only after the Cold War did ecologists, biologists and geographers begin researching and observing shifts of the natural environment to conclude that there is an undisputed correlation between pollution and negative environmental consequences (changes of climate and natural catastrophies) (Grizold and Ferfila, 2000: 160-161). Therefore, one of the components of the contemporary national security also refers to the ecological threats e.g. changes of national environment, which directly and indirectly threaten the development of humanity and consequently its security. Marc A. Levy (1995: 48) identifies the most concerning ecological threats such as thinning of the ozone layer, rising of global temperature and climate changes (the so-called greenhouse effect), diminishing of biodiversity, lack of fresh and quality water supplies etc.

At this point it has to be mentioned that armed forces are also among the polluters of the national environment because they use a variety of armament and ammunition that have a negative impact on the environment. Because of the pollution of natural environment and with an increase of public environmental

awareness the adoption of standards for environmental protection became an imperative and essential part of the national security system of industrialized countries and a task for international security organizations, especially NATO.

## **MILITARY ECOLOGY?**

Although humans were always very closely integrated into the environment, a systematic analysis of interactions between separate ecosystems and the consequences of their cohabitation were introduced relatively late. The term ecology and its recognition as an independent science came from biology. In 1866, famous biologist Ernest Haeckel (v Gams. 1986: 4) was the first man in history to define ecology as a new science that studies relations between different organisms and the environment around them. In the broadest sense it comprises all the conditions of existence and residence of each and every organism in the nature. In this first, and more or less classical form, ecology defined itself as a biological discipline that examines closely relations between the organisms and their environment, with a special emphasis on studying the adaptiveness of organisms, their reaction and adjustment to different demands of the environment. Besides that, the "biological" ecology devotes much of its scientific work to the examination of the circulation of substances and the energy between environment and organisms on the one hand, and relations between different types of population of the ecosystem on the other. Discovering and defining the ecosystem – key term of ecology as a junction of biocenosis and biotope – was one of the most revolutionary achievements of ecology as a science (Omladič, 1998: 169). Nevertheless, the extent of research and, consequently, the meaning and understanding of ecology as a science have seen constant development and evolution. The main reason for that is in the semantic comprehension and definition of the ecosystem. Luka Omladič (1998: 169) offers two possible interpretations: the first of these defines the ecosystem, where a joint living association is considered an aggregate of separate species as individuals and changes of that association are based on separate species as individuals. The second interpretation relates to a functional correlation of species, where the living association is dealt with as one superorganism. Many different ecological philosophies were based upon this concept of ecology, forming a so-called deep ecology, which defined Earth as a living organism. The planet Earth becomes just one superorganism as a self-regulated cybernetic system.

The term ecology is of ancient Greek origin, and is composed of two words: *oikos*, which means home and *logos*, which can be translated as science. Since the space in its broadest definition is a basic structure of the ecosystem, many different sciences are involved in the research of the ecosystem from different points of view. Therefore it is necessary and logical to understand the ecology, as the originally naturalistic biology science, in a broader – interdisciplinary – sense. Thus geography uses the different findings and results of ecology, as the space is the core subject of the

geographic research. Ecology in the field of geography is focused on the research of damaging consequences of human activities on the environment, and the way to prevent and annul those consequences (Tavzes, 2002: 257). The ecological content in geography has been merged to form a new scientific discipline – environmental ecology. Karel Troll, who first defined and used this term, understood it as a study of the complex character of the effect of living associations (biocenosis) and their living conditions on the earth, which are dominant in a certain part of the landscape (Troll in Gams, 1986: 8). Such an understanding led to a reverse process of the ecosystem determination, as offered by the philosophy of deep ecology. Founding fathers of environmental ecology introduced a new term – ecotope. It describes an environmentally and ecologically homogenous section of the landscape. Since the human being more or less changed much of the environment and, consequently, homogeneity is very difficult to reach, scientists excluded all the influences of living creatures and defined a new term – physiotope (Gams, 1986: 9). Finally, we can conclude that geographic environmental ecology sees the human being as a much more important factor than biological ecology.

In its most general form ecology includes many other sciences besides those already mentioned. Požarnik (1985: 15) defines ecology as a science of the ecosystems that includes biological, chemical, physical, geological, geographical but also sociological, technical, economic and political aspects. As such, it is necessary because the governing economic logic, way of life, values and flawed political decisions all over the world, and in developed countries in particular, directly concern mankind and its natural and social environment. From that point of view ecology may be viewed as a radical criticism of contemporary culture and politics of industrialized, developed societies. It gave birth to the ecological movement, which had its roots in the 1960s' and 1970s' student movements in the West. An extreme burden on the environment, which can be equated to a degradation and destruction, prompted a very clear reaction among the young who disapproved of unbridled economic growth and consumption. Their main objective was clear resistance to nuclear energy and a demand for faster development of alternative technologies (Kirn, 1986: 23). In 1972, the first report of the Roman Club was published. Based on a presumption of unchanged growth of population, consumption of resources, degradation of the environment, industrialization and food deficiency, it said an ecological catastrophe could be expected within the one next hundred years (Požarnik, 1985: 7). Such developments ushered in a new term – ecological crisis, which still accompanies mankind. In a matter of several years, ecology as a modern science spread among the entire world population. There can hardly be anyone who has not heard about ecology in one of its numerous modifications nowadays.

Since every human activity is accompanied by different influences on the environment it is necessity to study their significance and consequences. Therefore, the organization and activities of the defence system also came to be probed. Among the many issues involved there are two obviously vital ones: how and more importantly

to what extent or with what intensity does the military burden the environment? The second issue relates to the consequences of such environmental degradation. However, one more important and never very precisely defined question also has to be answered: who is going to study and research all the impacts on the environment caused by military activities? The environment has different meanings for a defence system. Gregory D. Foster (2001: 382) underlined three possible ways of correlating environment and security. The first relates to an annihilation effect of military forces and development of more and more destructive weapons and technologies that must be tested and used in day-to-day training of the armed forces. The second is closely connected to a so-called environmental warfare. In this case the destruction of environment is the main goal of the armed forces and enables the realization of military strategy. The third aspect of correlation between the armed forces and environment belongs to the area of consequences and changes in the environment that may cause instability. In all three aspects it is essential to research and study all possible effects that the armed forces as part of the defence or national security system have on the environment. There are some systematically organized factors of the defence system (e.g. different kinds of intelligence services and military geography) intended to research the effects of the armed forces on the environment, known as "environmental warfare". Their primary goal is to carry out a thorough analysis of concrete places – potential battlefields – and to use their findings to support the management, decision-making and organization of military activities in peace as well as in wartime and to enhance the possibility for a victory in an armed conflict (Prebilič, 2002:60). Hence, the defence system is very much aware of the effects its activity could cause in the natural environment. But this information is usually not available to civilians. It is considerably more difficult to define the research of the defence system's impact on the environment in a peacetime situation. The reason for this lies in an intentional marginalization of the system's effects, a possible negative influence it might have on the definition of civilian-military relations and a relatively low degree of ecological consciousness of the system itself.

Is the military activity likely to gain its "own" military ecology, as was the case with other sciences (social ecology, economic ecology, landscape ecology...)? Two additional dilemmas arise when trying to discuss the term, which has not yet found its way into the military or civilian terminology. The first dilemma refers to the subject of research of a possible new discipline. From the point of view of the geographical interpretation of ecology, the subject of military ecology could be defined as research of the interreaction between the environment and the defence system, the main emphasis being predominantly on the negative or harmful effects of the defence system, their prevention and eradication. Another dilemma, which is probably more difficult to solve, is the structure of the experts who are supposed to carry out research in the field of military ecology. Due to all the reasons mentioned above the consequences of the defence system activities on the environment remain relatively insufficiently researched.

It is also very important to stress the exponential growth of a burden on the environment by the defence system. It is due to a considerable growth of the armed forces themselves, and consequently to the enlargement of the defence systems and their new, unconventional weapons – weapons of mass destruction. Two additional specific aspects of the burden on the environment by the military are continuity and intensity. Continuity represents uninterruptedness, which is directly related to a continuous training of soldiers and the whole system, both in times of peace and of war. Intensity refers first of all to two basic defence system situations: peacetime and wartime situation. Certainly, wartime can be expected to cause a much more intense burden. But its research is almost impossible due to two reasons. The first refers to the hierarchy of values. The value of security (safety) is much more pronounced in wartime because the very human existence is threatened, so it is irrational to expect a preservation of the environment when there is struggle for existence. The other reason is represented by a warfare doctrine that has already been defined by the term “environmental warfare”. That is why the research of the defence system’s burden on the environment is limited to peacetime situations. There are two situations that are directly related to everyday activities of the armed forces:

- life in military bases and direct influences on the environment
- training of soldiers on a firing range or training ground, and direct influences on the environment related to it.

## **MILITARY BASES AND BURDEN ON THE ENVIRONMENT**

It is very difficult to conduct scientific research of a possible environmental impact of the military system. However, it is possible and reasonable in the process of conversion of the former military sites and installations. Up to now scientists and experts have focused on the environmental impact of the former military bases. Military bases comprise the territory on land or sea, whose main purpose is to enable the concentration and execution of military and combat activities of all military branches. Besides the area occupied they also include the military and civilian staff. The number of staff is directly related to the purpose of the military base.

There are two basic categories of military bases according to their location: military bases on the national territory and military bases abroad – hosting military bases. This criterion relates to the military-historic experiences, geopolitical orientation, geostrategic position and defence doctrine of a particular state. The United States owns the largest number of military bases not only on its national territory but all over the world (Collins, 1998: 309). Preliminary studies showed that the extent and type of possible pollution can not be researched during the active use of a military base because bases are not accessible to civilian experts. During their closure and withdrawal of the staff (soldiers and civilian employees) the soil, building and water analysis on the territory of former military bases can start.

Therefore, base closure and conversion is closely related to research of environmental impacts and possible pollution.

With the end of the Cold War, reunion of the Federal Republic of Germany, disintegration of the Soviet Union and NATO enlargement to the East, many Soviet and American military bases lost their purpose and a massive conversion process was initiated. This process was most intensive in Germany, where the biggest concentration of both sides' armed forces was. Experts of the Bonn International Centre for Conversion underlined fundamental discrepancies between the Soviet and American military bases. In both cases considerable pollution and degradation of the environment was detected. However, the concentration and quantity of pollutants was higher in Soviet military bases. Therefore, clean-up costs and ecological sanitation procedure were essentially higher. But the German government was not compensated for any of these costs (Prebilič, 2001: 249). In case of the Soviet military bases compensation was not even expected, since the withdrawal of the armed forces was followed by a disintegration of the state and a collapse of the once joint national state bureaucracy. A legal successor was not defined and the German government could not find a counterpart to discuss even partial repayment of the very costly ecological sanitation procedure of the former Soviet military bases. The conversion and ecological sanitation procedure was not properly conducted in all other east European countries, where numerous Soviet military bases were located because they could not allocate enough funds from their national budgets due to the economic crises. On the territory of Ukraine, Hungary, Poland, Czech<sup>1</sup> and Slovak Republic, Romania and Baltic states (after the withdrawal of 500,000 Soviet soldiers) 1,283,165 ha of former military land was converted without any organized clean-up or ecological sanitation procedure. More than 5,849,162 ha were so polluted that the land remained closed to civilians and still represents the so-called grey areas on the national maps. In the Russian federation alone more than 12,000,000 ha are awaiting the ecological sanitation procedure (Myrntinen, 2003: 5).

The level of pollution is determined by two categories: the quantity and the type of the pollutant. Both categories are in close correlation with the type of military base. Military bases where soldiers and other staff primarily dwelled are mostly polluted by different kinds of organic waste and rubbish. Essentially far more dangerous pollutants, although in smaller quantities, are to be found in air and rocket bases, bases for the maintenance and repair of arms and combat systems, as well as the oil and its derivatives and chemical compounds storages. The most widely spread pollutants of the former military bases are oil derivatives (oil, petroleum, gasoline, kerosene, lubricants) (46%), the presence of heavy metals and different types of soluble substances (15%), halogen elements (12%), benzene, toluene and ethyl benzenes (12%) and heavy oxidants that were the integral part of fluid and hard fuels for rocket engines (9%) (Prebilič, 2002: 447).

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<sup>1</sup> Pollution with oil and its derivatives covered practically the entire area of the former Soviet military bases in the Czech Republic. For further use and termination of conversion procedure more than 1,3 billion m<sup>3</sup> of soil had to be physically replaced (Conversion Survey, 1999: 188).

Both NATO and EU are very active in the ecological sanitation process and elimination of pollution caused by the armed forces. Extensive financial help (\$980 million between 1994 and 1999) was provided to the most afflicted states: Czech Republic, Estonia, Latvia and Lithuania. Those funds were meant exclusively for the ecological sanitation process on the territory of the former Soviet military bases. While NATO focuses especially on the prevention of further environmental pollution of the armed forces, the EU continues with the calls for very favourable loans by the European Regional Development Fund for those regions that lost more than 1,000 jobs in the defence sector (Conversion Survey, 1993: 31).

## **TRAINING GROUNDS AND MILITARY POLYGONS AS A BURDENING FACTOR**

If the influence of military bases on the environment is described as indirect, military training facilities (shooting ranges, military polygons and other types of military testing grounds) have a direct influence and therefore deserve closer and in-depth analysis. There is a very high correlation between military training facilities and military bases. Each and every military base usually has different training facilities, where soldiers deployed there maintain their military capability and combat readiness. This correlation decreased significantly after World War Two because modern military combat systems require special testing grounds and shooting ranges. However, at the same time the level of military readiness and capabilities changed due to a new security environment and modern threats that were and still are reflected in the changes of the national defence doctrines. A decreasing trend in the number of military bases can be predicted with a high probability on the basis of geostrategic circumstances. But this is not the case with military training facilities because they have to and will be part of the military system in different forms in the future too. Soldiers have to maintain their combat readiness regardless of their deployment. This is possible through different forms of training exercises and war games or simulations only. Although the number of soldiers is still falling as a direct result of post-modern military trends, as famous Charles Moskos defined this phenomenon, a direct correlation between the number and size of military training areas can not be proved<sup>2</sup>. The use of modern combat military systems even dictates an increase in the size of the training grounds. When military training areas are discussed, experiences from the military history have to be considered. In most cases they determine the location and size of the military training grounds. Nowadays, especially the location is questioned. The development of the military combat systems follows two major goals: mobility improvements and an increase of the effective combat range (greater range and firepower of the projectile at the impact point). Consequently, the arms need larger training areas to accomplish the goals of the

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<sup>2</sup> An analysis of the experiences in the United Kingdom proved the predictions mentioned here. As much as 66% of all grounds used by the UK Armed Forces are earmarked for military training and different polygons (Savege, 1995: 40).



military exercise. Technical development of the military combat system was followed by doctrinal changes in the strategy and tactics. Modern army can fully reach the objectives only through synchronous and highly coordinated activities of all military branches. Modern weapons, especially the artillery, are based on high mobility (self-propelled artillery) in order to decrease vulnerability and increase efficiency (Dooxford, 1995: 15). Table 1 describes modifications of the battlefield areas occupied by 100,000 soldiers in the course of military history.

TABLE 1. Modifications of the Battlefield areas

Area covered by 100 000 soldiers	Antiquity	Napoleonic wars	War of Secession in the USA	World War I	World War II	Gulf War (1990)
Km <sup>2</sup>	1,00	20,12	25,75	248	2750	213 200
Length of the front (km)	6,67	8,05	8,58	14	48	400
Depth of the front (km)	0,15	2,5	3,0	17	17	533
Number of soldiers per km <sup>2</sup>	100 000	4790	3883	404	404	2,34
Area covered by one soldier (m <sup>2</sup> )	10	200	257,5	2475	27 500	426 400

Source: Savege, 1995: 35.

Due to a major shortage of appropriate military training areas and a growing disgruntlement of civilian population the armed forces have to use different simulations of their military exercises. These may replace the so-called "real" or "live training" on the polygon. The most significant factor that speaks in favour of military simulations is the price of various projectiles and huge organizational costs of a military exercise. On the other hand, different kinds of simulations enable the testing of many possible situations on the battlefield without risking the lives of soldiers, civilians or damaging the environment. Military simulations can even increase the reality of a combat situation. A number of modern weapons, including different pieces of artillery and rocket systems, endanger the lives of soldiers or civilians despite the available natural resources (the size of military training areas). Besides security, the ecological aspect has to be discussed as well. Ecologists warn that the use of different kinds of gunpowder and ammunition has a very negative influence on the soil quality, which reflects on the flora and fauna of the military training area. The use of heavy armoured vehicles and self-propelled artillery is accompanied by spills of oil and lubricants. This kind of pollution demands huge and very costly clean-up procedures. Military training by means of simulations requires a relatively high financial investment especially at the beginning, when hardware and software have to be bought and put together. Nevertheless, the cost benefit analysis speaks in favour of the simulations because their cost normally does not exceed 5% of the "live" training cost at the military training arenas. But many military commanders argue over a complete switch from ground military training to the use of military simulations. They insist on the basic ground training with some help of the simulations

(Savege, 1995: 28). From the ecological point of view, a greater use of military simulations could reduce the direct environmental burden. However, it would be utopian to expect that military simulations can completely replace ground training of the armed forces so that the ecological burden on the environment would vanish. Basic pollutants of the ground training vary, they depend largely on the type of the training area and especially on the military branch training there. They include:

- all sorts of oil derivatives;
- sulphates and nitrates as a result of explosions and detonations of all kinds of explosives and gunpowder;
- higher concentration of heavy metals (empty shells and bullets of fired charges);
- very slowly decomposing plastic shells of blank charges and other simulators of bombs and explosives.

Besides the pollutants mentioned above that are a direct consequence of the use of arms or different simulators, some other factors also need to be mentioned. They usually change the geomorphological structure of the surface (by building different shelters, obstacles, cutting down forests and undergrowth, appearance of sinkholes after explosions and impact of artillery shells, etc.). These activities and their results are constantly modifying the landscape and the existent ecosystem.

## **INTERNATIONAL TREATIES ON ENVIRONMENTAL PROTECTION AND THE DEFENCE SYSTEM**

International treaties and agreements form the basis for the implementation of the rules and recommendations of environmental protection for the defence system. In the international law the environmental protection came into force with the 1977 Protocol Additional to the Geneva Conventions of 1949 (Article 35 and Article 55), which forbids the use of the methods and means of war that may result in long-term and severe damage to the natural environment. However, the imprecise formulation of these articles makes the protection of environment virtually impossible in practice. To amend this status quo, a United Nations' Conference for the Environment and Development was held in Rio de Janeiro in 1992. The representatives of governments prepared key agreements on the environmental protection and these did not exclude the defence system. The most important agreements applicable to the defence system are the following: UN Convention on Climate Change<sup>3</sup>, UN Convention on Biological Diversity<sup>4</sup>, the Rio Declaration on Environment and Development<sup>5</sup>, etc.

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<sup>3</sup> The main objective of the Convention was to reduce greenhouse gasses in the atmosphere to the levels of the 1990- 2000 period.

<sup>4</sup> The Convention recommends the development of national strategies for the protection and sustainable biodiversity.

<sup>5</sup> The Rio Declaration on Environment and Development enforces key determinants of sustainable development, such as publicly accessible governmental information on the environment, protection measures and timely public information of the activities that may be harm-

In 1991, Agenda 21 was adopted, emphasizing the obligation of each government to ensure the implementation of environmental standards in the handling of hazardous substances and de-commissioning of hazardous waste. Further development in the field of environmental protection also includes the activities of armed forces, and was implemented in the Amendments to the International Convention for the Protection of Pollution from Ships (MARPOL convention)<sup>6</sup> and the Basel Convention, which addresses the problems and challenges posed by hazardous waste (uncontrolled movement and dumping of hazardous wastes - toxic, poisonous, explosive, corrosive, flammable, ecotoxic and infectious substances). Furthermore, in May 1993 the United Nation's Environmental Program (UNEP) reached a decision deriving from Agenda 21 on the implementation of environmental protection standards for armed forces. The UNEP's main objective is to encourage countries to prepare national environmental policies which would also include the provisions and standards for the protection of environment by the defence system. In this respect the UNEP Executive Director is also responsible for collecting data on the implementation of national environmental standards for the management of hazardous substances and hazardous waste disposal in the defence system, on the inclusion and contribution of the defence system to the national environmental policy to assess the damage to the natural environment caused by the defence systems and the activities of the armed forces, and propose adequate measures for its rehabilitation. The next step in environmental protection within the defence system was the Meeting on Military Activities and the Environment under the auspices of UNEP and the UN Economic Commission for Europe in Linköping, Sweden in June 1995. Its participants adopted the Linköping Document, which contains recommendations for future military activities (production of armament and its testing; military training; establishment, maintenance and closure of the military bases; storage and transport of military equipment; accidents and de-commissioning of obsolete military equipment) that directly affect the environment (soil, water, air and noise pollution; devastation of flora and fauna diversity etc.) (Environmental Guidelines for the Military Sector, 1996: 9).

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ful to the natural environment. The Declaration especially stresses the responsibility of developed countries for global environmental restoration.

<sup>6</sup> MARPOL is the main international convention regulating the reduction of pollution of the marine environment by ships from operational and accidental causes. The convention currently includes six technical annexes: regulations for the prevention of pollution by oil, regulations for the control of pollution by noxious liquid substances in bulk, prevention of pollution by harmful substances carried by sea in packaged forms, prevention of pollution by sewage from ships, prevention of pollution by garbage from ships and prevention of air pollution from ships.

## NORTH ATLANTIC TREATY ORGANIZATION AND ITS ROLE IN ENVIRONMENTAL PROTECTION

In 1969, the NATO established its Committee on the Challenges of Modern Society (CCMS) to provide a new "social dimension". The CCMS uses the expertise and technology available in member countries in order to resolve environmental problems and recommend actions to benefit all countries. Representatives of the Euro-Atlantic Partnership Council (EAPC) and Partner countries also participate in the work of the CCMS. The committee conducts decentralized research, namely defence related environmental pilot studies focused on the environmental protection by the defence system. Since its establishment CCMS conducted more than 40 projects in the broad field of environmental protection, problems of environmental degradation due to armed forces' activity and general quality of life. Research by CCMS contributed to a critical examination of the Alliance activities and their influence on the natural environment. Furthermore, pilot studies and research projects encouraged the development of national, bilateral and multilateral initiatives for the implementation of environmental protection measures and standards for the armed forces and the defence system.

The pilot studies and conferences exhibit a pattern of development that has shown how the growth of ideas has expanded. This development can be divided into three distinct phases. The early pilot studies and conferences in the 1984-1991 period represented essentially "NATO only" **first phase**, with the emphasis on attempts to understand the range of impacts the armed forces had on the environment and on the creation of broad objectives and plans for environmental protection. This led to a **second**, 1991-1997 **phase** and the adoption of an agenda where specific issues of interest were studied, such as the pilot study on the re-use of former military land. This was the period during which nations of the former Warsaw Pact were welcomed as study partners. The most recent **third**, 1997-2000 **phase** has shown a further development as issues are confronted on an operational and policy-making front. The Environmental Security became a reality and obligation for NATO and its partners. A recent *pilot study on environmental management systems in the defence system* illustrates the way CCMS is supporting professional environmental developments. It is assumed that NATO nations will adopt environmental management methodologies such as the International Standard ISO 14001 for Environmental Management Systems, which until recently were in use in industrial enterprises rather than in defence. The challenges CCMS now faces are organizational and budget allocation more than science and professionalism.

The first phase was characterized by the first pilot defence study on aircraft noise reduction upon the initiative of NATO member countries and civil society. The pilot nations were Germany and the US and the objective was to propose solutions to the increasingly difficult problem of military aircraft noise (combat training flights, frequently at low altitude in peacetime). The aircraft noise problem was particularly acute in Germany in the 1980s because of the volume of military training air

movements. The pilot study divided the research into three work groups: *source technology* (possibility of reducing noise at the source, e.g. both engines and airframes), *receiver technology* (possibility of reducing the noise on the ground) and *operations and information* (airspace management, education, public information) (Coulson, 2001). The most prominent achievement of this pilot study were two *international conferences on aircraft noise* (in Germany in 1986 and in the US, 1999) which produced reports and other material for circulation. The final report suggested that although the work of the pilot study had been completed, the establishment of a follow-up group would allow their activities to continue to the present time.

The first phase of environmental study by CCMS was marked also by a *pilot study on environmental awareness in the armed forces* (1987-1990) which focused on a range of concerns and interests about the impact of armed forces e.g. ground forces on the environment. Germany directed the pilot study because it had many worries about environmental degradation as a result of the "cold war" presence of armed forces. At that time there was an impression that the military were lagging behind in a desire to contribute to the environmental protection. From the military point of view there were worries that environmental issues would adversely impact upon NATO's ability to train in order to achieve its defence mission. The pilot study achieved much in a short time. It produced an educational film that encouraged environmental awareness among NATO soldiers and a pamphlet containing guidelines to the staff responsible for the planning of military maneuvers (Coulson, 2001).

The second phase<sup>7</sup> of CCMS defence was marked by environmental work focused on specific issues of mutual concern and coincided with the establishment and development of the partnership structures (EAPC and Partnership for Peace) for mutual support and understanding. One of the essential outcomes of the second phase was the conference on environment-friendly planning of military installations and training facilities that focused mainly on the issues of closing down of military bases and environmental revision – environmental restoration. Positions presented at the conference were the basis for the *NATO environmental policy statement for the armed forces* and other *guidelines on environmental training* (NATO CCMS, 1992). The approval of the *policy statement and its adoption by the North Atlantic Council in October 1993* was a great success of Manfred Wörner, the former NATO Secretary General. *Until 2001, these documents (C-M(93-71)) were the only official NATO statements on the environmental actions expected of all NATO forces in peacetime.* Conclusions and guidelines of the pilot study on information of environmental education and training were implemented in July 1992 at the *NATO School (SHAPE) in Oberammergau, Germany.* In 1992, CCMS undertook additional pilot studies in the field of cross-border environmental problems, four topics were examined: hazardous materials and defence-related activities in the Arctic; radioactive

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<sup>7</sup> The beginning of the second phase was marked by a seminar on the military role in environmental protection in Brussels, 1992.

contamination of rivers and transport through rivers, deltas and estuaries to the sea; management of defence-related radioactive waste; environmental risk assessments of two defence-related problems (nuclear powered submarines, defence-related radioactive waste in Latvia).

The Protection of Civilian Population from Toxic Material Spills during Movements of Military Goods pilot study was developed because of the realization that a decommissioning and demilitarization of large amounts of hazardous materials could put civilian population under significant threat. For some military organizations this was the first time they had studied civilian standards in detail because many had been exempted from it until that stage. Hence, the study lasted from 1992 to 2000, during which period a number of national regulations were developed.

The third major pilot study that built practical co-operation between NATO and PfP nations at that stage focused on the environmental aspects of re-using former military land. There were two phases, phase I (1994-1996) and phase II (1996-1998). This pilot study examined methods and formats for assessing the environmental characteristics of military land designated for re-use including land selection criteria, types of contamination, risk assessment approaches and prioritization methodologies. It also identified the most practical, expedient and cost-effective approaches to conversion. This pilot study was promoted by the US and Germany. The US had a wealth of experience in dealing with the environmental aspects of clean-up. Germany had acquired many areas despoiled by the military during the Cold War period and was willing to share its experience with others. Phase II of this study developed five potentially viable project proposals for specific site conversion. The pre-eminent result of the pilot study was the development of a Handbook on the Reuse of Former Military Lands, which may be applied to any site in any nation (Minutes, 1996).

It can be seen that the specialist professional interests within NATO and PfP can be catered to by the CCMS. This new professional approach is reflected in the preparation of the Environmental Guidelines for the Military Sector sponsored by the CCMS. The purpose of the handbook is to assist the military sector of any country with the development of an effective programme that protects both human health and the environment, while also enabling an effective and safe execution of the military mission. The guidelines use international agreements, treaties or conventions to establish the framework for recommended actions. The guidelines also use the experiences of many countries to provide approaches to solving the environmental problems (Environmental Guidelines for the Military Sector, 1996).

The third phase of CCMS involvement in environmental pilot studies developed further in scope and issues. Thus, civilian experts from international organizations, non-governmental organization and academic institutions were also involved in the pilot study on Environment and Security in an International Context (1996-1999) for the first time besides military experts. The purpose of the study was to prepare a

report<sup>8</sup> that summarized the relationship between environmental change and security at the regional, international and global level. The main goal was to enable decision-makers to integrate environmental considerations into deliberations on security issues. The structure of the pilot study reflects a new orientation towards practical action. Another characteristic of this pilot study is that it discussed innovative policy responses for dealing with the environmental stress and its potential effects on security.

The pilot study on Environmental Management Systems (EMS) in the Military Sector (Coulson, 2001), which looked at the detail of military activities and attempted to illustrate the value of a systematic approach to environmental management, represented an additional development in the environmental protection from military activity. The objectives of the study were to identify possible implications of initiating and implementing environmental management systems (EMS) in the military sector, and to develop application guidelines, frameworks and models appropriate to the military sector. At the very least EMS provide safeguards for top management that environmental legislation will be respected. In addition, the ISO 14001 standard demands continual improvement of the environmental performance of the (military) organization. This is unique to environmental management systems in general, but especially to the ISO 14001 standard. The greatest contribution of this pilot study is probably the final report, which is essentially a set of guidance notes for military organizations concerning the implementation of EMS (Environmental Guidelines for the Military Sector, 1996).

We can describe the final and current phase as "Maturity in Environmental Security Studies" because professional environmental scientists and policy makers can work with the military authorities to embed environmental ethics into the armed forces. Therefore, *NATO STANAG 7141 on environmental protection* was adopted, setting out guidelines for the implementation of environmental protection standards in the planning of NATO's military activities, as well as responsibilities of the commanding officer for environmental protection, education of officers in the field of environmental protection, etc. (STANAG 7141, 2002).

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<sup>8</sup> The final report outlined a typology of environmental conflict cases. It also sought to advise policy makers in terms of integrated risk assessment, to establish guidelines for assessing and prioritizing the potential impact of different types of environmental change on security. The report came up with a number of key findings to assist in policy making.

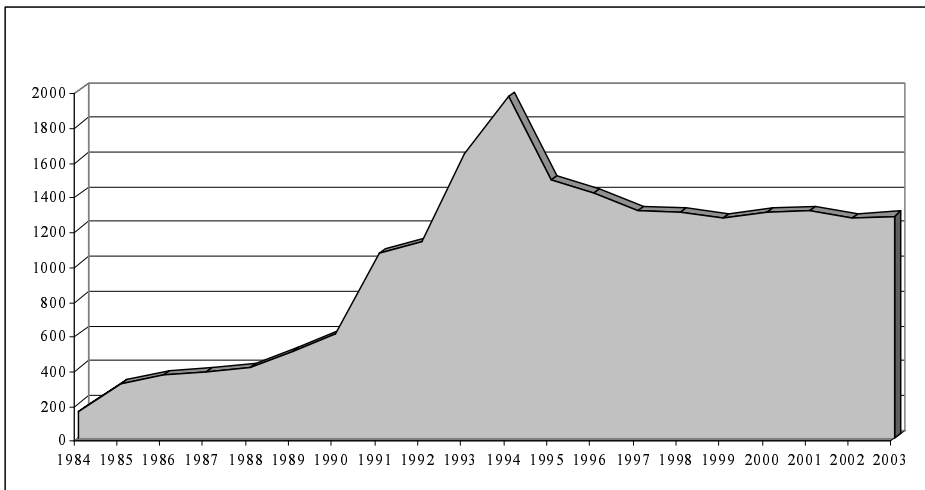
## **HOW TO ELIMINATE MILITARY BURDEN ON THE ENVIRONMENT?**

USA has the greatest number of military bases on its territory and all over the world. However, since 1988 the federal government has tried to downsize their number mainly due to geostrategic (new global security environment), military doctrinal and economic changes. In order to reduce the number of military bases efficiently, a special group of various experts – BRAC commission (Base Realignment and Closure Commission) – was established. This Commission was created for a mandatory period of time with a primary task to create a list of military bases that would be closed down the following year. All the BRAC Commission work is coordinated by the secretary of defence, who provides a draft list of the military bases that have been closely inspected by the BRAC Commission. This way the US was able to close down 497 military bases by 1995; each of them had more than 250 soldiers or other military personnel. Just a little less than half of them, 206 or 1,577 km<sup>2</sup> required thorough ecological sanitation procedures upon closure and during the conversion process. Two factors indicate how demanding these procedures were. The first is the average time of the ecological sanitation or clean-up procedure, which is around five years. With the help of different ecological working groups under the leadership and supervision of the Environmental Protection Agency the adequate sanitation process was completed at half of those military bases by 2004. All the other military bases are still undergoing the ecological sanitation process. The second factor refers to the cost of the ecological sanitation process. Funds are allocated by the US Congress but are spent under the supervision of the BRAC Commission. Between 1990 and 2003, more than \$8 billion was spent on ecological sanitation procedures. Around 63% of these funds had been allocated for the sanitation itself, with the other 37% going toward various scientific analyses of the ecologically devastated military bases. The latest research of the US Department of Defence in the field of ecological sanitation on the former military sites is even more concerning. Over 6,000 former military facilities and installations are still involved in the programme of ecological sanitation. Of these, 1,883 were categorized as very highly polluted, with 1,180 in the category of medium and 1,407 in the category of low pollution. Another 1,131 were not categorized at all and therefore did not enter the ecological sanitation process. The government intends to complete the ecological sanitation of these former military objects and installations by 2018. But all the funds necessary for the continuing dynamics of the ecological sanitation process must be guaranteed (Installation Restoration Program for Fiscal Year 2002 – Status and Process, 2003: 45-48). When adopting the defence budget, the US Congress pays special attention to the ecological sanitation. Based on this, the US has a very complex and efficient ecological sanitation process that also has to cope with different ecological challenges of the existent military bases. More than 28,500 military installations on the territory of the USA are listed in this category. Since this issue was too complex to be handled through an ad hoc approach, a special Defence Environmental Restoration Program (DERP) was created. Since 1984, the DERP has



been led by the assistant to the deputy defence secretary and it also has its own budget. Each year around \$1.2 billion is spent on the ecological sanitation process of the current military bases. The funds are equally distributed between all military branches of the US Armed Forces (Installation Restoration Program for Fiscal Year 2002 – Program Funding, 2003: 19-31). However, the Army occupies larger territories (military bases and training facilities) and had more soldiers than the Navy and Air Force), the other two can be presumed to represent a lesser ecological burden on the environment than the Army.

GRAPH 1. Funds spent by DERP



Source: *Installation Restoration Program for Fiscal Year 2002 – Program Funding, 2003: 29.*

## CONCLUSION

The development of modern military systems, whose primary goal is to enlarge the firepower and damage at the targeting position, and the possession of arms of mass destruction (chemical, biological and nuclear) represent a new strategy of modern warfare that aims at total devastation and annihilation of human being and environment on the targeting territory (Collins, 1998: 329). Although the actual use of the arms of mass destruction is little likely, its very existence represents a huge danger to the owner and more importantly to civilian population. Storage and maintenance of those arms is very costly and complicated, while even a small failure or inconsistent upkeep might cause huge environmental catastrophe. At the same time, the dismantling process needs a huge financial input. Since many states can not manage the financial burden, the arms of mass destruction become dumped military waste.

Some positive reactions to the military burden on the environment can be traced down within the North Atlantic Alliance. A key factor that fundamentally changed

the perception of military burden on the environment in almost all NATO members and some partner states was the creation of the CCMS. In 1980s, civil society put additional pressure on the military regarding its impact on the environment. Different protocols and agreements were signed to diminish and (where possible) eliminate environmental damage caused by the military system. After the fall of the Berlin wall a new chapter in the relations between NATO and partner states was ready to be written. The direct product of closer cooperation could be seen in joint pilot studies, numerous conferences and workshops to discuss the possibilities of a more "ecological" behaviour of military forces. The environmental cooperation between NATO and partner states to date has resulted in setting very high ecological standards within military systems. This fact can be seen as the very beginning of military ecological ethics. However, this kind of cooperation exceeded a mere restriction of further military burden on the environment but rather introduced a pre-planned approach that begins when new military equipment or arms are bought and are ready to be tested. Possible adverse aspects on the environment have to be considered as early as this stage. We can only hope that the military burden on the environment will make the agenda of the OSCE and the UN. However, all the negative impacts of everyday life of military forces appear constantly in peacetime. But in the near future a new chapter will appear before the CCMS – negative impacts during different kinds of military engagement. This is necessary because NATO is getting more and more involved in peacekeeping operations that follow military conflicts. Some military experts believe that NATO may be kept back from further military activities due to the military ecological ethics and the ecological standards that have been adopted.

This article has discussed many different aspects of the ecological burden on the environment by the military. One fact is indisputable: the military will accompany mankind into the future and so will its negative effects on the environment. The only solution lies in a compromise to study all those effects so as to restrict them to the minimum and eliminate them where possible. Such activities should represent the core work and research area of the military ecology on the one hand, while also defining the reason of its existence in the future. A very important question that remains open to discussion is who will lead, create and finance the military ecology experts? At the same time, it must be emphasized that military systems with armed forces as their integral part are very specific and include different aspects segregated from civil society. Besides, military training is normally classified. To prevent uncontrolled information leaks, military systems are in favour of their own scientific research in what can be understood as the formation of expert military ecological groups. Without underestimating military scholars and experts, their impartiality will therefore be questioned and will continue to create mistrust of civil society on the issues related to the ecological impact of military forces in the future. Modern societies are trying to break away from the so-called auto control, and the military system should follow this example. If it does, military ecology could become a very important scientific discipline enabling cooperation between military and civilian

experts. Such a transparency of the military could create a very solid basis for further development of civilian-military relationships of the modern society.

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# OBRAMBENI SUSTAVI I EKOLOGIJA – ULOGA NATO-a

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## Sažetak

*Sustavno istraživanje izravnih i neizravnih utjecaja ljudskih djelatnosti na okoliš započelo je razvojem ekologije. Imajući u vidu štetne posljedice ljudskog djelovanja, suvremeni koncepti nacionalne sigurnosti prošireni su tako da uključuju prijetnje okolišu. Zbog negativnog utjecaja na okoliš, oružani sustavi postali su predmetom pozornog praćenja i nadgledanja. To je rezultiralo regulacijom utjecaja oružanih sustava na okoliš putem međunarodnih konvencija i ugovora. Usprkos tomu, utjecaj oružanih sustava na okoliš – koji predstavlja svojevrsan laboratorij za uvježbavanje, a ujedno i ultimativni cilj djelovanja oružanih snaga – nije dovoljno istraživano. Inicijalne studije i istraživanja provodili su isključivo vojni eksperti, no danas su u istraživanja utjecaja oružanih sustava na okoliš uključene međunarodne institucije, nevladine organizacije i nezavisni znanstvenici i stručnjaci. Natov Odbor za izazove modernoga društva (CCMS) preuzeo je vodeću ulogu na ovom području. Proveo je pilot-istraživanja s ciljevima smanjenja buke koju proizvode zrakoplovi, oporavka prirodnog okoliša od pretrpljenih šteta, čišćenja vojnih baza itd. Razvoj ovoga područja ukazuje na to da je uspostavljena nova ekološka disciplina – vojna ekologija.*

*Ključne riječi:* obrambeni sustavi, ekologija, vojna ekologija, NATO, vojne baze

