

Video resume



## Introduction

# Climate change and its impact on defence

José Francisco Pérez-Ojeda y Pérez

*Laudato si', mi' Signore* – «Praise you, my Lord», sang *St Francis of Assisi*. In that beautiful song he reminded us that our common home is also like a sister with whom we share our existence, and like a beautiful mother who welcomes us in her arms: «Praised be you, my Lord, for our sister Mother Earth, who sustains us, and governs and produces diverse fruits with colourful flowers and grass» (Encyclical Letter «*Laudato Sí*» by the Holy Father Francisco).

«I sent my ships to fight against men, not against storms.» (Attributed to Felipe II).

The consideration of climate change as enhancing risk forces the Ministry of Defence in its strategic analyses to keep in mind the evolution of this phenomenon and its consequences. This is why the Spanish Institute of Strategic Studies (IEEE) has devoted a book to the Armed Forces and Climate Change.

This book is structured on the basis of a scientific analysis that highlights the unquestionable reality of climate change, the current situation and the foreseeable and undesirable effects that will inevitably occur if the appropriate measures are not taken.

These measures must necessarily be based on international agreements adopted on the basis of studies prepared by the Intergovernmental Panel on Climate Change (IPCC) and international agreements between a large majority of countries in the world and among which the EU and its members

have transferred the agreed measures regarding greenhouse gas (GHG) emissions, penetration of renewables and energy efficiency to regulatory commitments.

These are being transposed to the corresponding national legislation under the direction of the Ministry of Agriculture, Fisheries, Food and Environment (MAPAMA) and in such a way that the successive updates of the regulatory framework place Spain at the forefront of the fight against climate change.

If the measures to mitigate the consequences of climate change are not adopted, they may be dramatic for society: migrations, scarcity of resources, floods, spread of diseases, etc. In this scenario, it is clear that climate change is a risk enhancer.

In Spain, its Armed Forces as a national organisation, both for its staff and resources and for its social leadership, must be a reference in the fight against climate change and in the preparation and adaptation to face its effects. This will require a transformation effort that must result in a strategy and an application of the necessary measures and the corresponding plans.

The implications of the possible consequences of climate change for the armed forces make it necessary to address this issue from two different approaches: preparation on the one hand and mitigation and adaptation on the other. Preparation to have the capacity to act and help in the face of disasters or threats caused by climate change and, therefore, adequate training and resources, and on the other hand, to ensure that the impact of their own operation on the environment as regards emissions, carbon footprint, etc. be the smallest possible and always compatible with the mission.

In this sense, the armed forces must prepare to face the consequences of climate change. As guarantors of security, they may have to face conflicts of a multiple nature: mass immigrations, natural catastrophes, social disorders, humanitarian catastrophes. On the other hand, the conditions in which these events could occur necessarily require a preparation and training that allows for action under extreme weather conditions, which will involve adapting armament and materials capable of withstanding and maintaining its effectiveness in these conditions.

In writing the different chapters of this book, the IEEE assembled a group of experts who give a coherent view of those aspects that can serve the Ministry of Defence as a guide: to continue and strengthen its efforts to reduce the carbon footprint by reducing its emissions of CO<sub>2</sub> and other greenhouse gases; to increase, as far as possible, its absorption capacities through natural sinks that constitute the plant masses of its manoeuvre fields, and; to adapt and prepare (resilience) for events, which are widely discussed here and which presumably will occur as a consequence of climate change.

Military history is full of situations where extreme climatic conditions changed the power relations of combat between two opponents. As happened, for

instance, with the destruction of the Spanish Armada by a storm at the end of the 16th century, or as happened several times with the successive land incursions in Russia. More recently, in both Persian Gulf Wars (1991 and 2003), large sandstorms immobilised both air and land combat material for several days.

With regard to the English Navy and the decisive influence that the weather had on the disastrous fate of the great Armada, how was it that a storm of such proportions occurred in that place in the middle of August, totally out of season for such weather events? Today we know that a major new event was taking place in Europe, a climate change that scientists have dubbed the «little ice age». The storm that hit the North Sea in August 1588 and destroyed the Spanish navy had its origin in the Caribbean, where a tropical hurricane produced a major cyclonic depression in the Azores area. Three days after leaving the coasts of Florida, the same western gale blew furiously around the Irish coasts, hitting the Spanish ships and causing most to be wrecked. Something absolutely unexpected and completely unpredictable, which shows the decisive influence that weather has had on some important historical events.<sup>1</sup>

### Scientific approach

The important thing is no longer the occurrence of adverse weather phenomena, since as the examples show, they have always been there, but the fact that the frequency and intensity will probably, in the near future, be much greater, turning them from something isolated into habitual phenomena.

The exacerbation of extreme weather conditions, prolonged droughts, flooding of large areas, rising sea levels, the retreat of glaciers and increase in endemic diseases are possible consequences in the coming decades<sup>2</sup>.

According to the 5th report (AR5) of the IPCC, global warming is unequivocal and establishes the clear human influence on the climate system. As explained in the first chapter of this book by the Professors of the Comillas University, Mr. Pedro Linares and Mr. Iñigo Losada, climate change is a phenomenon of known causes and predictable consequences.

At least for the «principle of prudence» and given the seriousness of the effects of climate change for humanity and the planet, society in all of its areas and levels must take the necessary measures to minimise them as far as possible.

<sup>1</sup> QUESADA RETTSCHLAG, Fernando R «The Great Armada and Climate Change».

<sup>2</sup> PISSOLITO, Coronel Carlos. Blue Helmets Association. «The Consequences of Climate Change for Defence».

## EU policy

The global scientific consensus gathered by the IPCC has determined that to avoid the most negative effects of climate change, the average temperature of the Earth should not increase by more than 2°C (many scientists believe that this limit should even be below 1.5°C), which is coupled with certain ranges of reduction of greenhouse gas emissions to achieve it.<sup>3</sup>

This political commitment of the European Council gave rise to legislative measures proposed by the Commission and which should come into force before 2020. These are those that will largely replace the legislative framework currently in force.

The impact and future risks of climate change must be rigorously analysed in order to predict how it will affect humanity in different areas of the globe, particularly Europe and specifically Spain, so that with this knowledge base agreements of the United Nations can be adopted as well as European laws, and be transposed to Spain and therefore to its armed forces.

The European Union's commitment to the fight against climate change on a global scale is embodied in the internal policies and standards that are among the most ambitious in the world, despite the fact that in terms of emissions the Union is quantitatively reducing greenhouse gas emissions and its contribution to global emissions.

In the second chapter, the adviser-coordinator of the Environment of the Permanent Representation of Spain in the EU, Mr. Miguel Castroviejo Bolibar, brings us closer to the EU policy on climate change, the objectives and the main legislative instruments aimed mainly at reducing greenhouse gas emissions and achieving energy efficiency.

## Response of Spain

Last July, the National Security Council approved the Energy Security Strategy, which devotes special attention to issues related to supply and economic and environmental sustainability. If the navigability of the Arctic increases, the situation of relations between energy emitting and receiving countries will almost certainly be altered. For Spain, in particular, the supply of oil and natural gas has a risk component due to the possible instability of the producer regions.

At the same time, Spain is firmly committed within the EU to promote economic competitiveness and energy security, greater awareness of this problem and a greater commitment internationally towards renewable energy and sustainable growth.

---

<sup>3</sup> <http://www.ipcc.ch/pdf/assessmet-report/art4/syr/ar4syrsp.pdf>.

Environmental deterioration must be stopped and decisively reversed. To do this, we are adapting to the new demands to fight against climate change. The Spanish Office of Climate Change of the Ministry of Agriculture, Food and Environment has launched new initiatives to generate low-carbon economic activity and create sustainable employment (Plans to Promote the Environment, Climate Projects, the Carbon Footprint Registry, etc.). A new Law on Climate Change and Energy Transition is being prepared in which these initiatives will be established.

Ms. Valvanera Ulargui, General Manager of the Spanish Office of Climate Change of the MAPAMA, in the third chapter of this book introduces the official position of Spain in terms of regulations and actions to promote attitudes that align the policies on Spain's struggle against climate change and its effects.

### Climate change and security

For many years, climate change has ceased to be a strictly environmental problem and has become one in economic, social and security terms. Some authors even raise it to a higher level to treat it as an ethical problem<sup>4</sup> and contextualised in a crisis of the human condition that is experienced today. For this reason, they suggest that it is necessary to broaden the study and extend the impact of climate change to other disciplines such as social sciences and humanities to address its social, cultural, historical and ethical dimensions.

In 2011, Solomon Hsiang, then a professor at Princeton University (USA) and now of the Goldman School of Public Policy at the University of California in Berkeley (USA), was the co-author of a work that showed that the number of cases of civil war doubled in the tropics during the moments when «El Niño» produced unusually high temperatures in these latitudes. This work was the first to show that a global climate effect could be directly related to conflicts. Increasing temperatures and changes in rainfall patterns increase the risk of conflicts<sup>5</sup>.

The US Defence Department distinguishes between adaptation efforts, those aimed at anticipating expected changes, and mitigation efforts, that is, those aimed at reducing greenhouse gas emissions. At the heart of this is the consideration, expressed in the «Quadrennial Defence Review 2014», that climate change can increase the frequency, scale and complexity of future missions, including those related to supporting civil authorities, while at the same time it can diminish the efficiency of the military units' training tasks. An increase in the demand

<sup>4</sup> HOLM, P.; TRAVIS, C. «The New Human Condition and Climate Change: Humanities and Social Science Perceptions of Threat». *Global and Planetary Change*, 156/2017, pp. 112-114.

<sup>5</sup> «Wars: the hidden effect of climate change». *MIT Technology Review*.

for support operations for civil authorities is expected, as well as humanitarian support and assistance in cases of natural disasters.

Furthermore, the need to increase land, sea and air capabilities in the Arctic region will be accentuated by the appearance of limitations in the traditional environments of military operations. In general, there will be an increase in instability in certain countries and geographical areas, with its potential consequences in terms of the planning, availability and projection of forces.

Another effect also widely documented is the increase in adverse weather events on coastal areas. These can cause mass displacements of the population, especially where it is most concentrated on coastal areas (like in the Maghreb, for instance) and increase humanitarian crises due to adverse weather events.

The emergence of armed conflicts is not directly related to natural disasters caused by climate change. However, its consequences, such as droughts, rising sea levels, rising temperatures or the more frequent appearance of adverse weather events have the potential to heighten social tension by fostering the emergence of conflicts in regions that are prone to destabilisation<sup>6</sup>.

Climate change is a great risk to national security. US President Barack Obama was emphatic that it «represents a threat to the preparation of the forces» and that «it will shape the way in which infrastructures are planned, operated, equipped and protected, today and in the long term».

The consequences of climate change will undoubtedly affect both the operational requirements of the armed forces and their strategic orientation. In the former, in addition to the obvious consequences related to the adaptation of planning processes and acquisition of weapons and material, it is worth noting the need to reduce dependence on fossil fuels. It is not only about reducing the emission of polluting gases, undoubtedly an important achievement in itself, but also about avoiding the vulnerability that this dependence means in an operational environment where supply might not be guaranteed.

On the other hand, and continuing with the operational requirements, a growing political and social pressure is to be expected that the armed forces strictly comply with the environmental demands in any situation, whether at the national level or in the area of operations. This will give rise to the need to adopt ever stricter regulations and could result in changes in the classical conduct of military operations.

Finally, the need to face possible crises stemming from the phenomenon of climate change may require the establishment of mechanisms for coordination and even integration of capacities, bilaterally and multilaterally, with countries in the regional surroundings that share similar environmental

---

<sup>6</sup> Ministry of Defence Intervention in Morocco. September 2016.

risks. It is therefore necessary to maintain continuous dialogue at the bilateral and multilateral level that avoids frictions between the States in competition for maritime spaces or for their resources. The 5 + 5 Defence initiative (informal forum of dialogue of the countries of the western Mediterranean basin) is ideally situated for this purpose.

In the fourth chapter Ms. María del Mar Hidalgo of the IEEE analyses the binomial Climate Change - Security in detail.

### Climate change and Armed Forces. Their transformation

In a similar line, NATO distinguishes between efforts aimed at reducing the environmental effects of military activities (*Environmental Protection*) and the need to respond to security challenges from that environment (*Environmental Security*). In the former, the underlying argument is that environmental degradation can be a source of economic and social instability and cause new tensions, while its preservation can provide lasting stability and security. Therefore, to achieve success in the mission it is considered necessary to reduce environmental damage during military operations as far as possible. On the other hand, regarding *Environmental Security* it is considered necessary to highlight:

- The need for international cooperation and information sharing.
- The probable increase in missions related to the protection of critical infrastructures.
- The need to achieve energy efficiency in operations (*Smart Energy*).
- And above all, the growing tendency to regard the armed forces as guarantors of an immediate response (*first responder*) to natural disasters.

At the international level, the recent International Conference of Ministers and Senior Officials of Defence «The Implications of Climate Change for Defence», held in Paris in 2015, prior to COP 21, also produced similar conclusions<sup>7</sup>. In particular, the French Defence Minister in his closing speech pointed out the importance of the defence institutions preserving the environment (*Green Defence*), although he also stressed the imperative need to carry out an analysis of the risks resulting from climate change and their possible impact on anticipation, protection, prevention and intervention functions. Other speakers had previously emphasized aspects such as the need to increase the resilience of the units, as well as to adapt weapons and equipment to foreseeable extreme conditions, the convenience of reducing dependence on fossil fuels and, in general, the tendency towards a greater future demand in terms of natural disaster assistance missions, taking advantage of the

---

<sup>7</sup> The Conference received the participation of the Secretary General of Spanish Defence Policy as a speaker.

rapid response capacity of the armed forces in this field, in which they have a critical comparative advantage over other institutions<sup>8</sup>.

For the armed forces to maintain their capacity to respond to the new (and very diverse) threats presented to them, it is necessary to establish a process of constant transformation, which not only provides solutions to the present situation, but also grants the organisation the necessary flexibility to also adapt to new changes that the future will surely bring.

The geopolitical impact of climate change establishes new challenges to the continuous process of transformation of the Armed Forces in all its areas<sup>9</sup>. The changes that are currently noticed will continue and will intensify over time to a degree that will depend on the success of the mitigation policies in progress.

Other aspects related to the high temperatures of both the air and the sea will in the future have a greater influence on the operation of personnel, platforms and weapons systems and, of course, their future designs. «The change in weather conditions and the increase in extreme weather events, including high and low temperatures, drought and floods... have a significant impact on operations. These circumstances include an increased risk to life and safety, injuries and a degrading effect on mission performance... Numerous military studies cite weather conditions as one of the main factors in the battle, with examples from the Revolutionary War to the Operation Desert Storm»<sup>10</sup>.

The increasing frequency and severity of disasters caused by these phenomena is driving society to demand the intervention of the State, which has, in its Armed Forces, a very valuable instrument for their availability, autonomous capabilities, and ease of projection, but will have to be transformed as events evolve.

In terms of strategic orientation, the risks resulting from climate change will probably alter the potential missions of the armed forces towards those related to humanitarian support and assistance in natural disasters. This will imply the need to introduce the use of capacities that up to now have been considered civilian ever more in defence planning. This is something that has been done for some years now, either through coordination mechanisms at a strategic level or through the creation of specialised military units such as the Spanish Military Emergency Unit (UME).

---

<sup>8</sup> Ministry of Defence Intervention in Morocco. September 2016.

<sup>9</sup> NATO uses the acronym DOTMLPFI: *doctrine, organisation, training material, leadership, personnel, facilities and interoperability*; while Spain uses MIRADO: *material, infraestructura, recursos humanos, adiestramiento, doctrina and organización*.

<sup>10</sup> WEATHERLY, J. V.; HILL, D. R. *The impact of climate and extreme weather events on military operations*, U.S. Army Engineering Research and Development Centre, New Hampshire, December 2004, p. 1.



In the specific case of the armed forces, the lines of action to be followed should be: to ensure their preparedness to intervene in the increasingly frequent cases of humanitarian emergencies on the coast and to incorporate the necessary requirements into their design and action to limit their environmental and climate footprint as far as possible.

The training of forces in extreme heat and cold, as well as the assistance of specialised military units for psychological support to victims, is another area that must receive greater attention within the specific military training of their units.

In short, a comprehensive and permanent transformation of the military institution in all its areas, from doctrine to interoperability, becomes more necessary than ever, as well as a new energy and environmental culture.

The Ship Captain. Mr. Ignacio García Sanchez, Deputy Director of the Spanish Institute for Strategic Studies, in the fifth chapter analyses the need to transform the armed forces and their necessary adaptation capacity to face the challenges that the phenomenon of climate change may pose.

### **Climate change and Spanish Armed Forces**

The Spanish Armed Forces should, as far as possible, do their daily preparation and training while respecting the environment, limiting GHG needs as far as possible, thus reducing the consumption of fossil fuels to a minimum and stressing the use of renewable energies.

In this sense, the Ministry of Defence has taken important steps, first with the publication of the Ministerial Directive, which bases the Ministry's environmental policy on the principle of sustainable development compatible with the function of the armed forces, developed by the Directive of the Secretary of State of Defence in which the principles and objectives are established, as well as the actions to be taken, establishing the implementation of Environmental Management Systems in all the units as a fundamental tool.

In terms of the natural environment, the most relevant actions are directed in the first place to the prevention and extinguishing of forest fires in the training fields, for which standards of use have been established to make the protection of fauna and flora compatible and to avoid fire risks.

Technical plans for the prevention of forest fires are prepared for the fire protection of the training fields, which are approved by the Ministry of Agriculture and Fisheries, Food and Environment, and to improve the conservation status of the different forest masses, collaboration agreements have been established with MAPAMA (Green Agreement). The management of the forest masses on the military training fields has made it possible to partially offset the CO<sub>2</sub> emissions from the activities of the armed forces,

having calculated in a study that 26,635 ha of the wooded mass in the training fields absorb 132,000 tons of CO<sub>2</sub> a year, and work has begun on calculating the carbon footprint produced by the activities of the armed forces.

In terms of environmental quality and to tackle atmospheric pollution, measures are being taken to mitigate the increase in emissions that affect the ozone layer (Montreal Convention) and the greenhouse effect (Kyoto Protocol), fostering the use of clean fuels. Against soil contamination, in addition to promoting the proper management of waste, and the sealing and restoration of uncontrolled landfills, fuel and flammable liquid installations are being adapted to the regulations.

To do all this, it is essential to have qualified staff, for whom a training and awareness-raising programme was prepared, which has been in operation since 2004.

The fundamental tool of the Ministry of Defence to achieve these objectives is the establishment of Environmental Management Systems in accordance with the ISO-14.001 standard, which allow the environmental behaviour of bases, barracks and military establishments to be evaluated. The Spanish Ministry of Defence has the most installations with environmental certification of the European Union.

It is essential to know and cooperate for the fight against climate change. In this sense and at the international level, as already mentioned, representatives of the Department participate in the DEFNET Group (informal forum formed by experts from the Ministries of Defence of the EU countries to coordinate positions between military interests and the environment).

In 2015, Spain participated in the meetings of the Ministries of Defence preparing for the twenty-first meeting of the Climate Change Convention (COP 21). And in 2016, in the COP 22 preparatory meeting, also held in Marrakesh (Morocco) and which was attended by the Minister of Defence.

The Ministry of Defence participates in the meetings of the Consultative Forum for Sustainable Energy in the Defence and Security sector, organised by the European Defence Agency (EDA). This Forum examines the practical elements of EU energy legislation and their possible application by the armed forces of Europe.

At the national level, the Ministry of Defence is present on the National Climate Council, an organisation that oversees Spanish compliance with all the commitments acquired in relation to climate change.

The Ministry of Defence, in terms of the fight against climate change, has initiated a programme conceived with an open and participatory character. Open to provide it a dynamic character and continuous updating with the evolution of the phenomenon of climate change itself. Participatory, because collaboration and participation are sought of all those entities that due to

their experience and technical or scientific specialisation can contribute values of improvement to this Ministry of Defence programme to:

- Identify the main sources and activities that generate greenhouse gas emissions.
- Obtain and communicate accurate and credible information on the amount of greenhouse gas emissions.
- Allow the planning of a programme of reduction, mitigation, adaptation and offsetting of emissions.
- Provide the necessary tools and training for the Ministry personnel to participate in the periodic measurement and reduction.
- Identify the most appropriate measures for the preparation and adaptation of the armed forces to act in the face of possible disasters related to climate change.

The armed forces should also contribute to documenting scientific studies that seek to quantify the impact of climate change on the oceans. The campaigns of the ships *Hespérides* and *Las Palmas*, and the activities of the Antarctic Bases Juan Carlos I and Gabriel de Castilla are included in this sense.

The peoples of the Mediterranean, the bridge between civilisations and cultures, today have a common challenge: to preserve the environment to guarantee the well-being of the generations that will follow us. It is a challenge to which Defence can contribute decisively if we are able to work in concordance. The 5 + 5 Defence initiative is ideally placed to implement this path of dialogue<sup>11</sup>.

The Ship Captain Juan Rico Palma, biologist and former head of the Environment Department of the Ministry of Defence and Mr. Francisco Rodríguez Martín, responsible for the climate change negotiation of the Environment Department of the Ministry of Defence, describe in chapter 6 of this book the current situation of the armed forces in the fight against climate change and outline the Ministry of Defence Plan to address the future strategy to combat the effects of climate change.

Finally, citing the words of the Minister of Defence, I conclude that the armed forces work and will work convinced that their preparation and service spirit will result in the security, stability and progress of our society.<sup>12</sup>

---

<sup>11</sup> Minister of Defence intervention in Morocco. September 2016.

<sup>12</sup> Minister of Defence 2016. Day of the Immaculate Conception Marine Infantry Academy.

