# CEMC: CLIMATE CHANGE EVALUATION METHODOLOGY FOR MILITARY CAMPS

***STUDY REPORT N°16 - EXECUTIVE SUMMARY***

# Introduction

**Climate change has been mentioned for several years in armed forces' strategic documents, whether it be in documents from the French ministry for the Armed Forces[1] or foreign ministries of Defense[2]**. Beyond doctrinal elements, few of the most advanced countries' armed forces started **integrating climate issues into their practices**, through the creation of dedicated strategic committees, *via* efforts to achieve energy resilience or programs fostering operations and equipment' adaptation to a warmer world[3]. **Military installations are not exempted from climate vulnerability** and a small number of countries, led by the United States (USA), initiated camps' evaluations.

The conduct of such assessments is hardly surprising, considering that many military camps are located in areas that are, and will be, particularly affected by climate change impacts. These assessments rely on public methodologies (for the United States and the United Kingdom), and each of them displays specificities in its approach (conceptual framework, quantitative or qualitative approach). However, this **exercise remains an exceptional practice for ministries of Defense**, in contrast with the numerous climate vulnerability assessments applied to civilian infrastructures and ecosystems.

**Among countries integrating climate issues into armed forces' doctrine and practices, France is considered as one of the most proactive**.[4] This can be explained by the ministry for the Armed Forces' support for research, as testifies the creation of the Observatory of Climate Change Impacts on Defense and Security (*Defense and Climate Observatory)* in 2016. In this line of thought, the French ministry for the Armed Forces commissioned the Observatory, in 2018 and 2019, two analytical notes with the objective to study, on the one hand, on a generic level, French military camps and settlement points' vulnerability to climate change impacts, and on the other hand, to propose an evaluation of French installations' climate vulnerability in Ivory Coast.

Based on lessons learned from these exercises, which have demonstrated, among others, their usefulness in the context of intensifying climate change impacts, this executive summary of study report n°16 aims to present the **Climate change Evaluation methodology for Military Camps (CEMC): a generic and replicable methodology to assess military camps' vulnerability to climate change impacts.**

## The Climate change Evaluation methodology for Military Camps (CEMC) – a methodology to assess military camps' vulnerability to climate change

The CEMC brings the French perspective to international discussions on military camp's adaptation to climate change by proposing a methodology allowing an **operational**

[1] 2008 and 2013 White Papers, for example.
[2] Observatoire Défense et Climat, 2021, "L'intégration des enjeux climato-environnementaux aux forces armées étrangères", Rapport d'Etude n°15, Institut de relations internationales et stratégiques.
[3] *Ibidem.loc.cit*
[4] Clingendael, 2020, "Ready for take-off? Military responses to climate change ", *Planetary Security Initiative*, p.4

**analysis** of camps' vulnerability. As such, the CEMC focuses on how climate change affects **essential functions and missions** of studied camps, at different temporal scales.

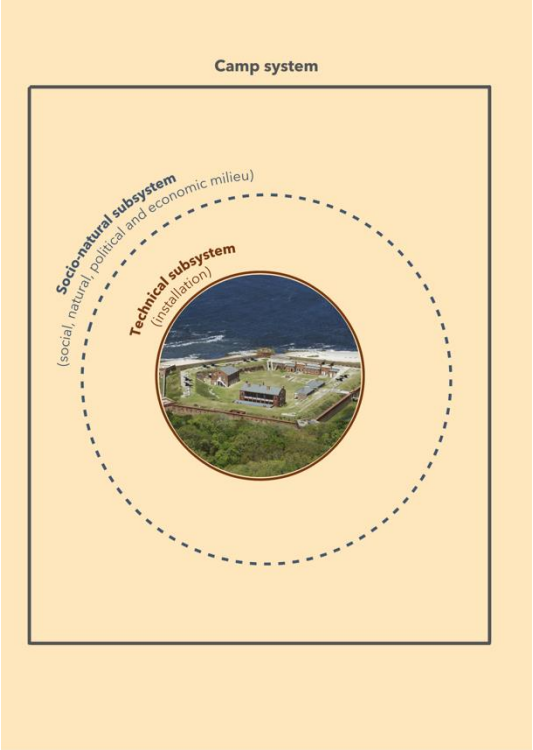
## CHARACTERISTICS OF THE CEMC

The CEMC approach is characterized by four features: 1) systemic/interactive, 2) systematic, 3) qualitative and 4) quantitative.

### Feature 1: the CEMC is systemic/interactive

The CEMC differs from other military methodologies as it conceives the evaluation of the military camp' vulnerability to climate change as the evaluation of **the vulnerability of a system - the "camp system" - which is composed of a technical subsystem** (the installation) **and a socio-natural subsystem** (the social, natural, political, and economic *milieu*[5]) in which the camp is located (see Figure 1).

***Figure 1. The camp system, composed of a technical subsystem (the installation) and a socio-natural subsystem (the social, natural, political, and economic milieu)***

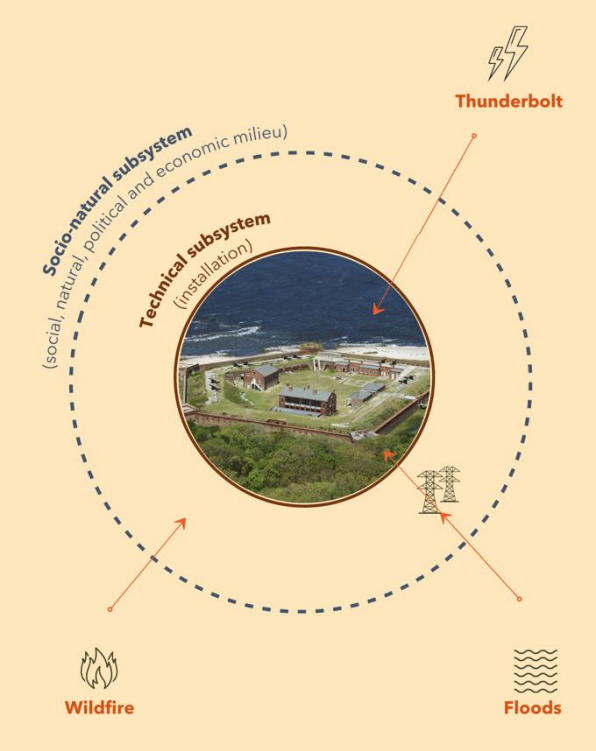



*(Source: Author)*

[5] The term *milieu* refers to the site in which the camp is located and encompasses all its natural elements, as well as its social, political and economic features. To simplify the articulation of subsystems, we call *socio-natural sub-system* the set of elements that compose the social, natural, political and economic *milieu* in which the camp is located.

Furthermore, the systemic vision of the CEMC requires to take into account **the interactions and dependencies of the two subsystems composing the "camp system".** This allows for the identification of **feedback loops** that could impact the technical subsystem. Finally, the CEMC **considers as more pronounced the technical subsystem' dependence towards the socio-natural subsystem, than that of the socio-natural subsystem towards the technical subsystem (see Figure 2)**[6].

***Figure 2. Illustration the two subsystems' exposure to climate change***




*(Source : Author)*

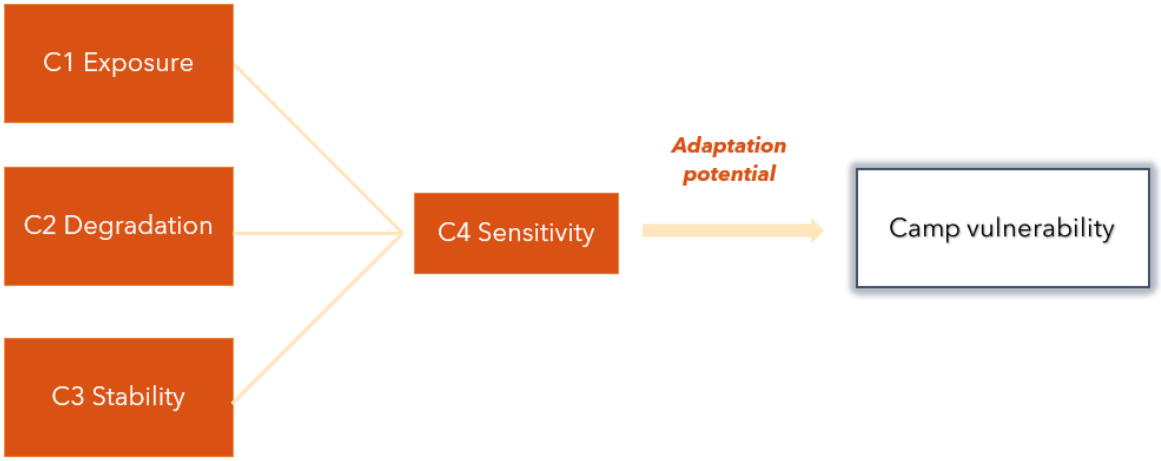
## Feature 2: the CEMC is systematic

**The CEMC provides a conceptual framework of vulnerability that can be applied systematically to each assessed camp.** In the context of this exercise, **the concept of vulnerability refers to the capacity of a camp to perform each of its essential functions, taking into account an adaptation potential, following the occurrence of a climate hazard or the combination of several hazards, which would directly, or indirectly impact it by degrading its implantation *milieu*.**

[6] The figure shows an example of how a flood can indirectly affect the technical subsystem by reaching the power line on which it depends. In contrast, shall the electrical infrastructures of the camp be affected by a flood, the socio-natural subsystem would not be affected, or at least not to the same extent.

The conceptual framework consists of four components: **exposure (C1), degradation (C2), stability (C3) and sensitivity (C4)**, the combination of which determines the studied camp system's vulnerability to climate change (see Figure 3); and enables the analysis of the camp interactions with its socio-natural *milieu*.

***Figure 3. Articulation of the components of the camp system vulnerability***




*(Source: Author)*

Two components of the CEMC are common to most vulnerability assessment methodologies, namely **the exposure and the sensitivity**. However, the conceptual framework of the CEMC was supplemented by integrating two other components: **degradation and stability**, which include elements necessary to analyze interactions and dependencies between the technical and socio-natural sub-systems.

### *C1 - Exposition*

**The first component is exposure (C1)** and is defined as the potential occurrence of **climate hazard (extreme as well as slow-onset events)** in the implantation *milieu* of the camp.

### *C2 - Degradation*

**The second component (C2) is degradation**. It is understood as the **degree of deterioration of ecosystems providing essential services to the studied system (natural resources, protection, etc.).**

### *C3 - Stability*

**The third component is stability (C3)**, which is a set of variables **that determine the capacity**:

(1) Of the installation (technical subsystem) to **maintain a constant mode of operation** over a defined time horizon, without further adaptation to climate change,

(2) Of the social system (community, human society), in which the installation is located, to **ensure at a given time social, food, political, economic, physical and health security of the population**,

in a degraded social, natural, political, or economic context.

### *C4 - Sensitivity*

**The fourth component, sensitivity (C4),** is defined as **the assessment of alterations resulting from current and future interactions, dependencies, and feedback loops of the exposure, degradation, and stability of studied subsystems, without adaptation measures. It also includes the potential impact of a combination of climate hazards.**

It is therefore the analysis, without adaptation measures, of interactions, dependencies, and feedback loops of the three components (exposure, degradation, and stability) that enable the assessment of **the fourth component: sensitivity**.

The **vulnerability of a camp** is then evaluated considering an additional assessment criterion: **the adaptation potential, which can be strong or weak**. Given the objectives of the CEMC, **the camps' vulnerability assessment to climate change is presented by essential functions**.

## Feature 3: the CEMC is qualitative

The CEMC is based on background data collection. This data is specific to the studied camp and based on **open-ended responses from stakeholders** through the distribution of a questionnaire. It also includes **conducting interviews** with previously identified resource persons **and conducting an on-site mission**.

In addition, the vulnerability assessment relies on the **evaluator's personal analytical assessment** to "qualify" the exposure and the sensitivity of the studied camp system, and the final vulnerability assessment by camp' essential functions.

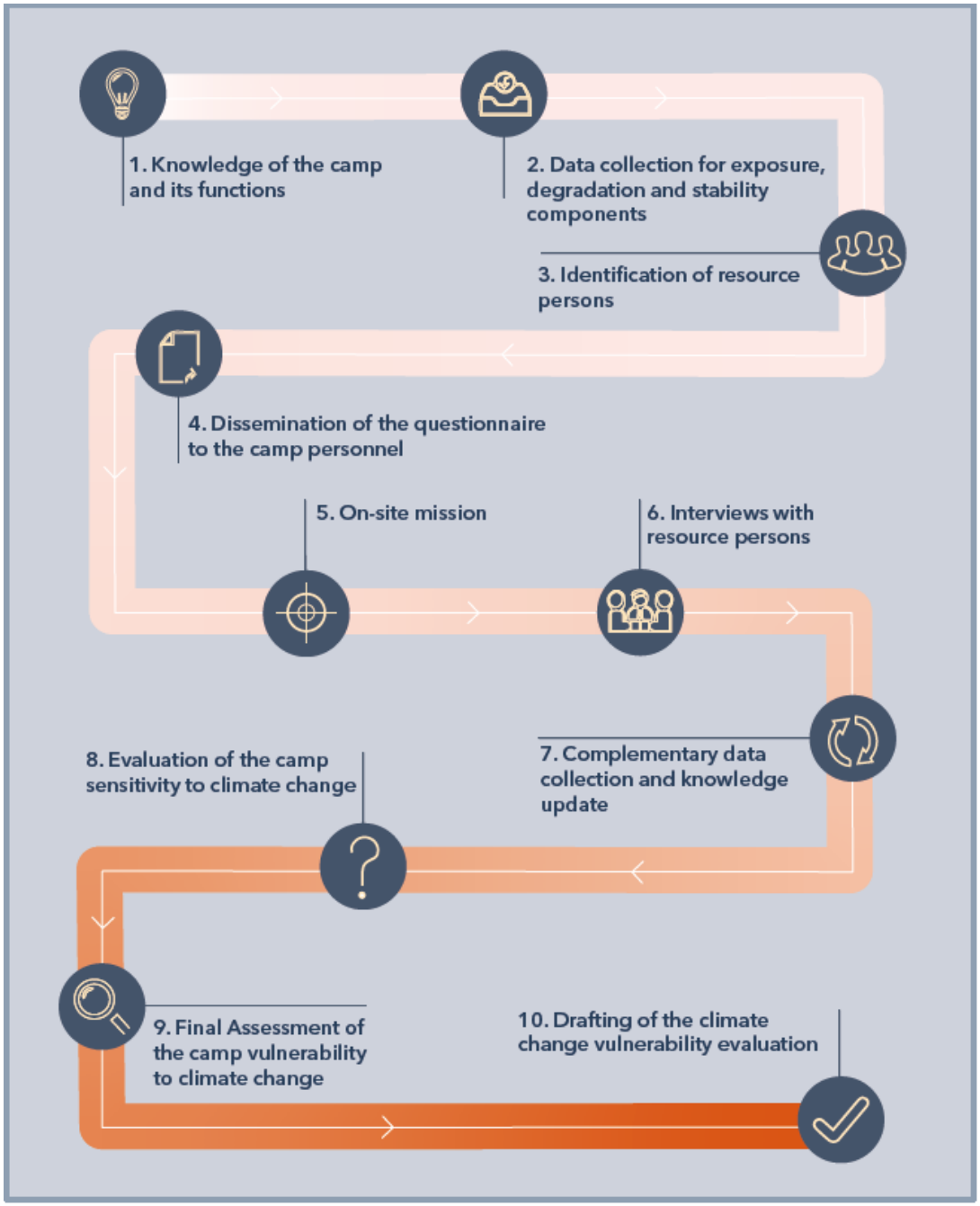
## Feature 4: the CEMC is quantitative

The CEMC is based on the **collection of quantitative data** related to the exposure, degradation, and stability of the studied camp system (e.g.: number of climatic hazards/years; population around the camp - see step 2). In addition, the questionnaire distributed to stakeholders **seeks to establish several sets of statistical information.**

## THE 10 STEPS OF THE CEMC

The CEMC is based on **10 steps (see Figure 4)**[7]. In addition, the questionnaire, tables necessary to conduct the CEMC, as well as **illustrative boxes** based on a fictional military camp are available in the full report and its appendices.

***Figure 4: Diagram of the CEMC steps***




*(Source : Author)*

[7] For a better understanding of the requested exercise, the full report should be consulted for contextual and explanatory elements, as well as guidance for the evaluator.