

# Thinking Ahead on Security: What's Different This Time?

## Dispatch no. 1 (10)

**Can prolonged drought explain the origin of war against the Syrian regime of Assad? Can agrarian reforms and the local security dynamics between different ethnic groups help us understand the conflict in Mali? How can the construction of one of Africa's largest dams explain the complex security developments in the Horn of Africa? And how can the rapid development of technology facilitate more accurate security analysis? The increasingly complex contemporary conflict panoramas accentuate the need for thinking about security holistically. This brief is one of a series that explains a concept of integrated security, as developed by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency.**

### Whose Security?

Does it make sense to maintain an emphasis on the security of the state at the expense of the well-being of its citizens? In today's world of rapidly increasing population growth, globalism and impacts from climate change, most observers would agree that maintaining a balance between the sustainability of the nation-state structure and the security of the individual people who live within its boundaries is an important challenge. However, understanding how different systems hang together, especially from a security perspective, is a delicate task. To encounter this challenge, i.e. on how to better understand the interaction between local and global security from a different set of interdisciplinary traditions, we propose the need to think "*integrated security*". This brief, and others in this series, highlight how this can be done.

### Linking Integrated Security

In 2013 a group of analysts at FOI began to consider the need to think more carefully about how conventional approaches to the study of security were linked. The puzzle emanated out of a shared sense that the practice of security studies in many respects had become specialised to such a degree that different sub-disciplines had stopped engaging each other. Especially at critical moments when there was a joint need to understand a situation of security, there was a general sense that there was a "mosaic" approach to it. More precisely, there was a sense that there were different disciplinary practices in the area of defence and security that had their own ways of collecting information, operationalising concepts, disaggregating data and analysing information. While the group recognised the existence of multiple traditions within defence and security studies, there was less appreciation of the absence of communication between the various disciplines.

Thinking more broadly about this trend of specialisation of defence and security studies, the group went on to ask what

the advantages would be of taking a more interdisciplinary approach to studying security (to bridge gaps). More precisely, what added value would a more integrated approach among FOI's various sectors of expertise yield? While taking holistic approaches to deal with contemporary security challenges is not new per se, the task is not commonly taken to a more practical level. FOI's research environment is unique in this perspective as it brings various competences and security disciplines into a joint research environment. Realising the increasingly complex nature of contemporary security issues, FOI gave the team a mandate to explore how an interdisciplinary approach could be developed to help decision-makers to be better informed and thereby better grapple with contemporary security challenges. This mandate has been both challenging and an opportunity. Even if the work is not yet finished, some unexpected results have already emerged. In essence the team found a number of limitations in the ways in which practitioners and researchers conventionally address security challenges. For example, as found, conventional models for analysing "conflicts" and "crisis" challenges have a tendency to focus solely on short- or long-term perspectives. Often there seems to exist an "either-or" approach, i.e. attention is given to dealing with short-term challenges without considering the long-term impact, and vice versa. Second, the group found that often knowledge was not transmitted between social scientists dealing with security analysis and those scientists working with technical means to tackle security challenges. Based on these observations the team quickly realised that there were a number of gaps to be filled by taking a more integrated approach to security. By identifying means to better bridge short-term security challenges with long-term security challenges, as well as by widening the notion of security for whom (i.e. to embrace individual, societal and state security) into a single analytical approach, the team anticipated that the management of these was likely to become more durable. Furthermore, the team also began



to look into how scientists working on more specialised and technical sides of security, such as space and laser engineers, could bring added value into the analysis.

### **What's Different?**

Over the years, different notions of security have been appearing. For example, since the mid-1970s the notion of comprehensive security has been very popular. The concept offered an approach that favoured a more holistic understanding of security as opposed to more fragmented and specialised ones. Other definitions appeared more frequently after the end of the Cold War as security concerns such as the environment, the economy, food, energy and sustainable development increasingly filled the conceptual space that opened up in the 1990s. Especially the so-called human security tradition emerged as a buzz word in international affairs, providing a vital stimulus to rethinking security in innovative terms. As theoretical work gathered those various concerns into several broad notions of security—hard and soft security, human security, and so on—comprehensive security lost its explanatory edge. Indeed, if “everything” is security then nothing is security. Following the trajectory in security studies, the FOI team has further observed that lately there has been a re-emergence of more traditional, state-focused definitions of security. The question this raises is what to do with the coexistence of state-centric and human-centric, or individual-centric, notions of security. The team quickly realised the need for renewed effort to think about security in a more holistic and integrated way. However, rather than just a tidy theory of comprehensive security that brings conventional and modern approaches to security together, we asked how such security can actually be better implemented. What are the methods and techniques that contribute to achieving a better understanding of security in an integrated way? However, we claim that by being able to combine analyses of traditional state-centric security, human security and other forms of security, and enhancing that with in-house technological capabilities and an integrative focus, much can be achieved analytically, not least by bringing quality assurance and control measures into the responses that practitioners need when facing contemporary security challenges.

### **Earlier**

Given that ecological, financial and political systems are under increasing pressure from human activities, and given that there are a number of complex and growing threats that go beyond hard security challenges (e.g. related to natural resources constraints, climate change and environmental degradation), it is important to understand not only how these trends affect

security, but also how they may interact with one another. Further to this, there is also a need to bring conventional hard security approaches into such analysis. An integrated approach is therefore key. How then will this integrated approach look and how can it function in practice?

The team suggests that the integrated approach, at its core, is an analytical platform in which different competences and expertise, working with different elements of security, meet to address a specific challenge.

More precisely, such an analytical platform offers a critical reading of how security challenges could be addressed, and with what means. Clearly, such a platform cannot address all challenges to security, but it can provide a stress test for how a particular security challenge can be analysed and operationalised. The analytical platform also provides a means for assembling information (data) for a specific security challenge. Again the desired end-state is to bring quality into decision-makers' and practitioners' responses to upcoming security challenges of a complex nature.

### **Is There More?**

In the series of briefs produced by the project, the FOI proposed concept of integrated security is explained from several perspectives, including some of the technological, analytical and organisational aspects that have been developed. Here, the main point has been that, even though the notion of comprehensive security is not new, and indeed has even been promoted in a number of different guises, attempts to apply it have been few. The result is that walking the talk of integrated security remains largely undeveloped. Even though its fundamental premises are credible—i.e. that it “make sense”—its methodology is thin. There has been little full-scale commitment to learning how to work with it concretely. Scientifically, there has been little of the iterative dialogue between theory and praxis and back to theory and yet more praxis that might otherwise lead to empirical robustness and policy-wise credibility.

FOI's study builds a platform that begins to address those failings. As other briefs in this series explain, it is a good beginning, but more remains to be achieved. We explain some of the technologies and assessment tools that are useful, describe the approaches to integrated security that some other organisations have developed, and consider a



number of practical applications. In subsequent briefs we go more deeply into various concrete cases of how the concept of integrated security could be applied. The briefs are based on ongoing research projects at FOI, and include research relating to environmental vulnerability and impact assessment approaches, earth observations, satellite images and human security approaches. The idea is to give examples of how security could be dealt with in an integrated way.

This brief was written by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency. It could be read as a stand-alone document but can also be read in the context of connected briefs on integrated security of which this particular topic is a cohesive part.

The project leader was Mikael Eriksson (Defence Analysis) and lead scientists included Annica Waleij (CBRN Defence and Security), Birgitta Liljedahl (CBRN Defence and Security), Louise Simonsson (CBRN Defence and Security), Christer Andersson (Defence and Security, Systems and Technology), Richard Langlais (Defence Analysis), Michael Tulldahl (Sensor and EW Systems) and Ulf Söderman (Sensor and EW Systems). Many other members of FOI provided support.

For further information on related activities of this project please consult [www.foi.se](http://www.foi.se)

# Integrated Security Thinking: Who's Doing It?

## Dispatch no. 2 (10)

**In today's world of rapidly increasing population, globalisation and climate change, most would agree that maintaining a balance between the sustainability of the nation-state system and the security of the individual people who live within its boundaries is a delicate and important challenge. However, thinking holistically on security—that is, accounting for short- and long-term challenges to the security of states, communities and individuals—is complex and requires special social and technical capabilities and methodological means. In this brief SÄKER provides an overview of existing organisations working with broadened definitions of security and how the Swedish Defence Research Agency could complement their work.**

### Background

This brief is one of a series that explains the concept of integrated security, as it has been developed by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency. FOI's study is seeking to develop new solutions to some of the policy dilemmas that decision-makers grapple with when engaging in complex crises and armed conflicts. These briefs highlight those insights. One of the questions addressed by the study is to what extent other organisations are working with the same, or similar, approaches. The short answer is "Not many". A longer answer follows below.

### What Were We Looking For?

The reasoning behind our search was that it would be useful for finding gaps and spurring improvements in conventional approaches to conflict and crisis analysis. While most organisations have their own set of standards on how to analyse threats to security, experience is seldom shared. Moreover, a number of actors in the field of conflict and crisis analysis tend to overlook aspects and dimensions that need to be part of an informed analysis. An important but basic distinction could be made between those actors that use technological means as part of their assessment, and those using only a social science approach.

The overview of research organisations that in one way or another are working on integrated security builds on the rather unique capability of FOI. FOI appears to be unique in its particular configuration of integrated security. It is not only broad conceptually, but it is often very discipline-inclusive. It strongly highlights technical capabilities and practical aspects as integrated characteristics of seeing comprehensive security as an applied concept, which is sought after and created, as a desired condition. This in turn makes it action-oriented and methodological in its concern.

A list of forty organisations that also appeared to be working with broadening notions of security was compiled. Given the indicative nature of the study, it was sufficient to classify the organisations on the basis of how they presented themselves in open media, such as their websites and in accessing their respective search engines.

In the following, the organisations looked at in the study, and their approach to integrated security, are briefly described. They are listed in a hierarchical fashion, in descending order according to their degree of divergence from FOI's general approach to security studies. This is further explained at the beginning of each section. In the section headings, integrated security is abbreviated as IS. Comprehensive security is abbreviated as CS. Each of the lists is organised alphabetically.

### Similar Concepts and Terms, without Technological Research Capability

The organisations in this section include a concept that they generally perceive as falling under integrated security and thereby follow in their suite of concerns. Their definitions of integrated security, sometimes also called a holistic security approach or comprehensive security, are similar to FOI's. Direct use of sophisticated technologies for primary data gathering is not mentioned in their self-descriptions. They rely heavily on social science methods, although secondary data from technology-based sources may provide inputs to their analyses.

- Carnegie Endowment for International Peace (USA)
- Center for Strategic and International Studies (USA)
- FFI, Norwegian Defence Research Establishment
- ODI, Overseas Development Institute (UK)
- RUSI, Royal United Services Institute (UK)



- Stimson Center (Henry L. Stimson Center, USA)
- Woodrow Wilson Center, Environmental Change and Security Program (USA)
- Worldwatch Institute (USA)

### **Similar Concepts to FOI's, though not termed IS, but include Technological Focus**

The organisations in the next list discuss broad definitions of security that resemble FOI's notion of integrated security, but without calling it that. They generally tend to integrate numerous kinds of approaches, and include both direct use of sophisticated technologies for primary data gathering, and rely heavily on social science methods. Even though they do not apply conceptual stringency in their discussion of diverse security perspectives, their overall approaches make them the group that is most comparable to FOI.

- CIA/CISSM (University of Maryland) (USA)
- Center for International and Security Studies at Maryland (USA)
- RAND Corporation (USA)
- The Robert S. Strauss Center for International Security and Law, CCAPS (Climate Change and African Political Stability), University of Texas at Austin (USA)
- SEI, Stockholm Environment Institute (Sweden)

### **Similar Concepts to FOI's, not termed IS, but do not include a Technological Focus**

Like the organisations in the previous category, those in this section work with broad definitions of security that resemble FOI's notion of comprehensive security, but without calling it that. Unlike the organisations above, however, they do not mention direct use of sophisticated technologies for primary data gathering in their self-descriptions. They rely heavily on social science methods, although secondary data from technology-based sources may provide inputs to their analyses.

- Adelphi research gemeinnützige GmbH, and Adelphi consult GmbH (Germany)
- Brookings Institution (USA)
- Center for Climate and Security (USA)
- Chatham House, Royal Institute of International Affairs (UK)
- CNA Corporation (USA)
- PRIO, Peace Research Institute Oslo (Norway)

### **Vaguely Broad Concept, not termed IS, and do not include a Technological Focus**

The organisations in this category, in common with all the organisations above, demonstrate that there is a need for broader definitions of security. Unlike those above, however, they generally appear to have a more wide-ranging focus on developing conceptual rigour, not least in several of their theoretical discussions. One shortcoming however is that these organisations seem to work without direct reliance on sophisticated technologies for primary data gathering. Although at least some of them may rely heavily on data from technology-based sources in certain of their focus areas, this does not appear to be the case with regard to their work with broader notions of security as discussed here.

- Air University DoD-Minerva Initiative on Energy and Environmental Security, Maxwell Air Force Base, Alabama (USA)
- American Security Project (USA)
- Center for a New American Security (USA)
- Center for American Progress (USA)
- DSTL, Defence Science and Technology Laboratory (UK)
- E3G, Third Generation Environmentalism (Belgium and USA)
- FIIA, Finnish Institute of International Affairs
- Heinrich Böll Stiftung (Germany)
- Institute for Defense Analyses (USA)
- International Alert (UK)
- National Democratic Institute (USA)
- Potsdam Institute for Climate Impact Research (Germany)
- SIPRI, Stockholm International Peace Research Institute (Sweden)
- TNO, The Netherlands Organisation for Applied Scientific Research
- UI, Swedish Institute of International Affairs

### **Conclusion**

The overview provided in this brief indicates that there are enough organisations working with broadened definitions of security for eventual collaboration to be feasible. At the same time, FOI's approach is so novel that there is ample room and opportunity for making serious contributions to the methodology, implementation and theoretical development of integrated security. FOI's study builds a platform that begins to address the shortcomings. As other briefs in this series explain, it is a good beginning, but much more remains to be achieved.



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# Integrated Security Thinking: How Is It Done?

## Dispatch no. 3 (10)

**FOI's project SÄKER is developing new solutions to some of the dilemmas that decision-makers grapple with. These briefs highlight those insights. One of the questions addressed by the study is to what extent other organisations are working with similar approaches to the study of integrated security. This brief is one of a series that explains the concept of integrated security, as it has been developed by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency.**

### Introduction

Which key actors are working on integrated security? Some forty organisations work on security-related research issues. More precisely, two categories of organisations have a holistic view on security.

One category included nine organisations that refer to a concept of integrated security that resembles FOI's. An essential difference, however, is that those organisations do not emphasise the role that the integration of technologically-based techniques can play in working for integrated security. A second category is made up of five organisations that have an approach that is highly congruent with FOI's, but which is not labelled as comprehensive security per se.

Neither of the two categories coincides exactly with FOI's approach, which appears to be unique in its particular configuration of integrated security. It is broad not only conceptually but also when it comes to its disciplinary inclusiveness. It strongly highlights technical capabilities and practical aspects, as integral to seeing integrated security as an applied concept, which is sought after and created, as a desired condition. This in turn makes it action-oriented and methodological in its concern.

One of the conditions established for the search for similar organisational approaches was that we must stick to a precise terminology. In other words, the search was based on the degree of conformity to the term "comprehensive security". Since that approach produced such scant results, the search was widened one level by scanning for those organisations whose approach to security studies resembled FOI's but that differed in name. Despite the argument that theoretical stringency is breached by accepting the use of other denotative terms, the second category of five organisations could then be derived.

The organisations in the second category are described in some detail below, especially the methodological aspects of their approaches. Because this is the result of a desk study (and some personal contact), the descriptions are qualitatively subjective and highly impressionistic.

To recap, the organisations in the following list discuss and, even more importantly, apply broad definitions of security that resemble FOI's notion of integrated security, but without using the same term for it. They integrate numerous kinds of approaches; include both direct use of sophisticated technologies for primary data gathering; and rely heavily on social science methods. Even though they do not apply conceptual stringency in their discussion of diverse security perspectives, their overall approaches are most comparable to FOI's.

- CIA/CISSM (University of Maryland, USA)
- CISSM, Center for International and Security Studies at Maryland (USA)
- RAND Corporation (USA)
- The Robert S. Strauss Center for International Security and Law, CCAPS (Climate Change and African Political Stability), University of Texas at Austin (USA)
- SEI, Stockholm Environment Institute (Sweden)

The CIA/CISSM is not discussed further here, since the actual content is covered by the CISSM stand-alone item. The point of including it was to show that even if the CIA does not itself directly engage in integrated security approaches, it does engage others to work with it on its behalf.

### *CISSM, Center for International and Security Studies at Maryland*

The CISSM's broad approach studies how threats posed by advanced technologies (e.g. nuclear material accounting, pathogens, space weapons) impact on civil conflict, moral issues, governance, regulatory systems and policy, and how



society can respond to emerging challenges such as climate change, geoengineering and cybersecurity. Apart from the usual range of scientific and policy studies, they are deeply engaged in various kinds of outreach at different societal levels. They organise, for example, specialised courses, gaming exercises, citizen involvement workshops, exchanges of experts between Russia and the USA, community debate forums, and so on. In sum, their niche is human security's "high ground", bringing usually elite and high-tech issues to the citizen level, and vice versa.

#### *RAND Corporation*

RAND's work does not need introduction. With regard to our present topic, a key difference between RAND and the other three organisations highlighted is that RAND can be typified as a "study-generating machine", that is, it produces studies on demand, on just about any topic. Because RAND seems to have done, or be able to do, studies on "almost everything", its work is difficult to characterise in any specific way. In that sense, it is difficult to say that it has any particular approach, other than that it has almost anything one might be looking for. On the other hand, its Internet presentation provides little opportunity for interaction, something which the remaining two organisations in this brief excel at.

#### *e Robert S. Strauss Center for International Security and Law, CCAPS (Climate Change and African Political Stability), University of Texas at Austin*

As its website says so succinctly, "CCAPS is funded by the U.S. Department of Defense's Minerva Initiative, a university-based, social science research program focused on areas of strategic importance to national security policy." Just that statement alone is revealing: the 5 million USD Minerva grant vouches for just how importantly climate change is being factored into US security considerations, both locally and abroad. The explicit interdisciplinary nature of the CCAPS approach is also confirmed by the fact that, even though one side of its research works with remote sensing, geographical information systems (GIS) and other forms of physical data gathering, the Minerva funding is for social science research. That dimension is covered by CCAPS' focus on the question of how the interaction and intersection of climate change, conflict, governance and aid affect African and international security. CCAPS works to correlate and validate remote data with on-the-ground local and social intelligence. A unique feature of CCAPS' website is its presentation of "dashboards" that provide the visitor with direct access to user-friendly manuals, entry points and examples of how to use the results of its studies, and, by adding one's own data, contribute to the

sophistication of CCAPS' own data. The CCAPS approach is highly developed, useful and even admirable.

#### *SEI, Stockholm Environment Institute*

While the other three organisations profiled here begin with security and include the environment, climate change and human dimensions in order to broaden their approach, the opposite can be said of SEI. It begins with a concern for environmental and ecological questions and broadens its approach to addressing them by including the security dimension. In that way, it is also the most comprehensive and expert in the extra-security, that is, environmental and human, dimensions of a broadened approach. It has an extremely wide range of topics, even to the point where it can appear scattered and diffuse. It applies methods such as participatory, community and stakeholder involvement, action research, co-design, and inter- and trans-disciplinary work, and combines a vast palette of technological, sociological, medical, geographical and humanities methodologies in its comprehensive studies.

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# The Security Concept in Transformation: Adjustments by Assessments Dispatch no. 4 (10)

**Recent decades have seen a shift in the perception of security and notions of corresponding threats. We therefore need to attune to strategic security thinking with practical implications for policy analysis. In this brief we suggest that this adjustment could be guided by an integrated security analysis framework approach that builds on recent advances in assessment tools.**

## **e Security Concept in Transformation**

Since the end of the Second World War, and propelled by the end of the Cold War, a noticeable shift in security studies has emerged. From being traditionally state-oriented, the security studies discourse has increasingly begun to include a wider notion of security beyond state security. Nowadays security often entails human security, societal security and the like. Furthermore, corresponding threats to security are seen as arising from multiple sources of various kinds, including threats from conventional armies, cyberspace, climate change and extreme weather events, epidemics, etc. In essence, one can summarise this as a far-reaching securitisation process. That is, conventional notions of the security of the state, including its conventional corresponding sources of threat (“hard security”), have broadened to cover non-conventional forms of security.

In practice most contemporary security challenges are neither agency- nor structurally-based, but somewhere in between. Although different elements of security analysis, such as human security, energy security, food security, water security, climate security and gender security, can be highlighted in isolation for analytical purposes they do often interact in a complex web of causes and effects. Thus, knowing how they interact is pivotal in security studies in order to develop adequate decisions that can support durable policy measures in areas such as conflict prevention measures, conflict resolution, peace-building, reconciliation, resilience and adaptation.

From a practical point of view, an integrated approach to security could therefore be an important approach to deal with short-, medium- and long-term processes having direct or indirect security implications. A combination of state, societal and human perspectives in the study of security could therefore be needed. However, to integrate different perspectives on security one needs to recognise how these different approaches are interlinked. To start this one needs to outline the purpose of the security analysis. What remains thereafter is to develop an analytical framework that bridges the different approaches to security and different security challenges, in other words, a framework for “an integrated comprehensive security analysis”.

## **Widening our Understanding of Security through Various Technologies and Assessment Tools**

An integrated security approach to the study of security allows for the use of various supporting tools according to need. Many kinds of tools have for instance been developed in the broad area of environmental, vulnerability and risk assessments, conflict analysis manuals, satellite image intelligence, etc. Apart from providing policy- and decision-makers with environmental information, these tools can also inform security analysis in areas such as human security, water security and food security. Great specificity in applications can be achieved through the large number of tools available. The environment and security are interlinked and numerous militaries have for instance developed applied tools for military activities that reflect this.

Environmental data and statistics are important for assessing the state of the environment and the humans who reside in it. Although environmental data, such as measurements of air, soil and water quality, is collected by both public and private sources in most countries, overall data quality often remains poor, as does information dissemination among different actors interested in security. For instance, average national statistics often hide the most serious deprivation in different regions and there are generally stark regional disparities in terms of economic performance, human development, social welfare provision and the prevalence of poverty. Results may also be contradictory for reasons connected with issues such as poor governance or corruption. Shortcomings like these present a serious challenge to measuring the consequences of e.g. environmental change and ultimately the understanding of complex security phenomena. Other issues, on the other hand, such as land use and forest cover, can be assessed on a broad scale using remote sensing by commercial satellite picturing. Remote sensing, combined with sufficient validation using actual measurements in the field, usually provides high-quality data for environmental statistics.

For an integrated security approach, security studies indeed require access to a wide range of information. Satellite data analysis is a technology that can provide security researchers with a global instrument adapted to the requirements of these studies. Satellite data shows the situation on ground “as is” regardless of national borders, political conditions, communications or the speed and time of the crises. Satellite-based earth observation has the capacity to provide the analyst with the data needed when it is needed. Advanced processing and classification methods are powerful and sensitive tools for mapping and monitoring environmental changes at an early stage of longitudinal processes or as information in an ongoing security challenge. Both sensor and processing technologies are under continuous development, which means that the influence and potential use of this type of information will increase in the future.

### Challenges and Opportunities

Moving from theory to practice has however proved to be tricky, which may be why few organisations currently do so. In fact, combining traditional state-centric security analysis with analysis of other forms of security requires strong motivation, considerable practice, and a truly integrative focus. There has furthermore been little full-scale commitment to following through theoretical analysis to operational implementation.

The idea behind the SÄKER project is therefore to attempt to further develop the “doing” phase of integrated security to support robust solutions to comprehensive security issues that combine the broader theoretical perspectives with the plethora of tools and technological advances to address the complex security challenges facing the increasingly interconnected contemporary world.

### Further Reading

Granit et al. 2015. *Integrating sustainable development and security – an analytical approach, case points from Middle East and North Africa, Central Asia and the Arctic regions*. Working paper. Stockholm: FOI and the Stockholm Environment Institute (SEI).

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Buzan, Barry, Waeber, Ole and de Wilde, Jaap. 1998. *Security: a new framework for analysis*. Boulder and London: Lynne Rienner.

Meadows, Donella H., Meadows, Dennis L., Randers, Jørgen, Behrens, William W. III. 1972. *The limits to growth: a report for the Club of Rome's project on the predicament of mankind*. New York: Universe book.

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# Vulnerability and Impact Assessments: Integrated Security Analysis through an Environmental Lens Dispatch no. 5 (10)

**Understanding how threats posed to and by the environment are linked to state, communal and human security is a complex undertaking. However, by using an integrated security approach greater specificity in applications can be achieved. This follows the large number of tools available in the area of environmental, risk and vulnerability assessments that can help us unpack this relationship. This brief discusses how, apart from providing policy- and decisions-makers with environmental information, these assessment tools can also inform security analysis.**

## Environmental Impact Assessment (EIA)

Back in the 1960s, practices for environmental assessments began to be developed as a result of an increasing environmental awareness at the time. Today, most developed states, quite a few developing countries, international organisations and corporate businesses have national or local requirements, methods and practices for environmental impact assessments (EIAs). While traditionally oriented to national practices, these assessment tools have increasingly come to be tailored to fit different security organisations such as NATO and the United Nations as well, recognising their strategic, operational and tactical benefits beyond merely providing environmental information.

*In Somalia, UNSOA (the United Nations Support Office to AMISOM) provides the African Union Mission in Somalia (AMISOM) with logistic support. One source of instability fuelling the conflict in the Horn of Africa is the charcoal industry. In addition to causing deforestation, illegal charcoal exports to the Gulf states are a major source of income for rebel groups, such as Al Shabab. An EIA undertaken by UNSOA revealed the environmental security implications of AMISOM using charcoal. AMISOM forces found that, by buying charcoal from local suppliers, they could gain a certain leverage of security by doing business with what are presumed to be rebel fractions. Hence they preferred to use charcoal although in the long term this went counter to the wider mission goals.*

## Strategic Environmental Assessment (SEA)

Strategic environmental assessment (SEA) is a tool for integrating environmental considerations into policies, plans and programmes. What makes an SEA different from an EIA is that it is intended to influence development planning, decision-making and implementation processes at the strategic

level, rather than project-level planning, as EIAs do. The SEA concept has mainly evolved from the recognition that many sustainability concerns can only be resolved by addressing them at the strategic level, long before any project is commenced and a traditional EIA has been initiated.

*SEA approaches have been tailored to different military organisations such as the UK Ministry of Defence and the Swedish Armed Forces (SwAF). Prior to SwAF deployment to MINUSMA (the UN Multidimensional Integrated Stabilization Mission in Mali), an SEA screening was performed. It revealed that local resource conflicts over land use and water were widespread. This kind of information that SEAs produce is important especially in regions at risk of an aggregate social and environmental footprint. This happens when refugees, local populations, humanitarian agencies and peacekeepers are situated at the same place, placing a potentially unsustainable strain on e.g. a water-scarce region, with security implications as a result.*

## Rapid Environmental Assessment (REA)

Rapid environmental impact assessment (REA) was developed to define and prioritise potential environmental impacts in disaster situations. It is adapted for rapid response situations (e.g. through the use of checklists) with a focus or priority on the identification of the most critical issues. The REA does not replace an EIA but is supposed to fill the gap until a full EIA is appropriate or possible to conduct.

*In the Upper Nile region in South Sudan, violent tensions over scarce resources such as fuel wood, water and grazing areas between refugees from Sudan and the local population were reported to the humanitarian system. An REA was performed that mapped the extent of the problem and proposed solutions, including Community Based Natural Resources Management activities.*

## Vulnerability Assessment (VA)

A vulnerability assessment (VA) is the process of identifying, quantifying, and prioritising vulnerabilities in a system. It often starts from a natural hazard or a contextual, social perspective. Some researchers also stress the mechanisms by which socio-economic and biophysical processes together shape vulnerability. This perspective places greater emphasis on how vulnerability plays out on, and across, multiple geographic and temporal scales. VA relates closely to human security since a common denominator for most VAs is that they comprise three dimensions—exposure of people, places and ecosystems to stresses, perturbations, and shocks; sensitivity, i.e. the degree to which people, places and ecosystems are affected by stress or perturbation; and resilience, the ability of the exposed people, places and ecosystems to recover from the stress and to buffer themselves against and adapt to future stresses and perturbations. The concept of vulnerability is also related to concepts including hazards, risk, adaptation, adaptive capacity and coping capacity.

*A vulnerability assessment performed in Mali, in support of Swedish development assistance, concluded that one of the more important threats to livelihood security in Mali are climate-related. Climatic variability has led to several large-scale disasters such as droughts and floods, and impacts food security and migration patterns, which in turn may relate to the overall conflict dynamic between different fighting groups.*

## Environmental Vulnerability Assessment (EVA)

Environmental vulnerability assessment (EVA) is a tool that has been developed in particular to inform decision-making and pre-deployment planning of SwAF peace support operations. The purpose is to identify vulnerabilities that should be taken into consideration prior to deploying to a certain region. It is performed rapidly, usually at the outset of the intelligence collection cycle, and is based on quality-assessed sources of data. EVAs include an assessment of the causes of differential impacts, together with responses that will prevent, reduce or offset adverse consequences. The main drivers of vulnerability are identified and then assessed to determine who and what may be exposed to hazards, and when the exposure is likely to occur. The level of sensitivity for each impact is analysed, together with the capacity to cope with these impacts and other stresses.

*EVAs developed for countries such as Mali, South Sudan, the Central African Republic, the Democratic Republic of Congo and Libya have addressed the security implications of a wide range of topics such as access to water, solid and sanitary waste management, energy infrastructure, corruption, wildlife crime, cultural and historical resources and land use. Most recently, EVAs for areas controlled by the Islamic State in Iraq and Syria (ISIS) have reviewed the tactical use of hydropower dams and wheat stocks for controlling and instilling fear among the population as well as control over oil fields as sources of funding for the insurgency.*

## Understanding Security Challenges Requires an Integrated Approach

Environmental and human security issues are fundamentally interconnected. Numerous militaries have tools to assess environmental risk and vulnerability that reflect this. Recognising the multiple environmental and security interdependencies and assessing them accordingly offers a number of benefits, including identifying security issues related to environmental factors, fully realising the potential of long-term trends analysis, avoiding unintended consequences, saving money and time, and producing better results thanks to greater community buy-in among the people and communities affected.

## Further Reading

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# Earth Observation as an Intrusive Eyewitness in Conflicts and Crises

## Dispatch no. 6 (10)

**Earth observation images obtained from satellites and the subsequent image processing and analysis have become an important tool for a comprehensive understanding of the Earth of today, not least in the realm of security. Image data has also become increasingly accessible to the public as well as to the security research community. Both software and hardware for handling huge volumes of data are affordable today. The following describes some of the methods that can be used in an integrated security analysis and the benefits.**

### **An Integrated Security Analysis Approach**

The combination of conventional and human security covers a wide spectrum of threats to safety. These threats typically cover anything from natural hazards such as earthquakes, floods and droughts to human-inflicted threats like terrorism, small arms proliferation and crises started by civil wars or state failure. From a geographical point of view these security threats vary hugely in location and scale as well as in time. While some threats appear suddenly others develop over the longer term. An earthquake at the bottom of the sea can affect large coastal areas on several continents and may give rise to a need for international aid in years to come. Similarly an attack by terrorists will probably be a sudden surprise although physically it will affect only a limited area. The political and social impact of the terrorist attack, on the other hand, may well spread around the globe.

In contrast to these rapid events, human security threats can evolve slowly and have an increasingly greater impact on the population and the society at large. Such slow-moving developments have conventionally been much more difficult to detect. Consider for instance the ongoing global climate change—a slowly evolving threat to states, societies, ecosystems and human security that needs to be monitored globally over many years if it is to be analysed correctly. The proliferation of small arms and large-scale deforestation are two examples of human-inflicted issues that also affect the security of society in the long term. Both short-term and long-term threats need to be mastered in any conflict- and crisis-sensitive security analysis. This suggests that an integrated security approach is a useful framework.

### *Using satellite monitoring systems*

The monitoring and analysis of threats to the state, societies, ecosystems and individuals as described above, and the subsequent need for support to possible rescue and reconstruction operations, require tools adapted to the very nature of the security threats—that is, instruments capable of covering and detecting security threats on a global level

and at the same time with a capacity to provide reliable information for security analysis at the correct time and on a “24/7” basis. The satellite-based earth observation technology and the follow-on analysis tools such as image processing and geographical information systems (GIS) have increasingly come to play a vital role over the last decade. Satellite earth observation technology provides security analysts with an instrument applicable on a global basis, assisting them with fast and untampered information.

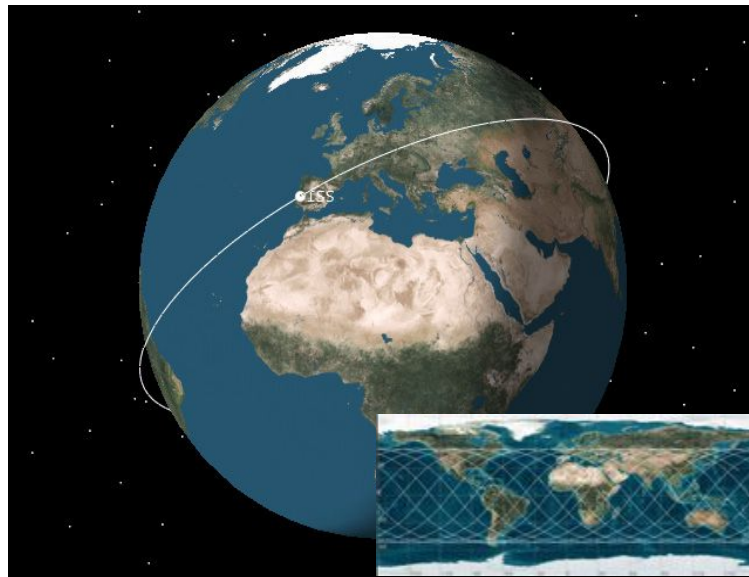
### **Satellite Orbits and Fundamental Features of Earth Observation**

An important characteristic of satellites is that they move in predictable space orbits around the globe due to the interaction with the Earth’s gravity, as illustrated in image 1 below. A fundamental feature of satellite-based earth observation that has changed the concept of information flow from crisis areas is the fact that the images are unbiased physical measurements that display the situation on the ground “as is”. Provided that the security analyst has full control of the image tasking and image production, satellites show an objective view of a crisis situation that normally could be closed for the world.

### *Challenges for earth observation*

At the same time it is important to understand the limitations of satellite-based earth observations. Earth observation data only gives a snapshot of what the crisis situation looks like at a specific time. Thus, an image presents what has already happened, be it a gradually increasing global climate change, deforestation or an erupting ethnic cleansing crisis. The interpreter of the images therefore needs to be able to recognise the changes by comparing images over time to understand the course of the security threats—a course which in turn could give an indication of the driving forces, as well as the ambitions and motives of those involved if it is a human-inflicted security threat. However, to understand this, there is a need for an integrated approach to security.





**Image 1:** An orbit of a satellite at low altitude. The orbit plane is not polar and thus the satellite does not cover the globe at high and low latitude. The inset displays the corresponding track on the ground over a particular period of time. Image: FOI.

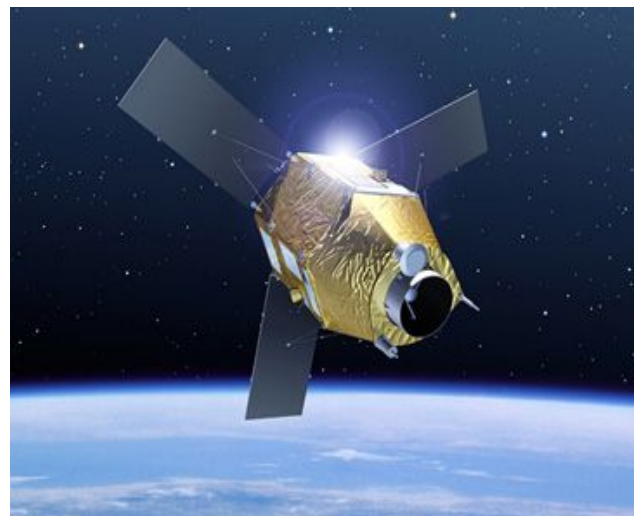
### Prerequisites for Security Assessments based on Earth Observation

The discussion above implies some special considerations when it comes to using earth observation in security assessments. First, the satellite system used should be under the full control of the user, from the ordering of images to the processing and analysis of the data. Second, the earth observation system used should be able to provide the user with the data required and when it is wanted. Access to the data should not be restricted in any way, whether geographically or in a time sense.

Today these requirements are fulfilled not only by the intelligence community, but also by civilian governmental and non-governmental organisations. In a revolution in satellite geospatial intelligence, an increasing number of public actors now have access to vital satellite capacity. For example, the Swedish Defence Research Agency (FOI), under a special agreement between the French space agency Centre National d'Etudes Spatiales (CNES) and the Swedish National Space Board Authority (SNSB), has access to an earth observation satellite system called Pleiades. The satellite system is designed for both civilian and military users and especially suited for rapid response for the detection of changes in a short time. Some of the features are:

- It offers a daily revisit to any point on the globe.
- Based on three programming plans per day the system offers late order requests.
- Data is downloaded from the satellite to the Esrange receiving station in northern Sweden.

- Users can access a search archive to browse through old archived data for comparison with the current security situation.



**Image 2:** Pleiades is an optical observation system consisting of two identical satellites that deliver 50-cm colour images. Credit: CNES.

The agreement with SNSB gives FOI and other Swedish institutional users a unique, controlled, fast and untampered access to earth observation data at low cost. Moreover the agreement gives FOI the right to order the satellites to record images within a specific time frame. That is, the security specialist can act proactively and receive data from an area during a future time period he or she predicts will be of interest for the analysis of the crisis.

### **Benefits of Satellite-based Comprehensive Security Analysis**

A wide variety of conceptual frameworks and methods for analysing threats to the conventional security of the state, societies, ecosystems, and human well-being has been developed over the years. Attempts have been made to tailor such assessment tools to crisis and conflict contexts. However, with the development of space based sensors and its increasing availability, satellite data can be an important source of information to deal with threats to comprehensive security concerns. It also works well as a source when implementing complex integrated security analysis because it links both social and technological advances into one framework.

A near-real-time, clear and comprehensive satellite-based information picture is essential if the security community is to be able to perform its assessments, from situation monitoring to crisis management. Earth observation is a vital contributor to this general picture and complements other types of information, ranging from publicly collected data to classified material from human intelligence sources. The information from the satellites can be used for a variety of security reports. For instance it can contribute to:

- Image-based maps on various scales and sizes depending on the area of interest and type of crisis or security threat. These maps may cover whole continents with information regarding deforestation or focus on a small village subjected to ethnic cleansing, showing burnt-down houses.

- Providing direct answers to requests for information of the type “has bridge X in town Y over the river Z been swept away?”, thereby provide up-to-date resources.
- Digital terrain information in 3D thereby providing detailed elevation information e.g. to perform a simulation of the effects of a dam rupture downstream.
- Long-term time series to detect small changes and impacts on ecosystems that indicate a wider global or regional climate change.
- The size or extent of natural resources such as biomass in forests and the volume of the cutaway bedrock from an open-pit mine.
- Progress in the construction of large infrastructure and its possible environmental impacts on the nearby surroundings (see the images below).
- Movements of troops or rebel groups and their vehicles into demilitarised areas, or the deployment of non-authorised weapons to countries under blockade.

### **From Continental Coverage to Eyewitness on Village Level – A Piece of Integrated Security**

The next two images provide an example of how earth observation images could be used to detect and assess even small, but significant, changes in a wider and complex course of events. The background to the images below is the start of the construction of a large electric power plant dam in Ethiopia called the Grand



**Image 3:** A small village 500 m upstream from the planned GERD dam construction area. Note the kitchen garden around the green trees at the beach to the Blue Nile and several huts as pinpointed by the blue line. Date April 29, 2003. Image: Digital Globe.

Ethiopian Renaissance Dam (GERD). The first image (image 3) shows a small village upstream from the planned dam area prior to construction starting. The next (image 4) shows the same village and area after the start of construction and the impact from the various activities of the dam.



**Image 4:** The same village and area on May 28, 2012 when construction work has started. Note that the huts marked by the blue circle as located in the image 3 above are missing and there is no other trace of the village's inhabitants. All the village agricultural areas are lying fallow and a dirt road has been established along the right-hand edge of the image. Image: Digital Globe.

These two images show how a larger event such as the construction of a dam will drastically impact humans and their habitat. Images from satellites can detect even small and local but significant changes in the environment. Moreover, these changes can also be measured and quantified in a larger area to provide statistically realistic trend analysis for an entire region. The effect of such changes has in this case been the displacement of the local population.

#### **Conclusion: A Widened Understanding of Security by Satellite Data Analysis**

Earth observation based on publicly available satellite images is one of the new techniques being offered today that provide researchers with a global instrument adapted to the requirements of a comprehensive security analysis. Earth observation shows the situation on ground "as is" without being restricted by national borders, political conditions, communication or the speed and time of a crisis. In a comprehensive security analysis the satellite data will be a strong and current near-in-situ factor. FOI today has the capacity to transform this technology into a non-intrusive scouting eyewitness in conflicts and crises.

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# Very High Resolution Satellite Images and Human Security – Yes, It Makes Sense! Dispatch no. 7 (10)

**Interest in satellite-based earth observation is increasing among those engaged in human security analysis. Having previously mainly been a concern for those interested in conventional security analysis, satellite imaging is becoming an increasingly relevant instrument also for those engaged in analysing challenges to human, societal, and ecological systems. A major factor is the increase of readily available very high resolution (VHR) satellite imagery. The imagery makes detailed and objective information easily accessible for any place on the globe and provides new opportunities for the security analyst in tasks such as detailed site assessment and environmental monitoring. The result can then be applied to and support a broader integrated security analysis. In Sweden the use of VHR images in the public sector is specifically supported by participation in the European Pleiades VHR satellite programme.**

## **Very High Resolution Satellite Data and their Applications**

Very high resolution (VHR) satellite images are usually images that offer, in technical terms, “sub-metre resolution”, meaning that the limit in size of the smallest objects or environmental features that can be clearly discerned may be below 1 meter. This is the highest image quality available from non-military remote sensing satellites today. This type of image as well as the derivative products that can be produced are used on a daily basis in areas such as national security and civilian applications. The VHR images provide an excellent means for the security community to perform assessments—from situation monitoring to crisis management. They can be found in use by public institutions and private entities to meet threats to human security (e.g. to detect assaults and burning of small villages in remote areas), and to support peace support operations (e.g. by monitoring refugee flows and the establishment and growth of refugee camps), emergency services (e.g. monitoring ground movements in support of earthquake disaster relief operations), surveillance and intelligence collection (e.g. on troop movements), environmental protection (monitoring deforestation), and national development.

Satellite-based earth observation and VHR images not only allow for site monitoring, object identification and other similar remote sensing tasks. The satellite images provide an unbiased physical measurement that depicts the situation on ground “as is”. This is particularly valuable for making various assessments in situations where other objective inputs may be closed for the world due to censorship, violence, or some other reason. Satellite-based earth observation and VHR images also involve some challenges. Acquisition of optical images is always weather-dependent. A cloudy rainy season will cause problems for continuous monitoring of an area. Moreover,

earth observation data provides a snapshot of what a crisis situation “looks like” at a specific time. The images present what has already happened, be it gradually increasing global climate change, deforestation or an erupting ethnic cleansing crisis. During the analysis it is therefore imperative that the interpreter is able to recognise the changes by analysing images over time in order to understand the course of the security threats.

## *the Pleiades System – Some Technical Aspects*

An example of a satellite system that provides VHR images is Pleiades. It is an optical satellite observation system with sub-metre resolution designed to offer a high acquisition capability with a daily revisit to any place on the globe. The Pleiades constellation today consists of two identical satellites equipped with sensors that can capture high-resolution (0.7m) black and white (panchromatic) images and four low-resolution (2.8m) colour images, one red, one green, one blue and one near-infrared (NIR). The precision of the geographic localisation of the acquired images is usually within 10m if no ground reference points are used. If ground points are available the localisation can be brought down to approximately 1m.

A number of standard products that enable and support a wide range of operative earth observation tasks are often produced from the raw images. The two most common standard products are a 50-cm resolution black and white image and a 50-cm “pansharpened” colour image (RGB). The latter is the result of fusing the raw high-resolution panchromatic image with the raw red, green and blue lower-resolution images. The pansharpened image contains both the high level of detail found in the black and white image and the colour information from the red, green and blue low-resolution images. It therefore provides an excellent basis for an analyst to detect detailed structures and make interpretations

based on colour using one and the same image. An example of a VHR pansharpened colour image from the Pleiades satellite system is shown in image 1.



**Image 1:** Part of a pansharpened colour image from the Pleiades satellite system showing logging and clear-cutting for the building of barracks for workers on the GERD dam in Ethiopia. The resolution of the image is 50 cm.

### 3D Terrain Data from Images

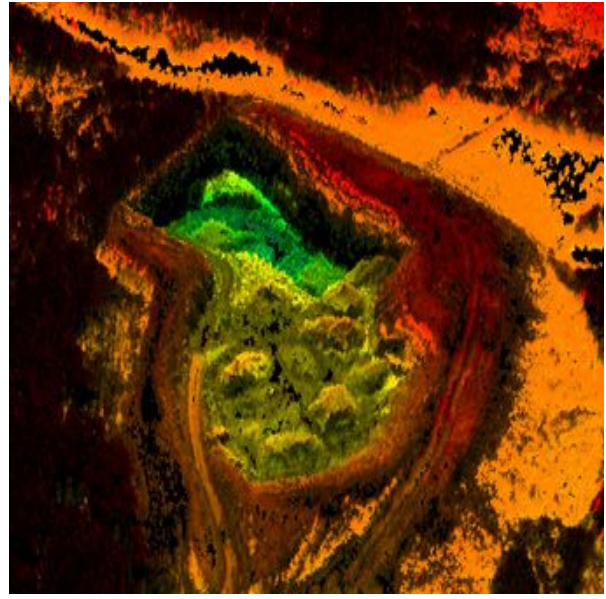
The Pleiades system also offers the possibility of stereoscopic imaging in terms of associated stereo pairs of images. These image pairs can be used to extract 3D information that describes the geometry of the terrain as well as objects on the terrain. The geometry information allows an analyst to directly obtain features such as the length, width and height of objects as well as distance and invisibility between points on the ground. If time series of stereoscopic images are available then the geometrical changes in the environment may also be detected and measured. This information can be used to measure and monitor ground movements, for example, to support disaster relief management in case of earthquakes or landslides. It may also support analyses and predictions for assessment of the potential risk of further movements. An example of extracted 3D information based on stereoscopic images is shown in Image 2 below.

### Increased Data Availability and Potential Operative Impact – a Swedish Perspective

To secure national access to VHR images Sweden is participating in the Pleiades satellite programme. Besides access to images, the participation also aims to support an increased operative use of VHR satellite images as well as the development of new applications. The Pleiades programme is led by France and is designed for both military and civil applications. Through this programme, Swedish public institutions have nearly free access to already captured VHR satellite images from any place around the globe (not only over Sweden). It is also possible to task (order) the satellites to acquire new and recent images should there be no suitable image already acquired.

The conditions for access to the Pleiades data are governed by a special agreement between the French space agency CNES (Centre National d'Etudes Spatiales) and the Swedish National Space Board, SNSB. According to this agreement SNSB has the right to use and allow further use of VHR satellite images from the Pleiades satellites under certain licence conditions: it can grant public institutions in Sweden permission to obtain and use data. The licence conditions allow for free use and the production of derivative products for internal institutional needs. The results obtained may also be distributed to other institutional users. All commercial activities are however prohibited.

At FOI access to Pleiades images has been exploited in the interdisciplinary project SÄKER. In this project FOI's expertise in security analysis, image processing and image interpretation has been put to work in an interdisciplinary case study to support the development of a framework for integrated security analysis. The conclusion is that satellite-based earth observation using the Pleiades VHR images provides an excellent opportunity for human security analysis and fits well in an integrated security analysis framework. There are of course other imaging satellite systems accessible for security research and crisis management besides Pleiades, but no other programme is streamlined to support their use at such a low cost for Swedish public entities.



**Image 2:** To the left: part of one of two VHR images in a stereoscopic image pair from the Pleiades satellite. The image shows a quarry. To the right: 3D terrain data derived using the stereoscopic image pair. The overlaid colours (from green to red) indicate the elevation of the terrain.

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# New Threats, Old Vulnerabilities? Mali and Comprehensive Security Dispatch no. 8 (10)

**Can extreme weather, climate change and variability explain the conflict in Mali? The need for integrated security analysis is growing. This brief is one of a series that explains the concept of integrated security as it has been developed by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency.**

## **The Conflict in Mali – Bringing New Dimensions to the Study of Conflict**

The history of conflict in Northern Mali can be traced back to the early twentieth century, when the semi-nomadic Tuareg people violently resisted French colonial occupation. Since Mali became independent in 1960 it has experienced four Tuareg rebellions, the most recent of which started in 2012. It has been argued that exposure to climatic stresses and scarcity of resources have led to conflicts between the pastoral Tuaregs and farmers. The effects of climate change and changes in climate variability added to the impact of environmental degradation, and of population and land-use pressure. The current conflict followed, and was concurrent with, a major drought in the Sahel. However, there are many different ways to analyze the conflict. Each conflict analysis will lead to its own conclusions and recommendations. A conventional security analysis set to analyze military capabilities among warring parties will inevitably suggest recommendations that address military capabilities, while a humanitarian security analysis, analyzing the role of fragile communities, will provide recommendations that look at ways to strengthen these. Such conflict analyses are tremendously vertical and “drainpipe” with little horizontal analysis and cross-disciplinary input, despite the complexity and interactions of many factors that pertain to the root causes of the conflict. But what if there were an integrated analysis of the Malian conflict that not only looked at conventional security reasons, but also added other crucial levels of analysis, including climate and environmental processes and their interconnections with human and societal dynamics in time and space? Adding to this, what would be the end recommendations if we were to make use of tools such as satellite images, and climate change and vulnerability assessments?

### *The multilayered nature of the conflict*

The crisis in Mali should be understood in terms of the multilayered nature of the conflict, which includes both internal and external actors. The actors are rooted on both

the global and local level and act on the basis of various sets of ideological affiliations, ethnic identities, interpersonal tension and networks. Add here that military and security assistance to the African continent has grown substantially in recent years, and Mali is currently poised to receive significant resources to strengthen its military power and control. There are therefore many reasons to argue that the conflict is to be understood in different terms and cannot only be regarded as jihadism, a “Tuareg problem”, or north vs south. The political and security concerns that have now reached a critical level according to regional and international actors are not new. To disentangle these relations, an analysis of the conflict needs to look deeper into root causes. It has been claimed that the root causes of the current Malian crisis include corrupt governance, growing criminality in the northern region as part of a Sahelian transnational phenomenon, armed Islamism and continuous social unrest between ethnic groups. But the role of climate variability, climate change impacts and environmental degradation and vulnerability issues also need to be analysed in the conflict context.

## **The Conventional Actor Analysis**

In January 2012 a Tuareg faction, the National Movement for the Liberation of Azawad (Mouvement National pour la Libération de l’Azawad, MNLA), sought increased autonomy for three regions of northern Mali: Gao, Timbuktu and Kidal. Simultaneously, an alliance between al-Qaeda in the Islamic Maghreb (AQIM), the Movement for Unity and Jihad in West Africa (Mouvement pour l’unicité et le jihad en Afrique de l’Ouest, MUJAO) and Ansar Eddine mounted a military offensive whose aim was to implement their interpretation of Sharia law. In March 2012 a coup d’état overthrew the Malian government, and these three groups gained control of northern Mali. Malian Interim President Dioncounda Traoré then requested military assistance from France, and Opération Serval was launched in January 2013 to regain control of the country. Six months later, the United Nations Security Council unanimously adopted Resolution 2100

which established the UN Multidimensional Integrated Stabilization Mission in Mali (MINUSMA). The European Union (EU) also initiated a training mission, EUTM Mali, in 2013, focusing on capacity building of the Malian Armed Forces and the Ministry of Defence. During late 2013 and early 2014, armed groups returned to areas previously evacuated during the French operation. However, the alliances and dynamics ruling the situation in northern Mali and the Sahel are fluid and allegiances change easily. A new jihadi group is Al Mourabitoun, which came into existence in late 2013 due to a merger between MUJAO and a former AQIM splinter group. As a consequence of the international military presence in northern Mali territorial control increased in 2014 and AQIM no longer occupy populated centres there. However, in 2015 a series of attacks targeting MINUSMA resulted in numerous casualties and Al Mourabitoun claimed responsibility for a terrorist attack in Bamako in March 2015. Al Qaida in the Islamic Maghreb and Al Mourabitoun, said they launched the attack together on Hotel Radisson Blu in Bamako in November when 20 people were killed.

### **Climatic, Environmental and Socio-economic Vulnerabilities**

The Sahel region has been subject to long-term socio-economic and environmental challenges. Factors influencing household vulnerability in Mali are primarily related to poverty, education, health, migration, gender inequality issues and environmental degradation. Livelihoods in Mali are closely tied to environmental conditions through agriculture, pastoralism and fishing. Hence large sections of the Malian population are highly vulnerable to climatic stresses such as recurring droughts and floods as well as land and water degradation.

Food insecurity is a major outcome of vulnerability in Mali. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA) estimated in 2012 that food insecurity affected more than sixteen million people within the Sahel region. It would be easy to conclude that a causal relationship exists whereby food insecurity is due to drought and the current situation is an example of a “climate change conflict”. But although climatic factors are important they are not the sole cause of food insecurity. The famine conditions in the Sahel during the droughts of the 1970s and 1980s should rather be seen in the context of maladaptive development policies and projects which ignored climate variability and increased social vulnerability to drought. Even today government institutions rarely address the climate and livelihood challenges experienced in underdeveloped and under-populated areas of the country.

Climatic variability and seasonality have led to the development of traditional coping strategies that to a great extent are characterised by migration and movement such as seasonal labour circulation, transhumance and the nomadic way of life. However, as the livelihoods of agriculturalists and settled populations are dependent on water resources, fertile land and grazing areas, relations between groups in the various communities have been characterised by a history of micro-conflicts between farmers and pastoralists, including disputes over land and resources, and political disputes. More recently, such disputes have also begun to include conflict over various types of trafficking, such as the smuggling of arms, drugs, alcohol and subsidised goods. The interconnectedness of vulnerable natural and human systems, and tensions brought about by extreme poverty and desperation, as well as the fragile nature of security and stability in Mali and the region, are thus important factors explaining why people are turning to violence and crime.

### *Does vulnerability to climate variability and change lead to conflicts and Tuareg rebellions?*

It has been argued that Mali is an example of conflicts attributed to climatic factors becoming manifest and the farmer–herder conflict may be related to climate change. However, some researchers claim that climate change and environmental stress in Mali are best seen as possible contributory factors to conflict. The severe droughts of the 1970s and 1980s had an impact on the Tuareg rebellion of the early 1990s, but complex historical and political factors and regional instability were more significant determinants of the insurgency in northern Mali than environmental stress. Long-standing conflicts such as the Tuareg rebellion are complex and highly political and are not readily explained by an environmental security narrative alone. Mali is vulnerable to climate change impacts and conflict situations.

### **Conclusion: Towards a Wider Understanding of Security and the Means to get there**

In recent decades the scholarly understanding of security has widened. There has been a substantial change of emphasis from national security which focuses on the survivability of the nation-state to human security. But rather than discriminating each other, the two approaches have come to adapt one another despite being fundamentally different.

The conflict in Mali could well be analysed through a conventional security analysis in which the centrality of the state is central to the focus. However, looking at the “state-vs-non-state actors” does little to help us understand the root



causes of the conflict and the means to resolve the existing grievances. There are good reasons to take a more holistic approach investigating the resilience of natural and human systems—an approach that brings into the analysis climate change factors, ecosystem analysis, livelihood assessments, urban-rural dimensions, migration patterns, access to water, food, education and health infrastructure, and gender relations. The vulnerabilities in Mali described here to a large extent fall within the common understanding of human security. However, despite these long-term socio-economic and environmental issues that have rendered the region vulnerable and insecure, it has arguably been the occupation of the northern Mali territory by Islamic insurgency groups which has acted as a tipping point for increased involvement by regional and international actors, as it reinforces the global threat of transnational terrorist groups gaining influence.

In sum then, an analytical integrated security approach would be applicable to encompass and understand the conflict and accomplish sustainable security. One step in the direction of widening the security discourse may be that the failed states concept is being replaced with the concept of fragility (state fragility), and more emphasis is being put on the human beings who are suffering in these states where vulnerability is becoming stressed. There are many different tools available to achieve this. By connecting technical assessment and monitoring tools like Pleiades (satellite images), environmental impact and vulnerability assessments, etc. with conventional armed conflict analysis. A deeper understanding could be gained and more sustainable recommendations be formulated.

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This brief was written by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency. It could be read as a stand-alone document but can also be read in the context of connected briefs on integrated security of which this particular topic is a cohesive part.

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# The Wider Security Implications of the Grand Ethiopian Renaissance Dam (GERD)

## Dispatch no. 9 (10)

**Most contemporary security challenges are neither agency- nor structurally-based, but somewhere in between. Although different elements of security analysis, such as human security, energy security, food security, water security, climate security and gender security, can be highlighted in isolation for analytical purposes they do often interact in a complex web of causes and effect. Thus, knowing how they interact with each other is pivotal in security studies in order to develop adequate decisions that can support durable policy measures. This brief discusses these challenges and needs using the Grand Ethiopian Renaissance dam as a case study.**

### The Grand Ethiopian Renaissance Dam

The Grand Ethiopian Renaissance Dam (GERD) is a major infrastructure project on the Blue Nile in the Benishangul-Gumuz region in north-western Ethiopia, a few miles upstream of the border with Sudan. The GERD<sup>1</sup> is of great interest to the regions of North, East and Central Africa as the river Nile poses a number of national security challenges, albeit different, for individual states. Egypt, for example, is totally dependent on the Nile for fresh water, irrigation and other agricultural purposes, and therefore tends to perceive the construction of the GERD as a major challenge to its national interests. The launch of the GERD project in 2011 was therefore greeted with political suspicion in Egypt, which was in the midst of a power struggle that had just toppled the Mubarak regime and left the country without a head of state.

The GERD brings to the surface the long history of water resource competition in the region. Most notably, unrestrained access to the Nile has been a vital component of the national security of all the Nile states (image 1).<sup>2</sup> GERD design specifications are a length of 1800 metres and a height of 170 metres, with a total volume of 10 million cubic metres. At 5250 MW, it will be the largest hydroelectric power plant in Africa and the tenth largest dam in the world. The electricity is intended for domestic Ethiopian consumption, as well as export to e.g. Yemen, Djibouti, Kenya, Sudan and Egypt. A new focus on

hydropower will give Ethiopia the opportunity to become the region's provider of electricity as well as diversify its economy, which is heavily dependent on agricultural exports.

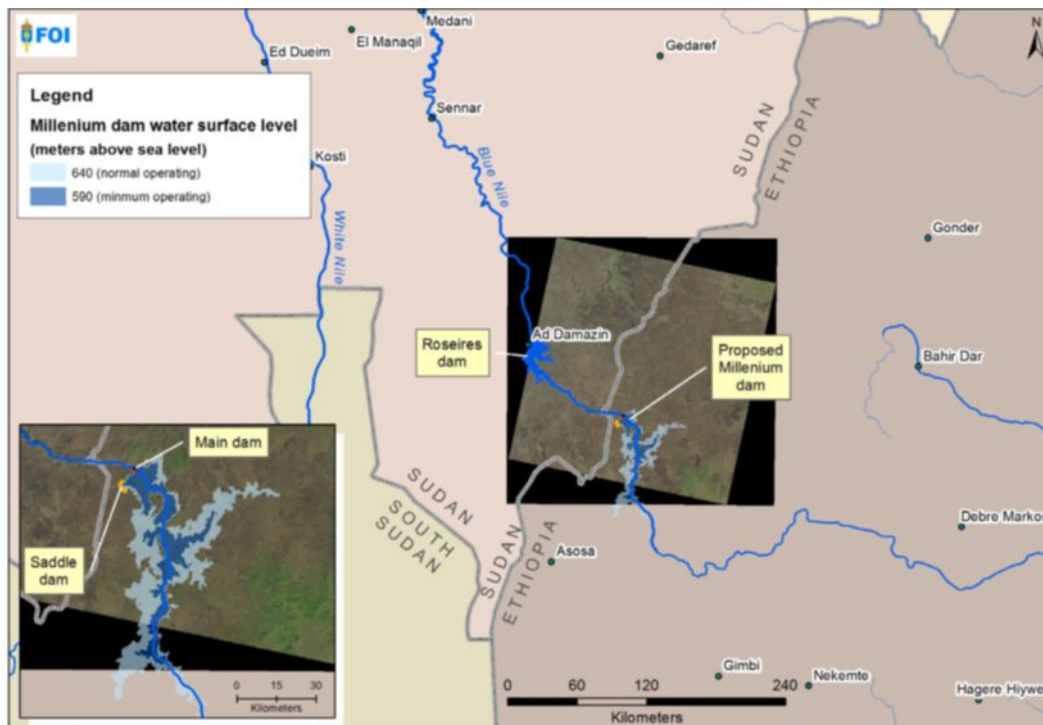


**Image 1:** The countries of the Nile river basin

<sup>1</sup> Formerly known as the Millennium Dam and sometimes as the Hidase Dam.

<sup>2</sup> The Nile flows through 11 countries: Tanzania, Uganda, Rwanda, Burundi, the Democratic Republic of Congo (DRC), Kenya, Ethiopia, Eritrea, South Sudan, Sudan and Egypt. The Nile has two main sources, the White Nile and the Blue Nile, which meet near Khartoum. The White Nile (the longer river) flows out of the Great Lakes of Rwanda and Burundi, through Tanzania, Lake Victoria, Uganda and South Sudan. The Blue Nile has its source in Lake Tanya, Ethiopia. Throughout its length, including the main arteries in Egypt, millions of people depend on its water for drinking and cooking, power generation, agriculture, fishing, transport and industrial processes, among many other things.





**Image 2:** Location of the GERD dam, in the Benishangul-Gumuz region of Ethiopia

### **e Political Implications of the GERD**

Notwithstanding the positive impact of the GERD, such as economic growth and increased electricity coverage and production, the main problem is that, just like any infrastructure project of this size, it impacts its surroundings. For one thing, Egypt and Sudan fear a temporary reduction in water flow while the GERD's catchment basin is being filled—a process that is expected to take five to seven years. They also fear a permanent reduction in the supply of water due to evaporation from the reservoir once it is complete. In addition, the construction of the GERD is tied up with a long history of water resource competition in the region. Most notably, access to the Nile is a vital component of the national security of all the Nile states. The construction of the GERD has indeed changed the security dynamics of the water regime in this part of Africa. For most of the states around the river the Nile is embedded as a strategic component of their foreign and defence policies. Several Nile river analysts agree that the social stability and economic prosperity of the Nile states depend on continuous access, both by households and by large-scale industries, to its waters. Any interference with the Nile waters could provoke political, economic and military retaliation from the countries in the region.

The GERD declaration, signed on March 23, 2015, seems to have eased some of the tensions surrounding the GERD. It

includes provisions on cooperation in regard to the water needs of Egypt and Sudan on one side, and Ethiopia on the other. It states an obligation not to cause any harm or damage to any of the signatories and also states that the aim of the GERD is just and fair use of Nile water as well as sustainable development and regional economic integration. By giving Egypt and Sudan priority access to the electricity generated by the dam, the project can be trust-building. Thereby, the three signatories need to openly exchange knowledge and information required by experts to evaluate the building of the dam as well as a commitment from Ethiopia to adhere to international safety measures while building the dam. Furthermore, a reiteration of equal state sovereignty for the three countries is made and a pledge to peaceful conflict resolution, should future issues arise during the construction process.

The declaration does not however include any specific technical guarantees of Egypt's rights to Nile water. Nor does it stipulate any commitment on the part of Ethiopia not to jeopardise Egypt's and Sudan's shares of Nile water following the completion of the dam. The declaration may therefore carry political messages more than anything else.

Egypt, like Sudan, would be heavily affected by any mismanagement of the Nile's waters. As a consequence, it has for many decades assumed a hegemonic role in controlling the Nile's water management. This role formed the basis of

post-colonial treaties, in which Egypt was granted superior legal rights over the Nile. The struggle for political power in Egypt and the volatile security situation along its borders, following the so-called Arab Spring of 2011–13, have proved particularly challenging for the leadership in Cairo. Each of these factors is also part of the context in which the construction of the GERD must be seen.

Indeed, a number of additional security challenges face Egypt's rulers. These are seldom included in the narrower security agenda, but are of equal importance to the national security of the state. Key factors in its long-term security posture include access to farmland, which is currently diminishing; strategic resources such as energy, of which Egypt is becoming a net importer; and access to fresh water, for which the Nile is the only source. In addition, Egypt faces the impacts of desertification, high rates of urbanisation, coastal erosion and salinisation.

In fact the whole region of the Nile river countries suffers from the impacts of climate change, environmental degradation, extreme weather events, food insecurity and local conflicts over scarce resources, to mention a few challenges. For example, the reports of the Intergovernmental Panel on Climate Change (IPCC) indicate that there are already sufficient data and insights on the potential challenges for Africa linked to increasing temperatures, changes in precipitation and extreme weather events to make the need to improve the robustness and accuracy of our understanding of the challenges facing the Nile states obvious. As far as is known, however, no comprehensive assessment of the environmental and socio-economic impact of the construction of the GERD has been conducted.

### **Human Security in the Benishangul-Gumuz Region**

According to the Human Development Index (HDI), Ethiopia is the fifteenth most disadvantaged country in the world out of 187. It is classified as a least developed country (LDC) and is heavily dependent on foreign aid. Maternal mortality is among the very highest in the world, and the probability of dying between birth and five years of age is 40 per 1,000 live births. Less than 40% of the rural population had access to improved water sources in 2011, and less than 20% had access to improved sanitation. In assessing the vulnerability of the area it is a challenge to find regional information since much relevant information is not geographically disaggregated. It is for instance important to bear in mind that average national statistics often hide the deprivations that exist between different regions, such as regional disparities in economic performance, human development, and the prevalence of poverty.

For instance, the overall HIV/AIDS situation in Ethiopia is quite heterogeneous with large variations among regions. In Beneshangul-Gumuz region the prevalence rate is 1.3% whereas in Addis Ababa it is 5.2%. The national prevalence rate for HIV/AIDS between adults aged 15 and 49 is 1.3%. HIV is more prevalent in urban areas and along major transport corridors. This may be associated with labour migration to large urban areas and large-scale construction projects, such as the GERD. Moreover, the prevalence of HIV is significantly higher among populations that reside within 5 km from a main asphalt road.

Livelihoods in the Benishangul-Gumuz region are closely tied to environmental conditions, mostly through crop and livestock production and to a somewhat lesser extent through fishing. Environmental stresses in the region are many and complex as they vary from year to year and from place to place. Some stresses correlate closely with natural variability and some are driven more directly by human activity. To successfully reduce vulnerability an integrated approach based on an understanding of this complexity is needed.

A substantial amount of land has been transferred to domestic and foreign investors by both regional and federal governments over the last few years. Neither the land use mapping nor the land transfer process has been based on participation by the local communities, and land transfers have resulted in not only the displacement of communities from their villages and cultivated lands, but also the destruction of the natural environment and local livelihoods. In particular, this affects the Gumuz ethnic groups who depend on customary forms of land access. Despite claims that the land investments will bring social, economic and environmental benefits to local communities, these anticipated benefits have not been seen so far and are unlikely to happen in the near future.

Mapping of groundwater availability during drought shows that the Benishangul-Gumuz region suffers more from groundwater scarcity than some other parts of Ethiopia. It is quite likely that tensions over water may exist at the local level, especially in times of drought. So far five water-related disputes in Ethiopia have been recorded in the Water Conflict Chronology, two of which involve the Benishangul-Gumuz region.

Climatic conditions can cause a range of problems, from local crises to large-scale disasters. Apart from extreme weather events, there are other times when people will be particularly vulnerable, such as the recurring periods of hunger and water shortages. Other environmental hazards, for example land degradation, are not caused directly by climatic variability but may be either aggravated or initiated by it.





## Leveraging Impact Assessments and Technologies when Assessing the Impact of the GERD

In order to find out as much information as possible regarding the current situation on the ground as well as predicting likely developments in the medium to long term, several “tools” exists than can support security assessments. At the communal level, vulnerability and food security assessments are regularly conducted, to mention just two.

In addition, as with any infrastructure projects, an environmental impact assessment (EIA) should be performed to identify, predict, evaluate and mitigate the biophysical, social, and other relevant effects. According to the International Panel of Experts (IPoE) on the GERD project, an environmental and social impact assessment (ESIA) of the GERD and an initial transboundary environmental impact assessment (ITEIA) were submitted to the IPoE in 2011 and 2012 respectively. The ESIA was considered adequate with respect to structure and content whereas the ITEIA, as the name implies, was judged equivalent to a scoping study in an SEA (strategic environmental assessment). However, some of the concerns regarding the construction of the dam raised by the IPoE’s review of the ESIA included downstream dissolved organic matter and sedimentation, loss of dissolved oxygen due to flooded vegetation and soil, and evaporation losses during the filling periods, as well as the stability of the dam (image 3 in Appendix 1). The ITEIA on the other hand was criticised for not including socio-economic impacts on the local communities downstream, not considering the water quality downstream from the GERD, and a lack of economic assessments from a regional perspective.

Dam building in general has a considerable impact on the social, cultural and economic structure of the region affected. Not seldom, people whose settlement areas and lands will end up under water are forced to migrate. Earth observation images can provide further information on the situation as they can be used to detect and assess even small, but significant, changes in a wider and complex course of events. Image 4a (in Appendix 1) displays a small village upstream from the GERD area prior to construction. Image 4b shows the same village and area after the start of construction and the impact from the various activities of the dam. Image 5 displays Perspective Google Earth view data of the GERD construction area with image data from the Pleiades satellite draped on top in order to allow continuous monitoring of the development of the dam.

### In Sum

As the above reasoning indicates, a more integrated security analysis than just addressing conventional “hard” security issues is warranted. While the GERD project has increased

the political and economic stakes in hard security terms, decision-makers as well as practitioners in the region face a number of additional, intricate security dilemmas that involve multiple short- and long-term factors. Hard security analysis typically neglects such factors and challenges as the negative impacts of climate change on the region, competition for energy and natural resources, demographic pressures and ethnic grievances. At both the national and the regional level, such challenges are generally treated in isolation. In addition to hard security factors, the potential impacts of climate change alone, for example, show the risk of ignoring the broader range of challenges that face the Nile states.

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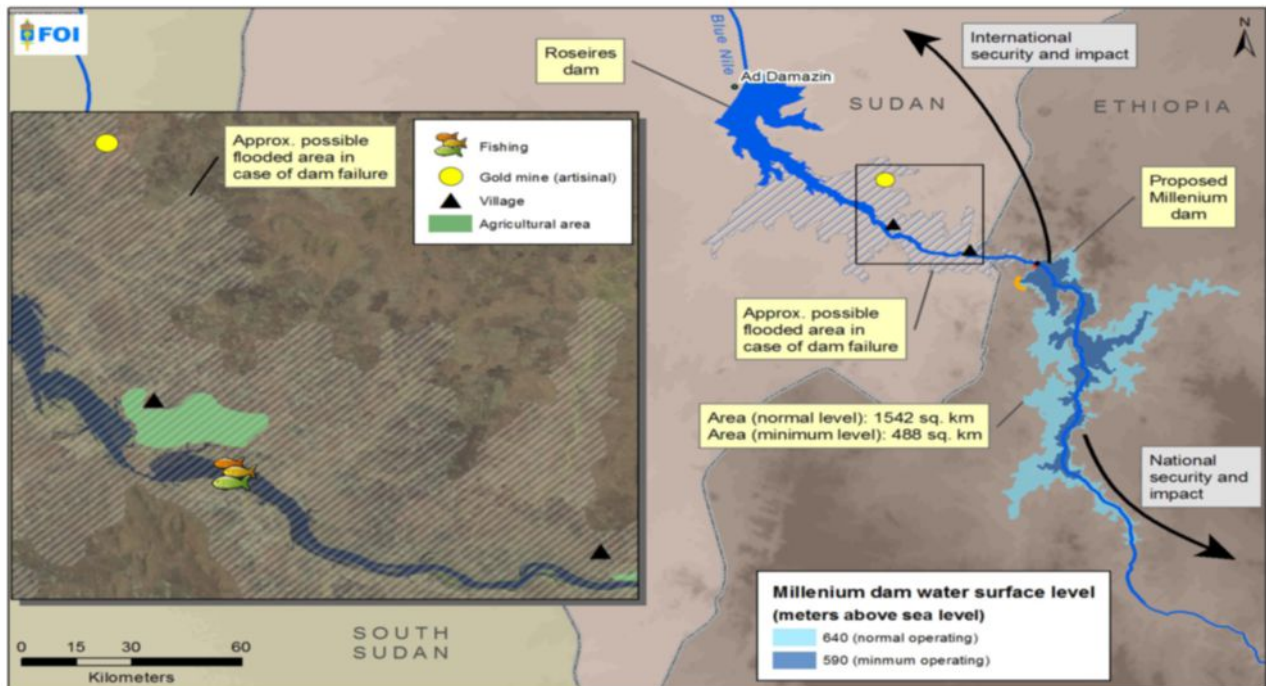
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## Appendix 1



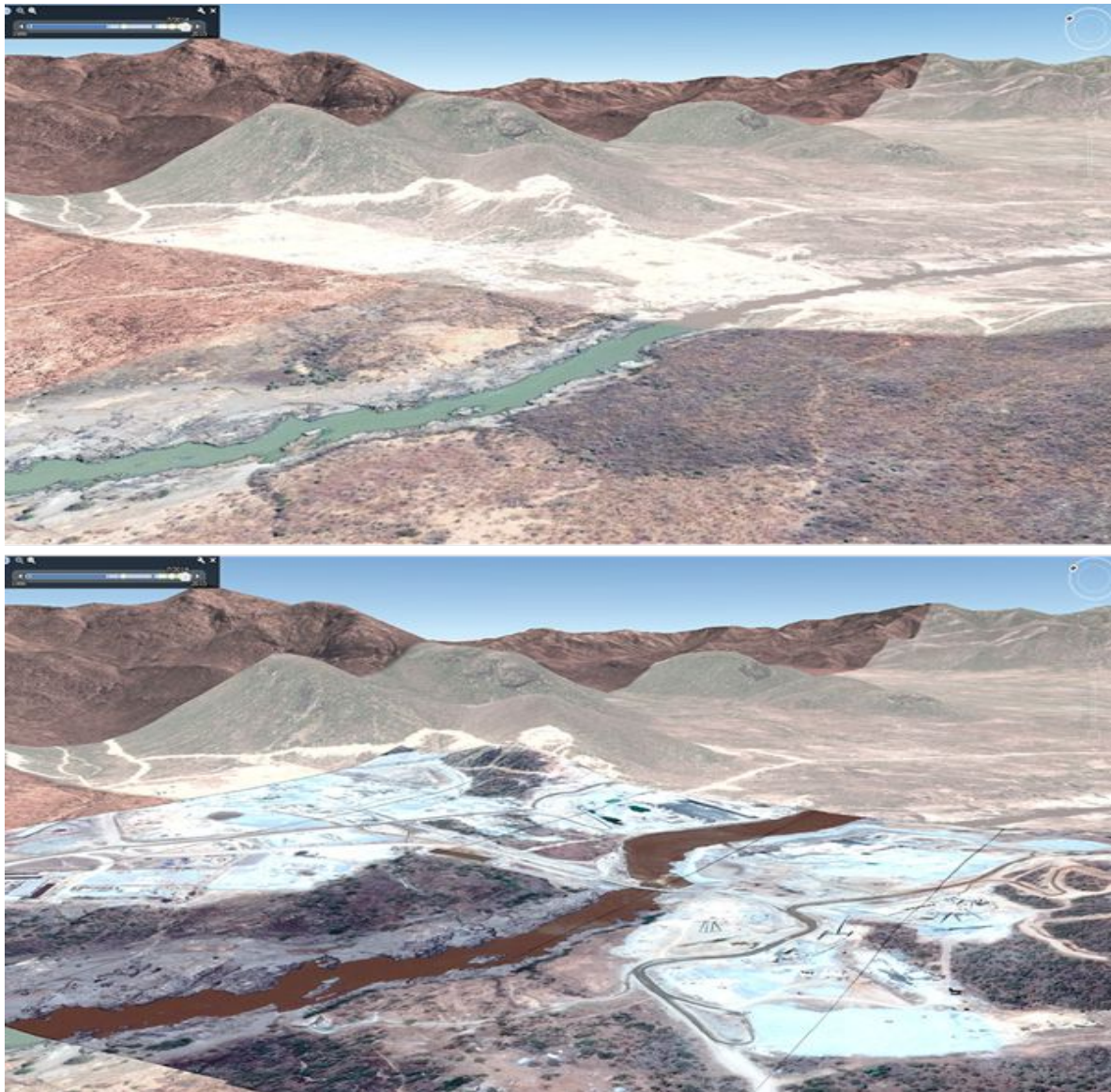
**Image 3:** Visualisation of the upstream and downstream impacts of the GERD



**Image 4a (left):** A small village 500 m upstream from the planned GERD dam construction area. Note the kitchen garden around the two green trees at the beach to the Blue Nile and several huts as pinpointed by the blue line. Date April 29, 2003. Image: Digital Globe.

**Figure 4b (right):** The same village and area on May 28, 2012 when construction work has started. Note that the huts (in the blue circle in the image above) are missing, and there is no other trace of the village's inhabitants. All the village agricultural areas are lying fallow and a dirt road has been established along the right-hand edge of the image. Image: Digital Globe.





**Image 5:** Perspective view of the GERD construction area looking north-east. Image data from the open and public Google Earth of date May 28, 2012 and older. Image data as in archive of June 2014. Note that only half of the dam area is covered with images recent enough to show the construction and moreover with low contrast. Image 5b (below): image data from the Pleiades satellite draped on top of the older data and ordered to cover the area at frequent and regular intervals (140425, 140520, 140605, 140718 and 140811) to allow continuous monitoring of the development of the dam. Note the much better image quality.

# Climate Change and Security Challenges

## Dispatch no. 10 (10)

**Will climate change contribute to conflicts in the future or is this already happening? Several researchers and practitioners alike are increasingly recognising the complex systemic risks of climate change and its impact on security. This brief is one of a series that explains the concept of integrated security, as it has been developed by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency. The main question dealt with here is how should we deal with the challenges posed by climate change from an integrated security perspective?**

### Climate Change and Security

The latest assessment by the Intergovernmental Panel on Climate Change (IPCC) from 2014 affirms that the impact of climate change on human well-being, peace and security is going to worsen, especially for the poorest. Many of the people most affected live in fragile states. Such communities are suffering not only from persistent poverty, poor infrastructure, weak natural resource governance or unsustainable resource management, and lack of access to the world market, but also from other types of societal insecurity such as the fragility of state institutions, political instability, and the effects of recent armed conflict or the threat of approaching violence.

However, climate change is full of uncertainty, not only in terms of shortcomings in the data and modelling, and the insecurities of probabilities of future socio-economic, emission, mitigation and adaptation scenarios, but also in terms of methodological challenges on how to understand its impact. As with other highly politicised debates, such uncertainty tends to breed unease, which in turn could result in a discourse and policies that just mirror sensationalist academic and media headlines.

What is certain, however, is that the risks posed by climate change are systemic. For example, in the near future, environmental degradation and population and economic growth are expected to significantly increase pressure on resources and immensely influence the food–water–energy nexus. Increasingly, national security and intelligence assessments conducted by numerous governments have recognised the potential for this convergence of trends to contribute to security risks.

While much data exists on the potential impact of climate variability and extreme weather on states and security in the short run, less data exists on the long-term impact. The IPCC (2014) found that: *“Much of the current literature on human security and climate change is informed by contemporary relationships and observation and hence is limited in analyzing the*

*human security implications of rapid or severe climate change.”*

In fact the security risks of climate change may be the hardest of all climate risks to assess, because they involve the longest chains of causation or influence, and the most unpredictable factors. The risks of climate change are non-linear. While average conditions may change gradually, the risks can increase rapidly. On a high emissions pathway, the probability of critical thresholds being crossed will increase over time. Exploring the relationship between natural resources, environmental conditions, climate change and variability is certainly challenging but contextualisation is key.

### Demonstrated Links

The IPCC Assessment Report 5 explores the relationship between climate change and selected dimensions of human security, including culture, migration and mobility, armed conflict, state integrity and geopolitical rivalry. *“Some of the factors that increase the risk of violent conflict within states are sensitive to climate change.”*

Explicit links between climate change and violent conflict is a rather new topic area although it draws on developed thinking in environmental security and other related academic fields. Different research approaches and perspectives all contribute to increase knowledge and awareness but can also be criticised as being too reductionist, simplistic or vague or missing out important issues.

An independent report for the G7 members lists seven compound climate-fragility risks that emerge when climate change interacts with other social, economic and environmental pressures, and these are in line with most published thinking. They are local resources competition; livelihood insecurity and migration; extreme weather events and disasters; volatile food prices and provision; transboundary water management; sea-level rise and coastal degradation; and unintended effects of climate policies. These compound risks are not isolated from each other. They interact in complex ways.

Thus available studies should be interpreted and used for policy and practice with attention to underlying perspective and approach. Complexity and context will always mark the interactions between climate change and security.

### **Ample Empirical Data**

There exist ample empirical data and case studies on the security impact of climate change, climate variability and extreme weather. For instance, one strand of research argues that climate change has already been influencing dynamics associated with human, sub-national, national and international security. Such research findings however do not generally attempt to identify precise causal relationships, but instead consider how climate change may have altered probabilities and interacted with other factors to increase the risks.

One recent highly visible case study suggests that the ongoing conflict in Syria has elements that can be explained in relation to climate change. Scholars have argued that developments in Syria could be linked to a desiccation trend over the last few decades in the Middle East, North Africa and the Mediterranean—a region where climate change is thought to have played a significant role in this trend. Specifically, the extreme drought in Syria in 2007–2011 resulted in severe and widespread crop failure and loss of livestock. This contributed to a mass internal displacement of farmers and herders who lost their entire livelihood. Many then fled to urban areas, which in turn caused another stress on the livelihood of people in those areas. By 2011, around 1 million were extremely food-insecure, and 2–3 million had been driven into extreme poverty. While many other factors were important in driving the political unrest and conflict that followed, it is highly probable, some scholars say, that this widespread impoverishment and large-scale displacement did play a role.

Another case is the Arab Spring as an example of a complex temporal and spatial interaction between heatwaves, food price spikes, and civil unrest. In the summer of 2010, Russia suffered an extreme heatwave, believed to be correlated with climate change. Its wheat production was reduced by more than 30% and related droughts also affected wheat harvests in Ukraine and China. The top nine wheat-importing countries in the world, on a per capita basis, are all in the Middle East and North Africa. Libya, Jordan, Algeria, Tunisia, Yemen, Egypt and Iraq spend between 35% and 45% of their average household income on food. All seven experienced political protests resulting in civilian deaths in 2011. Although these countries are considered as fragile, food prices are recognised to have been one of the factors that led to the unrest. In Egypt,

although urban protests primarily focused on other social and economic concerns, bread protests occurred in rural areas across the country in parallel to the events in Tahrir Square, and may have broadened the appeal of the revolution to rural communities. In highly import-dependent countries such as Egypt, the price of wheat rose by 300% in late 2010 and early 2011. While climate change and extreme weather did not cause any of these events on its own they appear to have played a role in combining with other stresses.

### **What Are the Trajectories?**

Climate change has the greatest impact on natural resource-dependent livelihoods. The resulting increase in competition over resources can lead to violent conflict. When combined with existing tensions, such stresses, in turn, could increase the likelihood of already existing sub-national insurgencies, ethnic clashes, urban unrest and the like surfacing. Similar risk trajectories can be extrapolated to water and habitable, grazing or agriculturally viable land.

High levels of unemployment, particularly among young men, and labour migration to urban areas, which have neither sufficient jobs nor infrastructure, are also widely agreed to be specific conflict drivers. Climate change and extreme weather could disproportionately affect the livelihoods of certain groups and then compound inequalities and fuel existing grievances. They could also degrade the livelihoods of the rural poor in remote and fragile areas with high levels of organised crime, making people more likely to engage in illegal activities.

A case in point is research findings suggesting that, in combination with other social, economic and political factors, drought in the Sahel can lead to disruption and changes to livelihoods which can increase the risk of conflict between livelihood groups. Similar evidence is observable across other contexts including in South Asia, Central Asia, and Latin America.

While many studies have considered the links between climate change and sub-national conflict, relatively few have taken on the question of climate-influenced interstate conflict. Those that have have tended to focus primarily on transboundary water resources, drawing on a long history of interdependencies and disputes. In general, there is little support for the hypothesis of “water wars”—the idea that scarcity necessarily leads to increased armed warfare between states. Although it can actually lead to more cooperation, there is evidence that water scarcity and variability can increase political tensions between states sharing a common water resource, especially if their relations are poor due to other reasons. However, most of the existing body of research relates to the current climate. The variability, scarcities, and (in



some cases) surpluses induced by climate change in a warmer world are likely to be much greater than any recorded in modern history, and could act as major destabilising factors at a range well beyond the ambit of existing studies of past resource-conflict events. Land and water could become tactical assets and/or perceived to be of national protection concern. This would increase the risk of terrorism as well as military interventions.

### *Migration, conflicts and climate change*

As resources become scarce and/or degraded the potential flows of “climate change refugees” are often brought up in popular discourse (frequently confused with migration). The logic mainly put forward is that greater scarcity of resources, loss of land due to a rise in sea level, and an increase in the frequency and intensity of extreme events lead resource-dependent people to migrate. Methodologically, it is very difficult, if not impossible, to isolate the different drivers and triggers of migration. Migration is a multi-causal phenomenon in which a range of factors are interrelated. There is, in fact, no conclusive evidence linking climate change-induced migration with conflict.

However, if climate-induced migration is put into context together with other factors, likely conflict scenarios could emerge. High degrees of climate change could increase the risks of state failure in countries that are economically underdeveloped, resource-stressed, or already unstable for other reasons. In South Asia, drought and flooding in Afghanistan and Pakistan, and incessant flooding and loss of land to the sea in Bangladesh, could put those countries’ governments under great stress, and precipitate large-scale migration into India. In India, this would combine with an internal population shift from rural to urban areas, further increasing demographic pressure in cities, many of the largest being coastal and increasingly vulnerable to flooding both from sea level rise and from more intense rainfall.

Despite the lack of evidence, the linkage between climate change and migration has been adopted by several high-profile individuals to illustrate the wider challenges linked to climate change and conflict. For example, UN Secretary-General Ban Ki-moon put a focus on environmentally-induced migration as a pathway for conflict during the July 2011 debate on climate change and security in the UN Security Council. This is mentioned as one example of the “securitisation” of climate change.

Although simple demonstrated links are lacking, climate change has the potential to contribute to stresses on individuals and societies that could lead to security risks under certain circumstances.

### **Climate Change – a Threat Multiplier**

Climate change hinders the ability of governments to provide infrastructure, basic services and social safety nets, weakening the social contract, which leads to greater insecurity and unrest, especially in weak governance environments. It should be emphasised that even states that are otherwise stable may endure periods of fragility or harbour pockets of fragility. Climate change is thus commonly best understood as an trigger in places where some drivers of conflict already exist, putting additional strain on already stressed governments. Climate change is therefore often described as a “threat multiplier” as it will aggravate already fragile situations and may contribute to social upheaval and violent conflict.

### **Implications of the Security Discourse**

Climate change and its impacts will affect socio-economic, urban and rural, ethnic and cultural groups differently, affecting the poor and marginalised worst. In places affected by fragility and conflict people face especially challenging obstacles to successful adaptation.

There are knowledge gaps in our understanding of how the climate–conflict–environment nexus relates to vulnerabilities. Understanding vulnerability is critical in fragile situations characterised by uncertainty and a constant state of fluctuation; and, beyond evaluating current vulnerability, what does future vulnerability look like? There is a risk that the human security needs of the most vulnerable could be undermined if a security approach is practised.

However, attaching a security label to climate change has had certain advantages. It gives the state or government power to mobilise political and financial resources to address it. What form that action should take is already being discussed in many forums, such as the annual UN climate negotiations. Bypassing these discussions to bring about enforceable action through the UN Security Council would leave many of the most climate-vulnerable countries, which are not members of the council, out of the decision-making process. Deciding action based on the engagement of a limited pool of security institutions risks sidelining or missing out issues such as adaptation, mitigation, development, economic growth, equity, justice and resilience, which do not generally figure as main priorities on the security agenda but which are integral to addressing climate change.

Climate change will probably exacerbate humanitarian crises over the coming decades. However, to what extent the international community will have the capability and willingness to respond to these crises in the future is uncertain. Multiple pressures could contribute to a shift towards nationalism, and away from values associated with human rights, democracy, and cooperative global governance. Thus



there could be a gradual shift from a human security emphasis to a focus on national or military security.

If we recognise the link between climate change and security then naturally both civil and military actors are stakeholders with responsibilities to act in order to prevent crises and conflicts. However, it is important to be aware of the implications this may have for policy and practice.

### **Tools to Address Climate Change and Conflict Risks**

The compilation of “hotspot” and “coldspot” mappings (maps depicting different levels of vulnerability and the threat of climate-induced conflict), using a composite index of at-risk countries, is quite common. While useful on a generalised level, such mapping fails to represent the role of borders in conflicts, generalises entire regions in the same category or level of “threat risk”, and often fails to explain intermediary factors which affect the likelihood of armed or violent conflict, oversimplifying the complexity and the context.

Suggested ways to improve policy and practice on the climate–conflict linkages include incorporating climate change risk in multi-hazard risk assessments and analysis of peace and stability; and the application of conflict sensitivity and “Do No Harm” approaches to disasters and climate programming.

Evidence points to the need to adopt approaches that capture the interrelationship between risks, vulnerabilities and resilience, and to increase cooperation between humanitarian, civil and military actors.

However, most tools and approaches tend to focus within the comfort of their disciplinary boundaries. For example, thinking about disaster risk reduction and climate change adaptation is expanding to look at a range of risks, i.e. disaster- and climate-related, but rarely expands to include conflict. Joint risk assessment tools are widespread, but of sixty-six widely used tools relating to climate change, natural resources and conflict, only two explicitly address the three linked risks together. Climate risk assessment tools tend to be rooted in scenario-based approaches that follow a fairly linear progression from climate predictions to an impact to a set of consequences. This approach serves well in narrowly defined, model-based studies, but does little to help in understanding climate impact in difficult environments.

Finally, to support decision-making and practical considerations better, technical assessment could be connected to monitoring tools like Pleiades (satellite images), strategic, environmental impact and vulnerability assessments, etc. with conventional armed conflict analysis.

### **Further Reading**

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This brief was written by an interdisciplinary team of scientists at FOI, the Swedish Defence Research Agency. It could be read as a stand-alone document but can also be read in the context of connected briefs on integrated security of which this particular topic is a cohesive part.

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For further information on related activities of this project please consult [www.foi.se](http://www.foi.se).