E3G

# Degrees of Risk

## Defining a Risk Management Framework for Climate Security

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## About E3G

E3G is an independent, non-profit organization operating in the public interest to accelerate the global transition to sustainable development. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere. More information is available at www.e3g.org.


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# Acknowledgements

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*The opinions expressed in this publication are the responsibility of the authors and do not necessarily reflect the position or view of E3G.*

# Executive Summary

*"What we need is enough mitigation to avoid unmanageable climate change and enough adaptation to manage unavoidable climate change."*
John Holdren, US Presidential Science Advisor[1]

## Climate security threats are not being managed effectively

There is a growing consensus in the security community that climate change presents significant risks to the delivery of national, regional and global security goals. Through sea level rise, shortages of food and water and severe weather events, climate change will have significant impacts on all countries, which in turn could affect their social stability and economic security. In the coming decades such impacts will increase the likelihood of conflict in fragile countries and regions. Peaceful management of even moderate climatic changes will require investment in increased resilience in national and international security and governance systems.

Security analysis has mainly examined the implications of climate change over the coming two decades. These are largely unavoidable under all plausible greenhouse gas emissions reduction scenarios, given the inertia in energy infrastructure and the global climate system. However, if immediate action is not taken to reduce the steady rise in global emissions, there will be a rapid increase in the risk of far more severe impacts, resulting in security challenges that are much more significant than current estimates indicate.

But climate change is not currently well-managed. Agreements at the most recent UN climate negotiations in Cancun in 2010 included a goal of limiting climate change to, at most, a 2°C average global temperature rise. However, the emissions reductions pledged by countries at the same conference would actually result in a 50 percent chance of global temperatures rising by 3-4°C. Fragile areas such as Southern Africa could experience 50 percent more warming than the global rate. If countries failed to deliver on their emissions pledges, or if we have underestimated climate sensitivity, increases of up to 7°C are also possible. But the risks are not symmetrical. There is a 'long tail' on the probability distribution which makes more severe outcomes much more likely than more benign ones. In addition, above 3°C of warming the probability of breaching thresholds for "tipping elements" in the climate system rises sharply. For example, events such as a major die-back of the Amazon rain forest or release of methane from the Arctic tundra would further increase global warming levels.

**The implications of current security analysis are clear: unless climate change is limited to levels where its impacts can be managed effectively, and unless successful adaptation**

1 Holdren, 2010

**programs are implemented, there will be major threats to national and international security.**

Current responses to climate change are failing to manage effectively the full range of climate security risks. There is a mismatch between the analysis of the severity of climate security threats and the political, diplomatic, policy and financial effort countries expend to avoid the attendant risks.

**The question arises: If the security threat from climate change was analyzed as rigorously as nuclear proliferation, what would an appropriate risk management strategy to deliver climate security look like?**

### Countries need a comprehensive risk management approach to climate change

Countries are failing to tackle risk effectively because they are not considering the full range of potential scenarios. There are multiple levels of uncertainty involved in addressing and planning for climate change. This includes fundamental questions such as how much average global temperatures will rise, what the impact of more rapid regional climate change will be, and how effective countries will be in agreeing to and implementing adaptation and emissions reduction plans? However, debates on these issues are often over-simplified and uncertainty is often taken as an excuse for inaction.

Uncertainty *per se* cannot be a barrier to action. Uncertainty doesn't mean we know nothing, just that we do not know precisely what the future may hold. Public policy decisions (ranging from military procurement, to interest rates, to financial system regulation) are taken under higher levels of uncertainty than exists over climate change science, impacts or policy choices. In fact the range of uncertainty in climate change is generally smaller than that common in long-term security analysis.

In the face of a serious security threat, and partial information, this report proposes taking some hard won lessons from the security community and adopting a rigorous risk management approach. Absolutes are a rarity in national security and decisions are generally a matter of managing and balancing various forms of risk. Security specialists must balance long-term versus short-term risks. They must make decisions with incomplete information and models that predict divergent outcomes. This approach has underpinned the management of other global security threats, from the Cold War, to nuclear proliferation, to international terrorism.

Risk management endeavors to reduce both the probability of a bad outcome and the potential severity of its consequences. Good risk management requires us to account rigorously for the full range of possible outcomes and understand the deficiencies of our institutional systems in dealing with them. Critically, it requires objective and independent monitoring of the effectiveness of the risk management policies in practice, and updating and revising them as situations change.

Risk management is both an art and a science. It depends on using the best data possible, but also being aware of what we do not know and cannot know. It takes into account the biases in our data and in the way we analyze and use it. It requires complex, and often unquantifiable, trade-offs between different strategies to prevent, reduce and respond to risks. It is both long-term and reactive.

In managing conventional security risks both policy makers and the general public accept that uncertainty is no excuse for inaction. Indeed, it is hard to imagine a politician trying to argue that counter-terrorism measures were unnecessary because the threat of attack was uncertain. But, precisely this argument is often used by opponents of action on climate change to argue against even small measures to mitigate the threat, or build resilience to impacts.

### The benefits of a risk management approach

Risk management is a practical process that provides a basis for decision makers to compare different policy choices. It considers the likely human and financial costs and benefits of investing in prevention, adaptation and contingency planning responses. Some risks it is not cost effective to try and reduce, just as there are some potential impacts to which we cannot feasibly adapt to while retaining current levels of development and security.

Risk management approaches do not claim to provide absolute answers but depend on the values, interests and perceptions of specific decision makers. Risk management is as much about who manages a risk as it is about the scientific measurement of a risk itself. The Maldives will have a different risk management strategy to Russia; Indian farmers will see the balance of climate risks differently from the Indian steel industry.

Legitimate differences in risk management strategies will form much of the on-going substance of climate change politics. All societies continually run public debates on similar existential issues: the balance of nuclear deterrence vs. disarmament, civil liberties vs. anti-terrorism legislation, international intervention vs. isolationism. Decisions are constantly made even when significant differences remain over the right balance of action. Political leadership has always been a pre-requisite in the pursuit of national security. We should expect the politics of climate change to follow similar patterns.

Implementing an explicit risk management approach is not a panacea that can eliminate the politics of climate change, either within or between countries. However, it does provide a way to frame these debates around a careful consideration of all the available information, and in a way that helps create greater understanding between different actors.

It has often taken a decade or more of intense debate for robust risk management strategies to emerge to tackle existing national security issues. We do not have the luxury of such time in the case of climate change. Every day we fail to act, the risk becomes incrementally and irreversibly higher. Like the hands of a clock, the risks of climate change can only move

forward. The only way to decide what level of risk we want to take, and hence the point at which we need to stop the clock, is to have a frank debate on the full consequences of action and inaction.

### A Three-Tier "ABC" Framework

A responsible risk management strategy will aim to reliably achieve a specific objective to limit the overall level of global climate change. It must also include effective adaptation policies and contingency plans which are capable of responding to the full range of possible higher risk scenarios which could result from a failure of mitigation plans and/or the eventuality that climate sensitivity turns out to be at the upper end of current estimates. A prudent risk-management approach should be built on the following three-tier framework:

- Aim to stay below 2°C (3.6°F) of warming
- Build and budget assuming 3-4°C (5.4-7.2°F) of warming
- Contingency plan for 5-7°C (9-12.6°F) of warming

The temperature goals in this framework are not presented as some form of 'optimal' target. Rather they reflect where the majority view of the global political and scientific actors appears to be at this time. Some would argue for tighter mitigation targets and lower adaptation thresholds; others for looser mitigation targets and more emphasis on contingency planning. As countries begin to construct and budget for real national plans and budgets associated with adaptation to various warming trajectories, consensus may emerge to aim at lower emissions trajectories. The UN climate change treaty will review, and potentially revise, its current goal of limiting climate change to below 2°C by 2015.

### Ten Recommendations for Launching a Risk Management Approach

Each country will need to develop its own risk management approach, based on the framework above and detailed analysis of national vulnerabilities and interests. However, there are some common areas that are essential to building an overall strategy. *Degrees of Risk* advocates ten key steps toward a comprehensive risk management approach to climate change.

| | |
|---|---|
| **Aim to stay below 2°C** | Sufficient mitigation goals |
| | Increased investment in transformational RD&D |
| | Resilient and flexible global climate regime |
| | Independent progress and risk assessment |
| **Build and budget for 3-4°C** | Adaptation strategies include 'perfect storms' and interdependent impacts |
| | Improved cooperation on preventive and humanitarian intervention |
| | Increased resilience of international resource management frameworks |
| | Provision of data and tools that decision makers need |
| **Contingency plan for 5-7°C** | Contingency 'crash mitigation' planning |
| | Systematic monitoring of tipping points |



## Aim to stay below 2°C

### 1) Sufficient mitigation goals

The most certain way to mitigate security risks associated with climate change is to limit the severity of impacts by lowering the amount of warming. Aggressive mitigation towards lower greenhouse gas concentration targets reduces the probability of extreme outcomes rapidly, and so is a particularly effective hedging strategy against the highest risk scenarios.

The negotiations between Heads of Government at Copenhagen in 2009 suggested that many major countries do not yet have clear and settled view on the global mitigation goal they believe needs to be achieved; despite their agreement on paper to a 2°C goal. There is also little evidence that countries have analyzed the impact of different mitigation scenarios on their core national interests. However, only explicit and detailed national goals can lay the foundation for effective global action to mitigate climate change. Countries must explicitly identify the level of climate risk they consider acceptable, based on assessment of national and international impacts and the risk of extreme scenarios, and act accordingly.

### 2) Increase investment in transformational technology R&D

Limiting average global temperature increases to below 2°C will require rapidly accelerated innovation and diffusion of clean energy technologies in both developed and developing countries. In addition, higher levels of cooperative investment in RD&D in low carbon energy technologies and solutions would hedge against the risks of under-delivery in key mitigation areas such as energy efficiency and preventing deforestation.

Current national and international innovation programs are not sufficient to effectively manage the risk of policy failure or higher ranges of climate sensitivity. Public sector energy research, development and demonstration (RD&D) in major economies has fallen by up to half over the last 25 years. Nations should look to increase their clean energy RD&D spending by five times by 2020. In addition, they should designate a share – at least 10-20 percent – of increased RD&D spending to cooperative activity with developing countries and develop a range of international cooperation mechanisms to accelerate the development and diffusion of mitigation and adaptation technologies.

**3) Resilient and flexible global climate regime**

As in arms control, the principle of "trust and verify" is a good foundation for control of greenhouse gas emissions. But if it is not possible to determine whether a nation knowingly missed a target or made a good-faith effort but failed, there is a high potential for misunderstanding and mistrust.

The emerging global climate regime must include the creation of strong rules for reporting, and should promote a high level of transparency. This allows for early identification of problems, and helps outsiders distinguish between intentional freeloading and honest imperfections.

A global climate regime must also provide contingency options that will allow the system to make up for missed reductions.

Reducing global greenhouse gas emissions to safe levels is a marathon, not a sprint. Countries must establish resilient and flexible regimes at national and international levels to avoid failures in the future.

**4) Independent national climate security risk assessment**

Each country must commission an independent assessment of its progress towards defined goals by an institution outside the usual policymaking chain. A failure to separate policy development and assessment risks biasing the results to justify the initial policy assumptions. Such separation is widely used in other areas of security policy, such as weapons proliferation assessments.

All countries should commit to explicit independent assessments of the effectiveness of national and international polices in achieving strategic climate security outcomes, and critical climate security risks to a country's interests. In addition, explicit processes need to be in place to ensure that objective assessment of threats actually reach senior policymakers and the public. The United Kingdom's independent Committee on Climate Change is one example of a new institution performing part of this role.

## Build and budget for 3-4°C

**5) Adaptation strategies for "perfect storms" and interdependent impacts**

Some impacts of climate change are unavoidable, due to warming *already in the system* from current atmospheric greenhouse gas concentrations. Comprehensive planning for adaptation to expected changes is needed.

A risk management approach to adaptation should include:

- Clear identification of the planning scenarios being used (for example, 2, 3, 4°C or higher)
- Significant investment in measures to increase community and ecosystem resilience to coming changes, and
- Proactive design of adaptation measures to reduce potential for conflict over increasingly scarce resources.

Adaptation planning must not be merely a technical exercise. It must take into account the broader political, economic and social impacts of both climate change and adaptation measures in order to avoid exacerbating rather than reducing the costs of climate change.

When considering adaptation strategies in countries with weak governance structures it is essential to remember that poorly designed adaptation can increase potential for conflict. Adaptation measures can play into local power structures as access to resources can be used to wield power over community members or neighbors, and resource access points, such as wells, can become targets in conflict.

**6) Improved cooperation on preventive and humanitarian intervention**

The effects of climate change will require larger and more frequent humanitarian and preventive missions by the international community and regional organizations. These will require better coordination, higher levels of civilian capability, and greater investment in preventive approaches to natural disasters.

For example, groups of countries should develop joint regional scenarios based on warming of 3-4°C and use these to drive the development of shared contingency plans and enhanced response capability.

**7) Increased resilience of international resource management frameworks**

In many cases, society has successfully used legal agreements to reduce conflict over vital resources. Looking ahead, peaceful resolution of resource tensions created by climate change

will necessitate updating international management efforts in order to preserve a rule-based global order. These changes could include reforming resource-sharing mechanisms, enhancing international arbitration, and improving scientific cooperation.

The time to strengthen international mechanisms to reduce resource conflict is now, when the impacts of climate change are still at relatively low levels. Failure to actively improve resource management regimes may make them ineffective reconcilers in the future, giving rise to intensification of conflicts and fostering power-based approaches. It may also create climate-related backlash where countries resort to unilateral actions such as retaliatory trade actions, escalating tensions at the international level. This will require action to reform a wide range of international, regional and bilateral agreements.

**8) Providing the data and tools that decision-makers need**

Specific information gaps – particularly in the likely response of social and economic systems to climate change – are a significant source of uncertainty in managing strategic security risks, including climate risk. As with other security challenges, straightforward investment in identifying and addressing gaps in our knowledge base will help to narrow the range of scenarios that must be addressed in order to adequately manage risk. More focused risk management requires projections that provide actionable information on relevant social and landscape scales.

The IPCC (Intergovernmental Panel on Climate Change) process and other climate-related data collection, analysis and out-year projections rely heavily on academic funding mechanisms and typically adopt conventions and modes of description tailored to the academic community. So it is not surprising that climate data and analyses based on such data are often expressed in ways that, while well suited to academic publications, are not focused on providing informational and analytical support to policymakers and the complex and difficult decisions they face. Decision makers must make clear the data they need for decision support, and researchers and relevant experts need to focus on responding to those needs.

Solutions include:

- Reinterpreting existing data to reflect the time and geographic scales security analysts, planners, and policymakers need.

- Developing new data that incorporates specific characteristics of vulnerable communities and helps determine fragility or resilience in the face of anticipated impacts.

- Providing detailed bottom up monitoring of data identified as relevant to environment, resource and conflict interactions in vulnerable areas and countries.

- Creating well-designed and adequately resourced feedback loops to effectively incorporate new data and advancements in scientific understanding and support continual refinement

and validation of analyses, impact projections, and effective response mechanisms.

Additional information is necessary but not sufficient. Analysts need new tools to use this information to provide compelling investment cases for priority preventive actions – especially given current financial constraints.

## Contingency plan for 5-7°C

### 9) Contingency "crash mitigation" planning

A growing body of evidence suggests that vulnerability to catastrophic climate impacts might be higher than expected. As it is not possible to adapt to some of the worst-case scenarios, it is vital to maintain a capability to implement a crash mitigation program should they occur. Examples might include geo-engineering of mechanisms to either absorb carbon dioxide or reflect heat away from Earth's surface, rapid diffusion of nuclear technology, and rapid deployment of clean energy technologies. However nations choose to implement a crash program, one thing is clear, a crash approach, which necessitates precipitous changes in emissions and infrastructure, will be much more economically disruptive than a proactive approach which can be phased in over a longer time horizon.

Some crash mitigation approaches could create additional security problems in their own right, for example leading to nuclear proliferation or low-oxygen 'dead zones' that undermine fisheries. And for any of these strategies, an approach driven solely by one nation's desires to protect itself could create a more challenging security environment for others in the region.

Countries should agree to a management framework for potential contingency programs now, or risk serious side effects of panicked responses to extreme climatic events in the future.

### 10) Systematic monitoring of climate tipping points

Many assume that climate change will be a slow, linear process toward a moderately warmer future. But scientists agree there are likely to be elements of the climate system that function like light switches – rapidly changing to a qualitatively different state. Scientists believe such 'tipping elements' include the dieback of the Amazon and Northern Hemisphere boreal forests, for the West African and Indian monsoon systems, and for melting of Arctic sea ice and the Greenland ice sheet. Any one of these changes would have dire and widespread consequences, but at present there is little systematic monitoring of such critical elements of the climate system.

There is an urgent need for a comprehensive, long-lived monitoring system that integrates Earth and socioeconomic observations and prioritizes issues of highest potential threat. The current IPCC system relies heavily on existing academic funding systems, which probably cannot provide the support or coordination necessary for such a comprehensive approach.

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