

Draft policy brief for Planetary Security working group on Water Security (WG 6).

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Policy brief

Climate, water and conflict: future changes require rethinking their interrelationship

W. Ligtoet, J. Knoop, S. de Bruin, D. van Vuuren, H. Visser (all PBL), K. Meijer, R. Dahm (Deltares)

Summary:

The world is facing unprecedented developments with respect to population growth, further economic development and increasing environmental stress due to climate change. These developments are projected to lead to increased stress on and disputes over available resources. Water is one of the key resources. The effects of weather extremes and slow-onset changes in water availability will affect water-related security issues. This will most certainly threaten human security in many locations all over the world, but it is far less certain if, and if so how, it also implies increased risks to political security.

The transition to a low-carbon energy system may also aggravate water stress, and this factor continues to receive attention. The increased use of hydropower may not only involve an increase in involuntary displacements, but also lead to shifts in political balances in transboundary river systems. The increased production of biomass for energy production may compete with local food production for land and water, impacting local food security and, potentially, people's livelihoods. These changing conditions necessitate further consideration of the relationship between the management of water, climate change policies (both adaptation and mitigation), human security and political or violent conflict.

Increasing importance of water

Water management is a contentious issue in many parts of the world and often has the potential to spark tensions at a scale ranging from local up to international river basins, with a wide range of actors involved and with the production of food and energy as major issues. Acknowledging the complexity of the interaction between the physical environment and human and political security, this policy brief focuses on their interaction under the uncertainty of climate change (Figure 1).

The numbers of people affected by climate- and water-related disasters are significant: between 1980 and 2015, there were 40,000 fatalities (on average) each year as a direct result of weather-related disasters; in the same time period, almost 200 million people were affected in other ways.¹ In comparison, violent conflicts resulted in an average estimated 80,000 fatalities per year in the period 1989-2015.²

Munich Re reported more than 1000 natural disasters worldwide in 2015 – most of them water-related (Figure 2A). Figure 2B shows water-related conflicts, ranging from tensions and riots to armed conflict, are geographically less widespread than water-related natural disasters and are fewer in number, with 119 conflicts over the 1945–2016 period.³

It is expected that water stress will increase in the future: 1.6 billion people already live in countries prone to water scarcity and, in the next two decades, this number could rise to over 3 billion. First of all, population growth implies more people will be living in flood-prone or water-scarce areas and, in combination with economic development, the demand for water will increase. Secondly, it is expected that, as part of global warming, precipitation patterns and the distribution and types of extreme weather events will change. As a result, flood risk and water stress may increase in large parts of the world.^{4, 5}

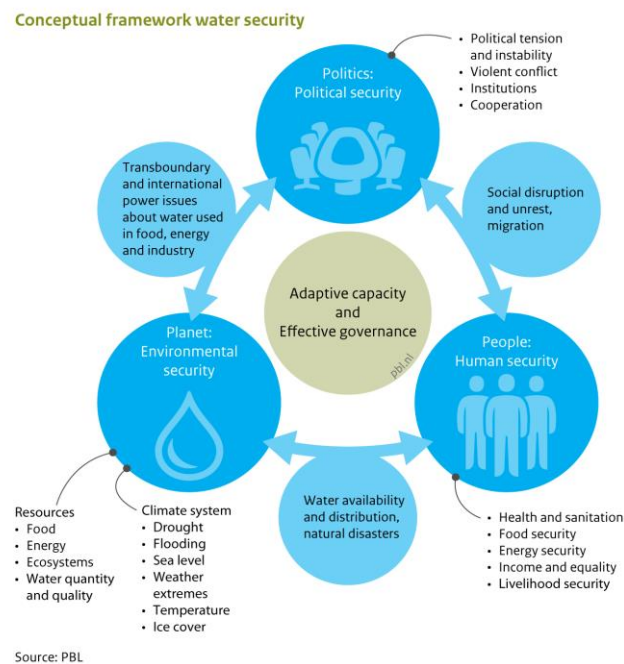


Figure 1 The interaction between the physical environment and human and political security is complex and context sensitive. In this policy brief we focus on the interaction between climate, water and human security and political security. The main climate and water aspects affecting human security are water availability and natural disasters. (inter)national competition for water used for hydropower, irrigation, and industries affect political security.

¹ Centre for Research on the Epidemiology of Disasters (CRED), "Emergency Events Database (EM-DAT)," (2016).

² Erik Melander, Therése Pettersson, and Lotta Themnér, "Organized violence, 1989-2015," *Journal of Peace Research* 53, no. 5 (2016).

³"A New Climate for Peace: taking action on climate and fragility risks," ed. Commissioned by the G7 members (2015).

World Meteorological Organization, "The Global Climate in 2011-2015," in *Weather Climate Water* (Geneva 2016). B.E. Jiménez Cisneros et al., "Freshwater resources," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2014).

Natural disasters worldwide, 2015

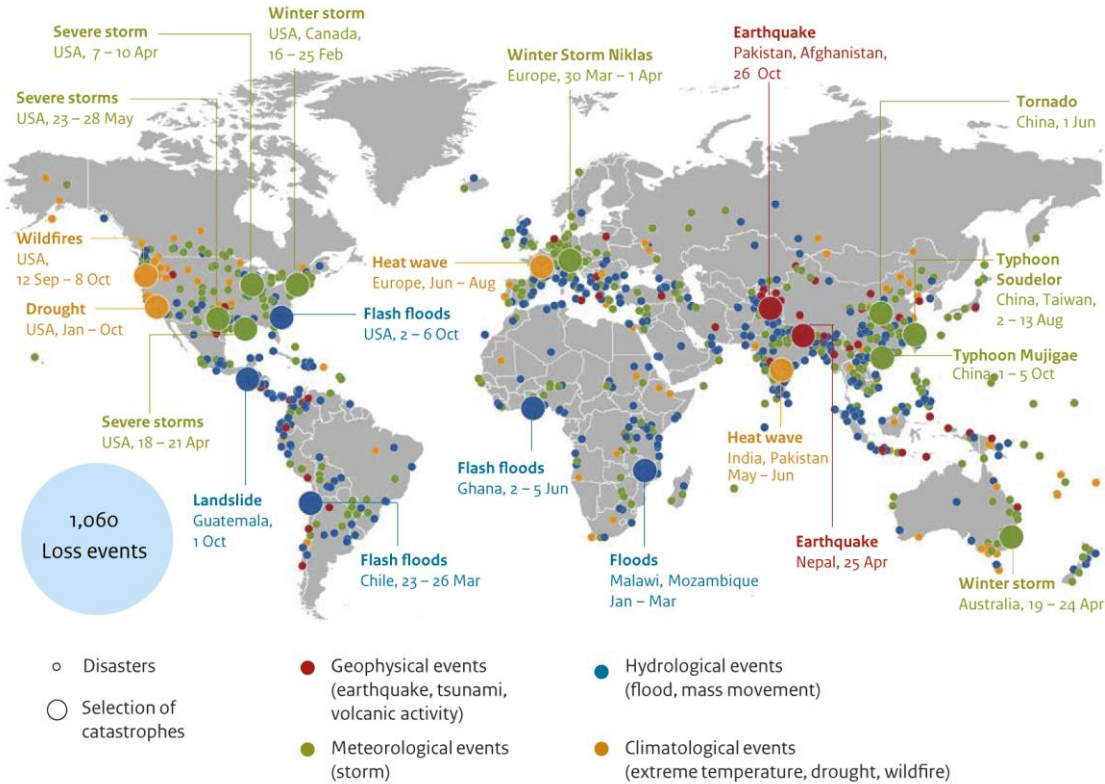


Figure 2A Geographical overview of natural disaster events reported for 2015 by Munich RE (2016). Reducing the impact of climate related natural disasters is an important aspect of adaptation.

Conflicts over water, 1944 – 2016

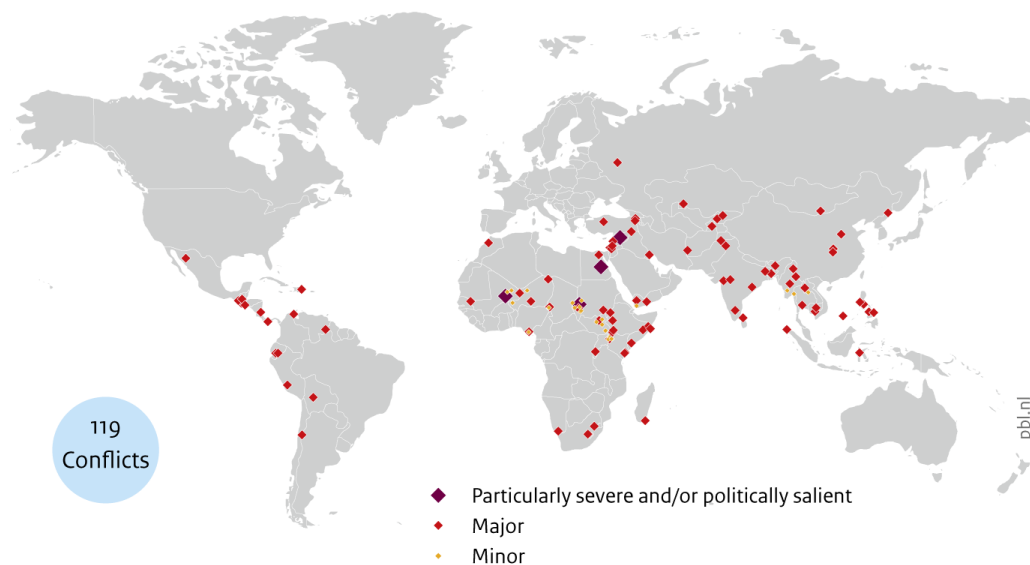


Figure 2B. Overview of water-related conflicts over the period 1944-2016 as reported in A new Climate for Peace. It has to be explored how the regional climate policies (both adaptation and mitigation) may interact with the risks for regional political or violent conflicts.

Climate change and water high on the agenda

Climate change is high on the political agenda in many countries. Decades of debate and negotiations led to the Paris Agreement 2015 – a significant achievement for the international community. Climate change, water and its impact on human security, political stability and economic stability are all factors that are receiving growing global attention. For example, the recent annual risk assessment reports by the World Economic Forum warn that failure to adapt to climate change is one of the major risks facing the world economic system.⁶ ⁷ The New Climate for Peace initiative, commissioned by the G7, and the installation of the Planetary Security Conference itself in 2015 also reflect this growing concern. Today's politicians, on all levels of government, are increasingly aware of climate change and its possible impacts; mitigation and adaptation in most countries, currently, are included in policy decisions. However, as the recent election results in the US illustrate, unexpected events may significantly change the political environment.

Actions to improve human security are visible at all levels, ranging from irrigation projects for food production to health and energy programmes, and from local and national adaptation strategies to the adoption of universal goals such as the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction. Many SDGs are directly or indirectly related to water. On the scale of transboundary river basins, there are committees that aim to improve collaboration between countries. The purpose of such committees are to reduce the chance of transboundary conflict (which may result from the construction of dams for hydropower production and irrigation purposes) and reduce the occurrence of flood events, water scarcity situations and water pollution.

Mitigation responses following the Paris Agreement have consequences for water stress

In addition to the effects of population growth, economic growth, and climate change, the required mitigation responses following the Paris Agreement in 2015 may increase water stress in certain regions. Depending on the implementation, the increased use of

hydropower may cause local conflicts due to involuntary displacements, or interfere with the political interaction between countries in transboundary river basins. The increased production of biomass for bio-energy could also lead to increased competition for land and water with local food production. Figure 3A shows the areas where, in 2050, water stress in regions may increase due to increased energy and food crop production. Figure 3B shows which regions have a large potential for new hydropower facilities.

⁶ World Economic Forum, *Water Security: The Water-Food-Energy-Climate Nexus* ed. The World Economic Forum Water Initiative (Island Press, 2011).

⁷ World Economic Forum, "The Global Risks Report 2016 " (Geneva2016).

Regions vulnerable to crop production losses due to irrigation water shortage and energy crop potential

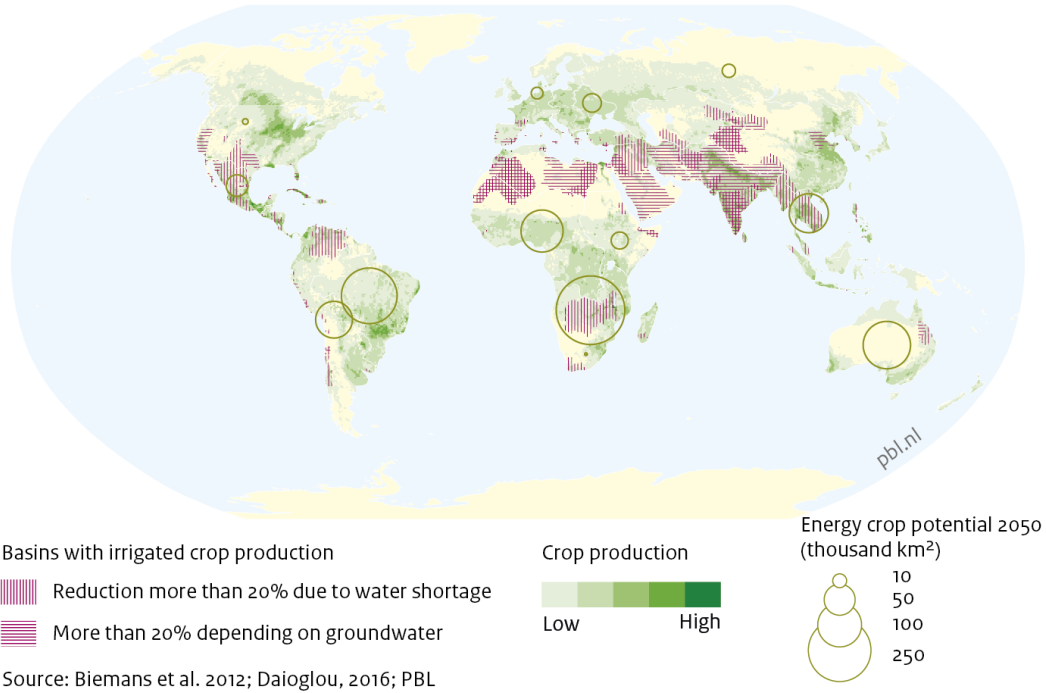


Figure 3A Regions where competition over land and water may increase due to increased food and energy crop production in 2050.

Hydropower potential in large river basins, 2011

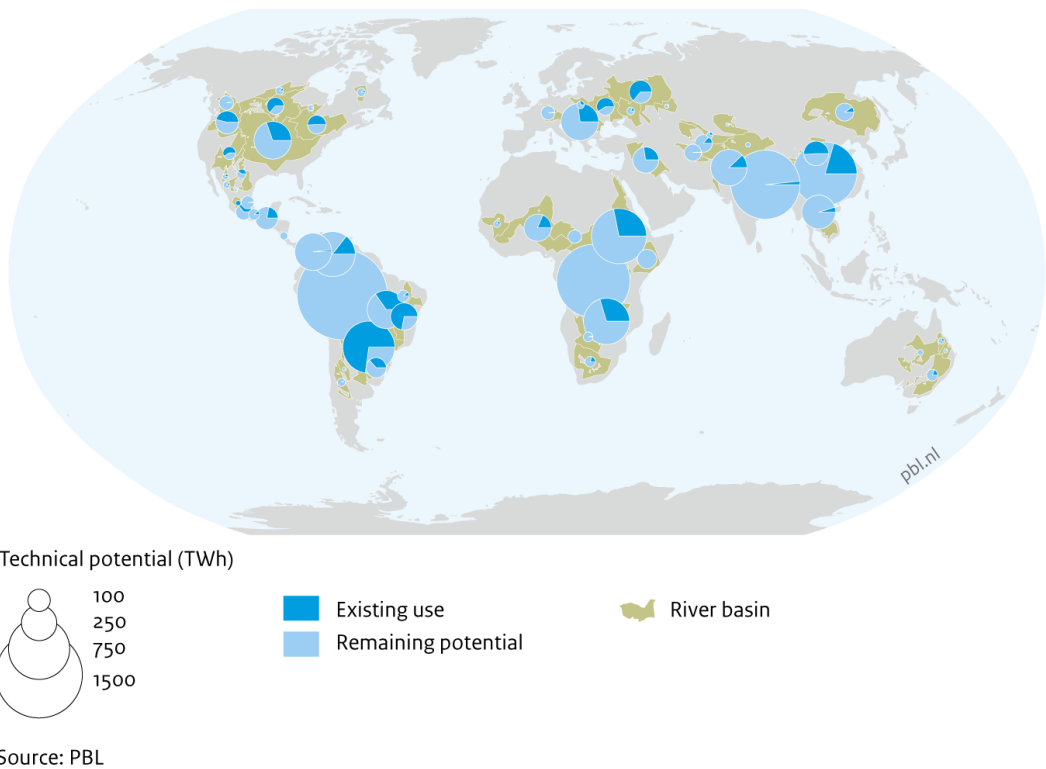


Figure 3B Regions where tension on river basin level may increase due to increased hydropower production.

Different views on the role of water in political or violent conflict

Global climate change will influence water security through changes in storms, sea level rise, and precipitation patterns resulting in droughts, floods, and changing groundwater recharges. The changing impacts are related to weather extremes and slow-onset changes in temperature and water availability. In response to the increasing knowledge regarding climate change and its effects on the water system, there has been increasing priority placed on understanding the relationships between climate change, water and security issues among international organisations, governments, universities and a broad spectrum of research institutes. This has resulted in a wide variety of studies and methods. There is little dispute about the direct link between water and human security, and there is a high level of consensus on the significant increase in the impacts of water-related disasters and competition for water.⁸ Reducing the impacts of weather-related hazardous events is a major aim of climate adaptation and disaster risk reduction policies, which are supported on a global scale by the SDGs and Sendai Framework for Disaster Risk Reduction.

There is substantially less consensus in scientific literature regarding the interaction between water and political or violent conflict. Publications assessing the interaction between climate change factors and the role of water in political security provide differing conclusions, reflecting not only differences in the focus and views of the authors, but also differences in the methods applied (qualitative or quantitative), the spatial and temporal scales, geographical focuses, contexts of each respective study and the variables selected. In general, the conclusions can be roughly divided into three groups.

One group of studies underline the role of climate and water in political or violent conflicts. These studies have statistically linked the increase in the prevalence of conflict to

climatic and environmental changes, which supports the perspective of climatic change and changing water security being a major threat to global security.^{9, 10, 11} In line with this group of scientific studies, more policy-oriented studies present global warming and water-related issues as the 'ultimate threat multiplier' for conflict¹² or label them as key drivers of conflict in the coming decade¹³.

Another group of studies is less explicit about the direct role of water in political or violent conflicts. At best, water is considered a subdominant factor in the conclusion of these studies, stressing the mix of determining factors are decisive, such as population size, demographic composition, governmental structures, poverty and inequality, ethnic fractionalisation, history of conflicts in the area or presence of neighbouring conflict.^{14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25}

⁹ Solomon M. Hsiang and Marshall Burke, "Climate, conflict, and social stability: what does the evidence say?," *Climatic Change* 123, no. 1 (2014).

¹⁰ Solomon M. Hsiang, Kyle C. Meng, and Mark A. Cane, "Civil conflicts are associated with the global climate," *Nature* 476, no. 7361 (2011).

¹¹ Cullen S. Hendrix and Idean Salehyan, "Climate change, rainfall, and social conflict in Africa," (2012).

¹² Defence Intelligence Agency, "Global Water Security," in *Intelligence Community Assessment* (Defence Intelligence Agency U.S., 2012).

¹³ *Ibid* 3.

¹⁴ Jan Selby and Clemens Hoffmann, "Beyond scarcity: Rethinking water, climate change and conflict in the Sudans," *Global Environmental Change* 29(2014).

¹⁵ O. M. Theisen, H. Holtermann, and H. Buhaug, "Climate wars? Assessing the claim that drought breeds conflict," *International Security* 36, no. 3 (2011).

¹⁶ Nina von Uexkull, "Sustained drought, vulnerability and civil conflict in Sub-Saharan Africa," *Political Geography* 43(2014).

¹⁷ Nina von Uexkull et al., "Civil conflict sensitivity to growing-season drought," *Proceedings of the National Academy of Sciences* 113, no. 44 (2016).

¹⁸ Matthew D Turner, "Political ecology and the moral dimensions of 'resource conflicts': the case of farmer-herder conflicts in the Sahel," *Political Geography* 23, no. 7 (2004).

¹⁹ François Gemenne et al., "Climate and security: evidence, emerging risks, and a new agenda," *Climatic Change* 123, no. 1 (2014).

²⁰ Jeremy Allouche, "The sustainability and resilience of global water and food systems: Political analysis of the interplay between security, resource scarcity, political systems and global trade," *Food Policy* 36(2011).

²¹ Thomas Bernauer and Tobias Siegfried, "Climate change and international water conflict in Central Asia," *Journal of Peace Research* 49, no. 1 (2012).

²² Christopher K Butler and Scott Gates, "African range wars: Climate, conflict, and property rights," *Journal of Peace Research* 49, no. 1 (2012).

²³ Nils Petter Gleditsch, "Whither the weather? Climate change and conflict," *Journal of Peace Research* 49, no. 1 (2012).

²⁴ Carl-Friedrich Schleussner et al., "Armed-conflict risks enhanced by climate-related disasters in ethnically fractionalized countries," *Proceedings of the National Academy of Sciences* 113, no. 33 (2016).

⁸ W. Neil Adger et al., "Human Security," in *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2014).

Finally, there is a group of publications that primarily focus on water management on river basin level, either nationally or internationally. These studies suggest that, although the pressure on water resources and competition between countries may increase, there are a large number of examples of collaboration in national or international river basins. These forms of collaboration result in a better understanding and cooperation between parties with conflicting interests. These studies may therefore indicate that future climate change may enhance collaboration rather than increase tension and/or conflict.^{26, 27, 28, 29}

Changing future conditions: better understanding needed of the interplay between climate, water, climate policies and human and political security

Given the expected future changes, the balance and interplay between the physical environments, in terms of climate change and water, and the human and political security may change. Already present violent conflicts, such as in Syria and Yemen, may have important underlying links with water scarcity^{30, 31, 32} and the likelihood of these types of insecurity and conflict, along with tension between countries in transboundary river basins, might increase.^{33, 34, 35, 36} A contemporary example of a major transboundary conflict is the emerging fight

over water between India and Pakistan, resurging earlier this year.³⁷

Assessing the role of water with respect to social and political insecurity is complex, because of its intertwinement with cultural and socio-economic variables. The challenge with respect to climate change, water and conflict is therefore achieving an improved understanding of the interplay between water, other contextual factors and human and political security. Following an improved understanding, bearing in mind that differences in perspectives may remain, the interlinkages between climate policies (adaptation and mitigation), water management and regional human and political security could be addressed in such a way that it contributes to reducing future risks.

Building on research for a better understanding and analysing trends in order to increase forecasting capabilities, structured knowledge building as well as debate within cross-border communities are required.³⁸ Based on the assessment in this policy brief, there seem to be two boundary crossing processes required:

- i) one in the scientific domain discussing the underlying scientific approaches in relation to the outcomes and aiming at bridging the different views about the role of climate and water with respect to security issues; and
- ii) one between scientific, political and societal communities aiming at a better understanding of underlying mechanisms at different scales and the interaction between climate policies (both adaptation and mitigation), water management, regional development processes and human and political security.

Both an increased scientific understanding as well as an increase in knowledge exchange and knowledge building processes involving the scientific, political and societal communities can contribute to reducing climate and water-related security risks.

²⁵ Ole Magnus Theisen, "Climate clashes? Weather variability, land pressure, and organized violence in Kenya, 1989-2004," (2012).

²⁶ Aaron T Wolf, "Shared waters: Conflict and cooperation," *Annu. Rev. Environ. Resour.* 32(2007).

²⁷ Erik Gartzke, "Could climate change precipitate peace?," *Journal of Peace Research* 49, no. 1 (2012).

²⁸ Rune T Slettebak, "Don't blame the weather! Climate-related natural disasters and civil conflict," *Journal of Peace Research* 49, no. 1 (2012).

²⁹ Richard Matthew, "Integrating climate change into peacebuilding," *Climatic Change* 123, no. 1 (2014).

³⁰ Peter H. Gleick, "Water, Drought, Climate Change, and Conflict in Syria," *Weather, Climate, and Society* 6, no. 3 (2014).

³¹ Colin P. Kelley et al., "Climate change in the Fertile Crescent and implications of the recent Syrian drought," *Proceedings of the National Academy of Sciences* 112, no. 11 (2015).

³² Nicholas S. Robins and James Fergusson, "Groundwater scarcity and conflict – managing hotspots," *Earth Perspectives* 1, no. 1 (2014).

³³ Muhammad Mizanur Rahaman, "Hydropower ambitions of South Asian nations and China: Ganges and Brahmaputra Rivers basins," *International Journal of Sustainable Society* 4, no. 1-2 (2012).

³⁴ Lucia de Stefano et al., "Climate change and the institutional resilience of international river basins," *Journal of Peace Research* 49, no. 1 (2012).

³⁵ Pallava Bagla, "Along the Indus River, Saber Rattling Over Water Security," *Science* 328, no. 5983 (2010).

³⁶ Idem 21

³⁷ J. Rowlatt, "Why India's water dispute with Pakistan matters," BBC World News

<http://www.bbc.com/news/world-asia-india-37483359>.

³⁸ Philip Tetlock and Dan Gardner, *Superforecasting: The art and science of prediction* (Random House, 2016).

Conclusion and Recommendations:

- The future changes in climate, population, economic development and climate mitigation policies will impact water systems, thus affecting the interplay between water and human and political security.
- Presently there is consensus about the importance of water for human security, but no consensus about the interaction between water and political and violent conflicts. The changing future conditions require a rethink on how to effectively assess and address the changing interplay between water, human security and political security, not only in the scientific domain, but also in the political, societal and economic domains.
- The discussion during the session will focus on this challenge, at all levels (from local to global).
- The final conclusions and recommendations will be drawn based on the input and discussions during the session.

Questions for debate

- **Knowledge:**

1. Organizing debate, bridging perspectives and improving understanding_in the scientific domain: what processes or research programmes could be envisaged to strengthen the degree of academic consensus on the relationship between climate, water and political conflict? (e.g. as part of the IPCC process, or within the Planetary Security context?)
2. How to better engage large scale models with qualitative case studies and local knowledge?

- **Policies:**

3. Cross-border policies: How to promote the integration of human and policy security risks within regional climate, water and development policies?
4. How can improved water management and water-related adaptation policies contribute to reducing water security risks?
5. How could integrated river basin management be strengthened in trans-boundary catchments and reduce water security risks, especially in politically conflict prone regions?

- **Scale:**

6. Dynamics between scales: how could the interactions between international, national and local approaches benefit from each other, focussing on the local scale?

7. What are the required steps on what scales?
8. What types of actions could stimulate the interaction between water and security managing systems on regional, national and local scale together?

- **Priorities:**

9. given the already existing processes and organisational structures, what actions and steps concerning the above topics should have priority, where could they be embedded and who would be responsible or could take the initiative for what?