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Climate change

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Introduction

In the 2012 Strategic Monitor, climate change was seen as a catalyst for various security risks. Due to the melting polar ice, new shipping routes and options for resource extraction in the Arctic could open up in the future. Without clear international agreements on the use of these routes and raw materials, tensions may arise, as the previous Monitor concluded. The implications of recent developments in the Arctic for possible security risks will be further explored in Box 1. Scarcities and natural disasters resulting from climate change could lead to migration and political and social unrest in various parts of the world. In the long run, food security and access to clean drinking water could come under strain in some parts of the world. Box 2 examines issues surrounding water and food problems related to climate change.

The exact magnitude of the above-mentioned risks is difficult to estimate given the scientific margin of error in climate science and the importance of other factors such as economic and political interests. During the past year, the impact of climate change on security risks appears to have further increased. In this chapter, we will map out the climate developments of the past year and discuss their significance for the probabilities and uncertainties of the future.

1 Significant changes in the past year

The debate on climate change and climate security has intensified in recent years. Recent findings by PricewaterhouseCoopers (2012), in co-operation with the World Bank and BP, show that global warming will probably be higher than was estimated in 2007 by the Intergovernmental Panel on Climate Change, the UN climate panel. The panel emphasises the relationship between climate change and extreme weather events such as hurricanes, heat waves, and drought. The US East Coast was ravaged by Hurricane Sandy in November 2012, and recent research has shown that such hurricanes pose a greater risk when temperatures rise. In 2012, extreme drought led to crop failures in the United States, while Ethiopia and India experienced extreme flooding. Such events led to a deterioration in global water and food security.

Regarding the speed and severity of climate change, 2012 gave little cause for optimism. It became apparent that the sea ice in the Arctic is melting at a faster pace than researchers originally assumed, as a result of which ice volumes in the Arctic reached their lowest levels ever in 2012 (see Box 1). In the past year, new findings were published on the environmental effects of black carbon and methane: both substances are considered to be key drivers of climate change along with CO₂ because they generate additional heat in the atmosphere. As a result, the consensus among climate scientists has grown in 2012. On the basis of recent findings, more and more 'climate sceptics' recognise that a relationship between greenhouse gases emitted by humans and climate change might very well exist. Not all climate sceptics have changed their minds: due



Drought and the problems it poses to agriculture and food security in the Horn of Africa have increased in recent years.

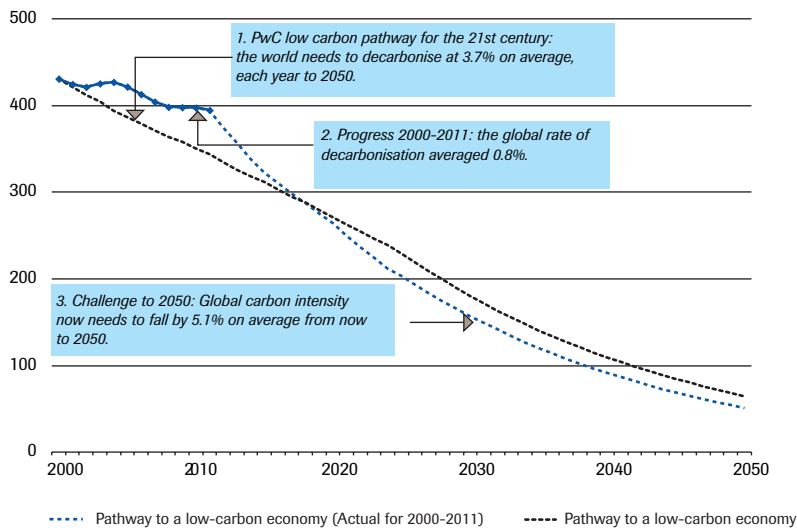
Photo: FMCS

to the complexity of the matter, considerable disagreement still exists about the speed, nature, and extent of the effects of climate change.

Climate change has occupied a less prominent place on the political agenda in the United States, Asia, Africa, and Latin America than in Europe. National interests that conflict with an active climate policy still dominate. Partly as a result of this, attempts to achieve international cooperation and to reach agreement ran into difficulty in 2012. The US stresses that the emerging economies, its main competitors, are evading their international responsibilities because they have yet to commit themselves to reducing emissions. The emerging countries in turn use the fact that the US is not a participant to the Kyoto Protocol as an excuse to get out of firm commitments. In comparison with the EU and other progressive countries, both emerging economies and the US have adopted a negative stance towards making legally binding commitments at the international level that would be subject to independent international supervision. They do want to implement a climate policy eventually—not because of international responsibilities but because of domestic considerations such as local air pollution and dependence on fossil fuels.

At the climate summit in Durban in 2011, Europe was able to establish agreement—in collaboration with other progressive countries from Latin America, Africa, and the Pacific—on a second term for the Kyoto Protocol reduction commitments for developed countries. The summit participants also agreed to continue negotiating and to conclude a new treaty by 2015 (Van Schaik 2012). Given the positions of the various parties, we cannot rule out that in 2015, as in Copenhagen in 2009, these parties will fail to conclude a treaty with binding emission reduction obligations. The difficult negotiating climate was illustrated by the limited progress that was made at the ‘Rio +20’ sustainable development summit held in 2012 and the recent climate summit in Doha.

Figure 1 Low Carbon Economy Index (PwC 2012).



We use the carbon intensity for countries as a measure of progress towards a low carbon economy. The carbon intensity of an economy is the emissions per unit of GDP and is affected by a country's fuel mix, energy efficiency and the composition of the economy (i.e. extent of activity in carbon-intensive sectors).

The lack of agreement is reflected in the dissensions over the use of nuclear energy as an alternative to fossil fuels. In the area of standards for biofuels and research into new forms of energy, opinions are likewise divided because the production of biofuels entails indirect CO₂ emissions and thus can lead to higher food prices and deforestation. To counteract this indirect effect, the European Commission came up with a proposal in 2012 to set a ceiling of five percent for the use of food crops for biofuel production (Ros 2012). In addition, the International Renewable Energy Agency (IRENA) was established in 2009 and is dedicated to encouraging the widespread adoption and sustainable use of renewable energy. However, its work is still in its infancy (IRENA 2012). In contrast, the development of new technologies for climate change adaptation and renewable energy steadily continues. The market for renewable energy and the

question of energy dependence are particularly high on the European Union's agenda. The reason for this is that the dependence on imports of fossil fuels from potentially unstable regions is a great risk for EU member states in terms of security of fossil energy supply.

In what is seen as a worrying development, since the onset of the financial and economic crisis in 2008, the rate at which CO₂ emissions are being pushed back has declined. If one wants to achieve the desired emission reductions by 2050, then radical 'decarbonisation' is needed, according to research by PwC (2012). This is illustrated in Figure 1 and Table 1.

Table 1 Degree of 'de-carbonisation' worldwide and per country of the largest 'consumers' (PwC 2012)

Country	Change in energy-related emissions 2010-2011	Actual growth in GDP (PPP) 2010-2011	Carbon intensity	Change in carbon intensity	Annual average change in carbon intensity 2000-2011	Required annual 'de-carbonisation' 2012-2050
World	3.0%	3.7%	395	-0.7%	-0.8%	-5.1%
Brazil	1.7%	2.7%	197	-1.0%	-0.7%	-4.1%
China	9.4%	9.1%	754	0.2%	-1.4%	-6.1%
EU	-3.6%	1.5%	213	-5.1%	-2.3%	-5.2%
India	6.9%	6.8%	817	0.0%	1.9%	-7.0%
Indonesia	0.9%	6.5%	377	-5.2%	-0.1%	-4.9%
Japan	0.1%	-0.7%	281	0.8%	-0.8%	-4.8%
Russia	2.9%	4.3%	510	-1.4%	-3.9%	-6.0%
US	-1.9%	1.7%	374	-3.5%	-2.1%	-5.1%
South Africa	1.5%	3.1%	781	-1.6%	-1.4%	-5.6%

Scenario framework

The distribution of power within the international community was described in the 2012 Monitor as multipolar, whereby the fragmentation scenario applied: the international system was characterised by opposing blocs, with the US and the emerging countries as the main antagonistic players. Their disagreements concerned in particular the concluding of agreements on CO₂ reductions. In other areas, especially those related to renewable energy, there was more room for progress due to the influence of the market and companies. A year later, the picture does not differ very much. International cooperation is being determined by market-economic developments and mainly by national interests. Although cooperation is still difficult to get off the ground, state actors—especially emerging countries with a less extensive and active civil society—appear to be taking a more dominant position in relation to non-state actors such as NGOs. With the absence of binding rules, the world is therefore shifting towards the non-cooperative, multipolar direction compared with the previous year.

Box 1 Climate change and 'the Arctic Five'

In recent years, the focus has primarily been on the effect of climate change on the Arctic and the melting of the ice cap, and the consequences thereof. About 25 percent of the world's undiscovered oil and gas reserves are in the Arctic region (US Geological Survey 2012). Due to global warming, this new, resource-rich area will be accessible for exploration and exploitation in the future. Given the presence of raw materials, the countries neighbouring the Arctic—also known as the Arctic Five¹—see the Arctic as a strategic priority. With a view to securing their political and economic interests, they are seeking to strengthen their presence in this 'no man's land'.

Map of the Arctic coastal states (SIPRI 2012)



For example, in June 2012 the United States began its largest mission ever in the waters of northern Alaska to investigate its ability to guarantee maritime safety, law enforcement, the prevention of pollution, Coast Guard missions, and national security. Denmark also went on an expedition to Greenland in July 2012 in order to prove that the Arctic region belongs to the Danish kingdom. Such operations are expected to increase in scale and frequency in the future (Perry & Andersen 2012).

1 United States, Canada, Russia, Norway and Denmark.

A latent potential exists for conflict in the Arctic region. This is illustrated by the ongoing dispute between Canada and Denmark over the strategically located island of Hans. It shows that, despite the fact that there are no conflicts as yet between the Arctic Five, the Arctic could become an area fraught with tension in the future. Alongside the issue of 'ownership' of natural resources, the opening up of (strategic) waterways and access to them as well as the risk of harm to the quality of life there all play a role in this.

It would be misleading, however, to portray developments in the Arctic as only leading to tensions in the region. Russia and Norway resolved their territorial dispute already in 2010. Thereafter, the melting sea ice and the areas that opened up as a result led to the establishment of an agreement between Norway's Statoil and Russia's Rosneft in May 2012. With this deal between the two companies, Russia and Norway have agreed to work together in the energy-rich Barents Sea and Okhotsky (Perry & Andersen 2012). How the Arctic will develop in the future remains uncertain, also since it is not clear when the exploration and exploitation activities can be developed on a large scale.

2 The next five to ten years: Probabilities and uncertainties:

Probabilities

- Ongoing climate change and global warming, with effects on the Arctic and food and water problems as a result.
- Increase in certainty within climate science.
- Further development of sustainable energy.
- Increase in food and water shortages due to extreme weather conditions.
- Absence of binding agreements and lack of international cooperation.

Uncertainties

- How will climate politics develop in the future?
- Is a climate agreement with binding reduction targets feasible by 2015 (with emission reduction targets up to 2020)?
- Will the release of new areas with raw materials in the Arctic, and food and water shortages lead to tension and conflict?
- Where will the negative effects of climate change first be demonstrated?

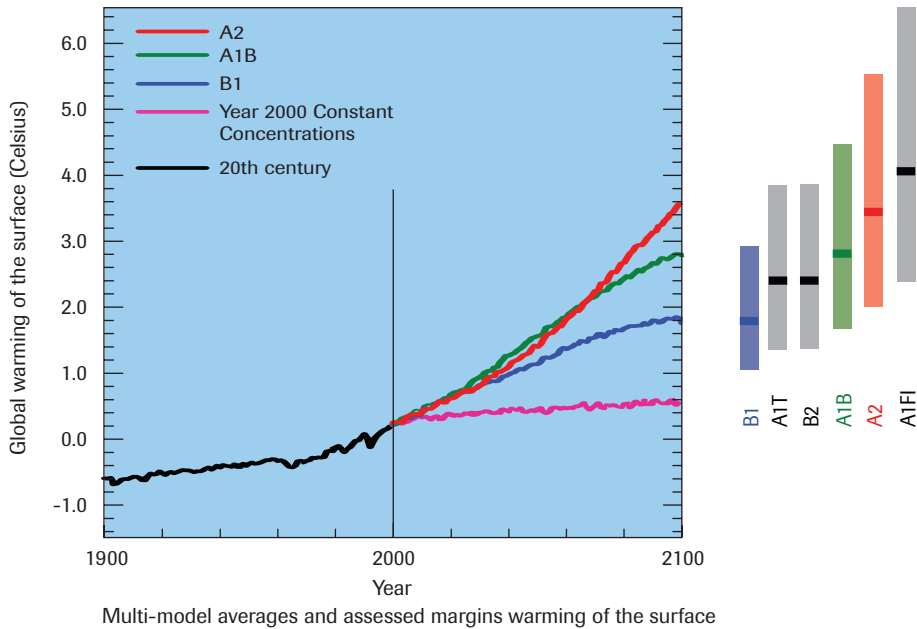
Based on the developments of the past year, more certainty is likely to pervade the climate science community in the coming years about the gravity of climate change. Measurements are becoming more extensive and more precise, as a result of which predictions regarding the effects of climate change will become more accurate in the future.

Given that CO₂ emissions are the main cause of climate change and global warming, it is striking that global emissions increased by 3.0 and 2.6 percent respectively in 2011 and 2012. The expectation is that they will rise even further in the future, in part due to the lack of effective international arrangements. Studies predict that by 2100, a temperature rise of between one and about four degrees can be expected (IPCC Fourth Assessment Report 2007). In Figure 3, this projection is shown graphically with their corresponding margins of error. The decline in political attention to climate change and the economic crisis have also led to reduced interest in climate issues by NGOs.

Given the expected further rise in emissions, the Arctic ice cap is likely to melt at an increasing pace in the coming period. If, as a result, new areas in the Arctic become accessible for resource extraction, tensions in the region between the Arctic Five could increase. The high cost of possible future missions in combination with existing opportunities for joint initiatives are likely to deter countries from engaging in large-scale conflicts in the Arctic in the future (Perry & Andersen 2012).

With the world population expected to grow by two billion in the coming decades, the problem of food and water scarcity will become an important theme in relation to security on political agendas worldwide in the coming years (see Box 2). Climate change resulting in extreme weather conditions plays an important role in this regard. Addressing food and water shortages and possible tensions will require more than the commitment of individual companies and countries and therefore requires international cooperation. The pressure to reach binding agreements—also in combating climate change—is likely to increase as a result. In addition, more attention is expected to be paid to specific areas and regions that run the highest risk of scarcity leading to instability. In this context, the ‘Belt of Instability’ is an area that is vulnerable to the impacts of climate change and its effect on water and food.

How high climate change will be put on the international agenda in the future depends on specific events and other driving forces. The economic crisis and unrest in the Middle East have led to climate change issues occupying a less prominent place on the political agenda. With dramatic events such as Hurricane Sandy, however, the debate on climate change could flare up again. In the course of 2013 and 2014, the fifth IPCC report will be published. The publication of this report is expected to lead to an increase in attention on climate science, although this is unlikely to match the commotion that erupted following the publication of the 2007 IPCC report. The crucial question in the coming period is whether the international community will be able to achieve far-reaching and binding agreements in the field of climate change (and related issues) within the framework of global public goods. In 2011, the UN climate process was saved from oblivion by the agreement on a new deadline for negotiations on a new climate treaty. At Doha, however, less progress was booked, with the main blocs still in disagreement. Especially the emerging economies and the US have remained reluctant to commit themselves to international legally binding agreements on emissions reductions. It is therefore uncertain whether the agreement to continue negotiating a climate treaty—which must be concluded by 2015 with emission reduction targets up

Figure 3 Expected changes in the climate up to 2100 (IPCC Fourth Assessment Report 2007).

to 2020—will be adhered to. International cooperation on the climate is expected to remain difficult to achieve. Should the international community nevertheless manage to conclude agreements, then it remains to be seen how ambitious and binding they will be and to which countries they will apply. If it is the EU's aim to play a significant role in the geopolitical arena and in the drafting of such agreements, it will have to show leadership by taking the initiative in the negotiation process as it did previously in Durban (Van Schaik 2012).

Scenario framework

The 2012 Strategic Monitor stated that the world would move in the direction of a greater role of the state and less cooperation over the next five to ten years. We now expect the increase in the role of state actors to be less than indicated in the previous edition of the Monitor. Due to the lack of firm agreements leading to emission reductions, we can expect a decline in international cooperation in the coming five to ten years.

Box 2 Climate change and land use: Food and water scarcity

Scarcity of resources—such as energy, raw materials, food, and water—is increasingly in the spotlight. For the purposes of this chapter, what is of particular interest is the interconnection between climate change and water and food problems. Climate change may also affect the availability of food and water and therefore has an indirect effect on health and sustenance. It affects the stability of water and food networks, ranging from a direct impact on the harvest as a result of changing weather conditions to indirect effects through the market (due to rising food prices) or the infrastructure of supply chains (FAO 2008).

Although much uncertainty still exists about the precise impact of climate change on food and water problems and the interrelationship between the two, recent developments have given cause for increasing concern. Research has shown that climate change—in particular, differences in precipitation—could bring about indirect social and political unrest (Hendrix & Salehyan 2012). Drought or flooding could in the future hamper or even cut off the supply of drinking water and food. In Kenya, water scarcity appears to be stirring up interethnic conflicts. In the US, drought in 2012 led to failed grain harvests. In September of the same year, an abundance of rainfall in Ethiopia and many parts of India—including the large city of Hyderabad—caused harvest failures and food shortages. As a result of these events, food prices worldwide reached record highs.

Rabobank (2011) has predicted that in June 2013 the food price index will increase by fifteen percent. If that prediction were to come true, the world risks a repeat of the global food crises of 2007 and 2008, which could lead to political instability, migration flows, and hunger. There are indications that the increase in food prices—with the ensuing social and political uncertainty and instability—can be considered an indirect catalyst to the Arab Spring. Water scarcity, partly as a result of climate change, can also be such a catalyst of tensions. The likelihood of unrest in this regard is greatest in countries with upstream and downstream river deltas, such as the Nile Delta, the Mekong Delta, and parts of the Indus (Brundtland et al. 2012). Besides the direct lack of drinking water, water scarcity also hampers food production and energy generation and thereby also obstructs the economic development of countries and regions (Brundtland et al. 2012).

Due to these developments, increasing attention is being paid to the interrelationship between water/food scarcity and climate change on the one hand, and security issues on the other. The Global Water Security Report (2012) of the InterAction Council concluded that a looming water shortage poses a threat to global stability. Social and political unrest and conflicts due to water and food problems are likely to increase in the future, with climate change as the catalyst. A better understanding of these relationships is therefore essential. A step in this direction has already been taken with the establishment of the UN High-Level Task Force on Global Food Security and the Agricultural Markets Information System (AMIS).

3 Strategic shocks

Strategic shocks

- Large-scale tensions or conflicts in the Arctic or in areas plagued by food or water scarcity.
- Unforeseen natural disaster with major consequences.
- A revolution in sustainable energy.
- Greatly accelerated global warming or unforeseen confrontations with the limits of ecosystems.

Unforeseen natural disaster with major consequences. The nuclear disaster in Fukushima (Japan) and Hurricane Sandy on the east coast of the US have shown that natural disasters can have significant consequences on both national and global security.

A revolution in sustainable energy. As the foregoing shows, developments in sustainable energy steadily continue. To date there has been no breakthrough, however. This may change in the future, with major implications for the energy problem.

Greatly accelerated global warming or unforeseen confrontations with the limits of ecosystems. As mentioned in the 2012 Strategic Monitor, there are limits to the capacity of the earth to offset the environmental damage caused by humans. So-called tipping points could in such cases lead to unforeseen upheavals and risks. This shock has become slightly more likely in the last year, but the chance of this happening is still small.

Large-scale tensions or conflicts in the Arctic or in areas plagued by food or water scarcity. The likelihood that tensions will develop in the Arctic due to the opening up of shipping routes and new areas of raw materials has risen somewhat. At present, activity in the Arctic is mainly characterised by new initiatives that should lead to more cooperation. The risk of conflicts in the region in the next five to ten years is therefore small. Should there be an escalation in the Arctic, NATO members must realise that this could indirectly affect their armed forces. The same applies to situations in which food and water crises elsewhere in the world lead to international food or water crises due to high food prices.

4 Winners and losers

When it comes to climate change, there are few winners and mostly losers. Relative to the 2012 Monitor, no significant changes were observed. The 2012 Monitor found that only shipping, short-term speculators in food markets, and energy producers could benefit from climate change. This comes at the expense of other players.

People living on low-lying islands or in other areas are likely to be the first to be hit by the negative consequences of climate change (World Bank 2012). Just as in the 2012 Strategic Monitor, therefore, the least developed countries in Africa, the Middle East, and Central Asia can be identified as losers. This so-called 'Belt of Instability' is and remains the most vulnerable to the effects of climate change.

For the 2013 Monitor, we have identified 'new' losers: poor people who are dependent for their food supply on affordable grain products. If climate change continues, they will be hit the hardest (IFPRI 2010).

5 Implications for global security and stability

Developments in recent years have shown that the effects of climate change could entail security risks. Natural disasters in the world can have disastrous consequences. This puts global economic security to the test. The effects of climate change can cause permanent damage to vital ecosystems, and local air pollution can be a problem for public health. The physical security of people may be at risk if average temperatures around the world continue to rise, with more chance of diseases and deaths. The breaching of dikes and other natural disasters could result in many victims.

Climate change may also have implications for global security because its effects increase the risk of flooding, desertification, and extreme weather events. These effects could lead to food and water shortages, tensions between communities, and possible migration. In the event of a mass migration (climate refugees), this can lead to social and political instability in countries and regions. This would create new challenges in the field of territorial security and stability in certain regions—especially in developing countries. The Horn of Africa and the Sahel are examples of regions where high food prices and food scarcity caused by climate change have already led to conflicts. The same applies to water scarcity as the cause or catalyst of conflicts (Brundtland et al. 2012).

Conclusion

Climate change remains a genuine driving force that, in terms of its effects, is strongly intertwined with other global and regional events and driving forces. It is primarily a multiplier of risks within the international system. Because of the interconnectedness of issues that can directly influence people's safety, such as the economic crisis, climate change tends to be a low priority on the political agenda. With the opening up of new areas for exploration of raw materials and with food and water shortages caused in part by climate change, international relations could be put to the test. In this way, climate change can directly and indirectly affect both economic and political security at the national and global levels. Because national interests are predominant, the prospects for effective international cooperation in this field remain uncertain, despite an extension



In addition to drought, floods due to climate change are increasingly posing a problem in both developing countries and the West.

Photo: OregonDOT

of the Kyoto Protocol and good intentions. Whether the international community will be capable of bridging the differences in opinion and arriving at a joint climate policy remains the big question.