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# National Safety & Security and Crisis Management

*Climate change and scarcities: a challenge for civil protection*

*2<sup>nd</sup> International Kurhaus Conference National Safety and Security  
The Hague, The Netherlands, 8-9 February 2010*



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# Foreword



*Manfred Schmidt,  
Director-General Crisis Management  
and Civil Protection of the German  
Federal Ministry of the Interior*



*Dick Schoof,  
Director-General National Safety and  
Security of the Netherlands Ministry of  
the Interior and Kingdom Relations*

On 8 and 9 February 2010, at the Kurhaus, The Hague a conference was held on the theme “National Safety & Security: Climate Change and Scarcities, a Challenge for Civil Protection”. About 100 delegates from the top management of government, business and science from across the global community took part in this meeting.

The conference is the continuation of the 1st International Kurhaus Conference on National Safety & Security, set up in 2008 by the United Kingdom and the Netherlands. Germany subscribed the needs for the continuity for a platform like this and took part in the organisation this year. For the future France and Sweden offered to take initiative together with the Netherlands to plan a conference in 2012 and 2014.

The conference enables organizations and countries that are working on their own safety and security strategies to share their views and experiences. Cooperation is vital. We are all increasingly conscious of the fact that national safety and security is not the sole domain of an individual organisation or country. Nor is it the exclusive domain of the public sector. We are all linked together.

This type of cooperation requires a shift from “need to know” to “need to share”. The aim is to establish and develop networks and exchange knowledge and best practices.

In the plenary session, the keynote speakers highlighted the conference theme. Global warming is a reality. There is a need for a unidirectional movement on multi-country policy response on climate change, food security, scarcity on rare-earth materials and livestock health. A holistic approach is needed where for instance insured investments in developing countries can be part of it to support adaptation. Risk assessment and capability analysis & capacity building in civil protection and crisis management are key elements for that.

In the two workshops the general lines of orientation were: what we need, and what we have. Or in other words: What methods and strategy are used for approaching risks, threats, and vulnerabilities caused by nature or by human behaviour?

How to rearrange existing capabilities? And what capabilities are developed or need to be developed to prevent identified risks, prepare for them, and respond to them? Best practices were shared and vivid discussions enriched our way of thinking.

We hope you will enjoy reading this special edition. We expect that the contributions will inspire you in your own field of work for the benefit of a growing national safety and security and strengthening crisis management and civil protection.



# Climate change and scarcities, a challenge for civil protection

We will be focusing at this conference on the theme of scarcity. I am sure that when we think of food, water and energy shortages and social dislocation the same image has been in all our minds recently, wherever we are from: Haiti. The shortages in Haiti were caused by an earthquake, so they differ somewhat from the issues of climate, scarcity and security that we will be discussing over the next few days. However, the impact can be much the same. Scarcity is not, in itself, anything new. For decades now, the world has been faced with food and energy shortages. The Club of Rome was warning as long ago as 1972 that natural resources were running out. But it's still a highly topical issue.

On 28 January the risk management provider and insurance broker Aon published the 2010 Political Risk Map. New features include the Agricultural Supply Risk Ranking and a Food and Water Insecurity Index. Thirty countries currently risk being confronted with serious food and water shortages in the medium to long term. The Supreme Court in India recently instructed the government to develop a comprehensive water plan as a matter of urgency, in response to the water shortages already being experienced in some areas. And in 2007 and 2008 rising global food prices led to serious unrest, such as food riots in India and industrial unrest in Cambodia. The UN Environment Programme has also reported that, since 1990, at least 18 violent conflicts have arisen in which the exploitation of natural resources played a role, and that 40% of all interstate conflicts since 1960 have been linked to natural resources.

Scarcity is a matter not only of availability – resources simply running out – but also of accessibility and dependence. Shortages are more and more likely to lead to political and economic instability, which impacts on international security. This is especially true of shortages of rare earth metals. These exotic metals, such as neodymium, terbium and dysprosium, are increasingly important in all sorts of highly technical applications, such as mobile telephones, wind turbines and the Toyota Prius hybrid car. In August 2009, a leaked Chinese government report stated that the export of rare earth metals would be restricted. It received little publicity at the time, but caused great unrest among industrial

experts worldwide. Although these shortages, and the challenges they present, are highly varied, it is clear that we, the international community, need to reflect on the threats scarcity poses in the immediate and long term.

As I see it, we are all here today for at least two reasons. Firstly, because we are keen to hear about new methods and practical solutions which will allow us to better prepare for shortages and the possible threats to security. Secondly, we are here in the interests of international solidarity and improving our own national security. No country should stand alone when it is hit by shortages and threats to national security. It is our moral duty to be aware of the risky situations that may arise, nationally and transnationally. People expect us to be well prepared for food, water or energy shortages, should they affect our countries. What we don't want to see is a competition in which the richest and strongest win and the security of our people and stability within and between countries and global regions is put at risk.

The current economic crisis and the ongoing challenge of climate change have demonstrated more clearly than ever that the major issues of our time can no longer be seen as isolated problems. And the more intertwined they become, the more they demand an integrated approach.

What we need is a global sense of urgency. We need a new approach to long-term threats, such as that adopted by the Club of Rome in 1972 in its report *The Limits to Growth*. In the report the organisation was the first to warn against the unbridled growth of the global population and the economy and of the consequences for the environment. It was controversial at the time, but much of what was predicted then has now been overtaken by reality.

In October last year the Club of Rome met in Amsterdam to formulate a Declaration for the UN Climate Change Conference in Copenhagen. The Declaration concluded: 'The financial crisis has mobilised enormous political will to tackle a crisis of global scope – the same must now be achieved on the interconnected challenges of climate, energy and economic recovery.'

The global problems of which we are all only too aware contrast sharply with the nature and scale of the risks we face here in the Netherlands. Be that as it may, we too are obliged to prepare to meet the threats we face. Then we can determine how useful the ideas we develop here are in a wider context. And this is the message I want to convey. Mutual solidarity on national security issues requires a comprehensive approach. An approach that focuses on analysing risks, thinking through possible scenarios, taking preventive measures, and ensuring we have sufficient capacity to respond appropriately.

In most countries the comprehensive approach is still in its infancy, although interest in it is growing. And we have made progress since we last met, two years ago. I told you then that the Netherlands had just begun work on a National Security Strategy. Each year we carry out a national risk assessment of threats to the Netherlands. We also estimate the likelihood of these threats occurring. This all-hazard approach puts the Dutch government in a position to make well-thought-out decisions. The assessment revealed, for example, that we were insufficiently prepared for large-scale evacuations in the event of floods. Emergency provisions for isolated areas were also a point of concern. In response, we decided among other things to place more emphasis on the need for people to be self-sufficient and take responsibility for themselves.

In terms of national threats, our main conclusion two years ago was that a flu epidemic was one of the biggest dangers we faced. We strongly suggested that businesses and government agencies draw up continuity plans. It soon became clear just how important this was. The serious threat posed by H1N1 flu forced the continuity plans into a higher gear. So: the measures taken were justified by events. But events also showed that countries still tend to respond to international crises individually, rather than in consultation with each other.

Fortunately, more and more countries are becoming aware of the international all-hazard approach. Early last year, the OECD report 'Innovation in Country Risk Management' was published. The OECD recognised the importance of an all-hazard approach, stating: 'Without a tool such as the "National Risk Assessment", it may be difficult for top level policymakers to make informed decisions on the relative benefits of buying down risks to public health, safety or security through mitigation investments.' The OECD also recognised the methods of risk assessment used by the Netherlands and the United Kingdom as 'best practices'. We are, of course, proud of this.

... we too are obliged to prepare to meet the threats we face

It is also encouraging that the issue of risk analysis in the EU as well as nationally was taken up by the EU Justice and Home Affairs Council under the Swedish Presidency. The importance of cross-border cooperation on security issues and the need for a strategic vision on prevention were high on the agenda. These issues were also included in the four-year Stockholm Programme and in the Council Conclusions on a Community framework on disaster prevention. In the near future, during the Spanish Presidency, the European Commission will issue a political statement on internal European security. This will clarify not only what the EU and national governments can do to ensure public safety, but also what individuals and companies can do for themselves.

New agreements were made to this effect at the European Council of 21 January. Many of my European counterparts support not only the development of a strategy that covers the entire domain of security and safety, but also the inclusion in this strategy of new threats such as cyber-crime, ICT and energy failures, and threats outside the EU. As far as I am concerned, the problem of scarcity can be added to that list. After all, certain countries have a virtual monopoly on a number of rare earth metals. The EU has to import many of them. That makes us vulnerable. It is our duty to reflect upon this in good time with each other, not forgetting the possible implications for national security!

It is good that the EU is making an explicit link with prevention, because it is precisely these kinds of creeping threats that need to be identified and dealt with head on and in good time.

We must not get bogged down in analyses. Rather, we need to take these issues forward and make people safer. This will mean daring to cut across our own enclosed structures. What kind of impact will engaging with the issue of scarcity have on trade policy, energy policy, foreign policy and climate policy? When it came to H1N1, vaccines and continuity plans were our key to make the Netherlands safer. We will need to look for similar keys at international level to solve the problems of scarcity.

Finally: let's say we meet again in another two years' time. What should we have achieved by then? It would be good if we could say that we no longer consider the future threats posed by scarcity and climate change as complex. It would be even better if we have a common understanding by then of how different issues, including new threats, are interlinked.

It would be great if Europe had a comprehensive security strategy, and the European Commission had carried out an EU-wide risk analysis, including scarcity. So that in two years' time we can say: this is how we're going to meet these challenges internationally. Let's work towards that goal today and tomorrow.



*Dr. Ole Schröder,  
Parliamentary State Secretary, Federal Ministry of the Interior, Germany*

In the coming years, climate change will be one of the greatest challenges facing humanity. Rising temperatures, melting glaciers, increasing droughts and flooding are the first effects. Natural disasters are occurring more frequently, on a larger scale and with greater impact, and they do not stop at national borders. The only way to develop effective solutions to contain and above all deal with these effects is by working together. The climate summit in Copenhagen last December was a small first step in the right direction. We must continue down this path and find effective ways to work with each other. That is why we are all here. We want to look together for ways to meet the challenges that climate change poses for civil protection.

# Climate change, a challenge for civil protection

## The German view

### **Civil protection in Germany**

It makes sense to locate the responsibility for civil protection as close as possible to the people affected. Preventive measures must be taken at the local level, which is the best place to determine what threats are relevant and which preventive measures are appropriate. Cities on the Rhine need to take measures to prevent flooding, while communities in the Black Forest have to think about how to protect locals and tourists against avalanches. If damage occurs despite preventive measures, the local level is most familiar with the local circumstances and best able to respond rapidly. The same is true of threats or damage on a larger scale affecting multiple communities. In this situation, an additional factor becomes important: It is crucial for the various local teams to share the work efficiently. To make sure that happens, coordination is needed at a higher level. In Germany, this is the responsibility of the states, which support the local agencies in preparing for and preventing risks.

In the same way, risks or damage affecting more than one state, such as the flooding along the River Elbe in 2002, can be managed only if participating actors work together across state borders and if the federal level helps the states prepare for such risks. In order to create the appropriate conditions for doing so, the federal and state governments worked together to draw up and

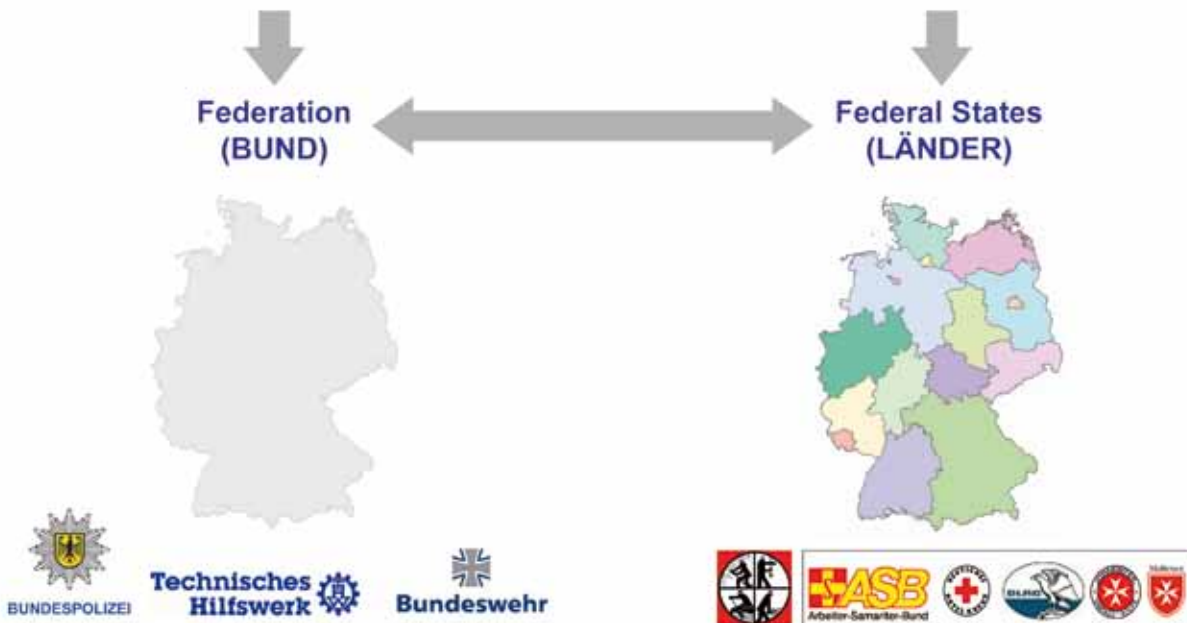
implement a new strategy for civil protection in Germany.

### **New federal office**

The Federation has created the Federal Office of Civil Protection and Disaster Assistance. It serves as the strategic hub and shared services centre at federal level for all agencies, organizations and institutions involved in civil protection. One unit of the Federal Office is the Academy for Crisis Management, Emergency Planning and Civil Protection, which offers those involved in civil protection with up-to-date training and exercises tailored to current, real-world challenges.

### **New tools**

The Federation has also created various new tools to provide the states with operational support in large-scale threat situations. We now have a joint federal/state information and situation centre to provide information and coordinate resources across state borders. It does so with the help of our database deNIS, in which information from the states, especially information about available resources, is linked, processed and made accessible to all. We have also set up a satellite-based warning system that can broadcast official emergency messages on all public and private radio and television stations.



### New law

The new strategy for civil protection in Germany also led to new legislation, the Act on Federal Civil Protection and Disaster Assistance, which entered into force on 9 April 2009. The principle of federal resources to support the states is anchored in the Act, which also created the possibility of central federal coordination in case of large-scale emergencies. Although the Act does not grant any federal operational competences or powers to take command, it does allow the Federation to coordinate information management and the distribution of scarce resources at the request of the states.

### Bilateral cooperation

But the potential dimensions of natural disasters require more than good cooperation at the national level; cross-border and international solidarity are equally important. Here I would like to thank the Netherlands for their good and close cooperation. We are very pleased to be able to host this conference with our Dutch colleagues.

### European positioning

Solidarity among neighbours is important. It also provides the foundation for civil protection within the European Union. While every Member State is responsible for protecting its own population, and should not be allowed to shirk this responsibility, situations may arise in which a country, despite its best efforts to prepare for emergencies, must turn to its European neighbours for help. In such situations, the bodies and institutions of the European Union can and should offer support.

### Lisbon Treaty

The Lisbon Treaty explicitly governs the EU's competences in civil protection for the first time. Under the Treaty, the European Commission may undertake measures to support, coordinate and complement Member State action in the field of civil protection. The new Article 196

of the Treaty on the functioning of the European Union spells out the tasks and goals of the Union's activities: "The Union shall encourage cooperation between Member States in order to improve the effectiveness of systems for preventing and protecting against natural or man-made disasters." The Union is supposed to support and complement Member States' action in responding to disasters within the Union, as well as promote "swift, effective operational cooperation" between national civil-protection services, while at the same time respecting the principle of subsidiarity.

In this way, the Lisbon Treaty assures greater legal certainty. The Union's ability to take action, and its limits, have been defined for the future. Support, coordination and complementary measures are subject to an explicit ban on substitution: EU measures may not take the place of Member State responsibility. This provides clear answers to certain current questions.

### MIC: no authority for operational crisis management

A central element of European civil protection is the Monitoring and Information Centre, MIC for short. It operates as a central coordination office, receives requests for assistance and coordinates the distribution of resources. Again and again, policy-makers demand that the MIC be given operational competences and the power to assume command.

In Germany's view, the response to such demands is clear: Each Member State is free to decide whether to request help from the European Community and whether to provide civil protection units for European operations. This decision flows from national sovereignty. EU measures may not take the place of Member States' own responsibilities. This is why the MIC cannot be granted any powers to give orders, which would clearly exceed the European Commission's mission to support, complement or coordinate.

On the other hand, what is possible and, in Germany's view, also necessary, is expanding the MIC's service role

for the Member States. This would mean improving personnel and material resources. The MIC's analysis and advisory competences should be strengthened and its ability to help coordinate should be improved. This should be one goal of our joint efforts to improve European civil protection.

### No EU operational forces

Another demand often heard is for the EU to have its own forces and resources for civil protection operations. In Germany's view, this is also clearly prohibited by the Lisbon Treaty. The European Union's responsibility to support, coordinate and complement Member States' action is to be measured against the principle of subsidiarity. According to this principle, the Union may get into action only if Member States' civil protection measures at national level are insufficient and measures can be better provided at Union level due to the extent of the need.

If a Member State is deficient in providing civil protection, such deficits are to be overcome by the Member State's own efforts. The EU's responsibility to complement Member States' action does not give the EU the right to "communitize" Member State deficits and compensate for them at EU level.

If, in case of unusual disasters, the national capacities of Member States are exhausted, even though they have taken sufficient action to prepare for such emergencies, this still does not justify creating the EU's own civil protection units. Under the clear description of tasks in Article 196 of the Treaty on the functioning of the European Union, the EU has the task of encouraging cooperation between Member States. The Member States are responsible for helping each other in case of disaster. The question of EU-level resources arises only if the Member States are unable to muster enough civil protection resources to help another Member State in an emergency. But given the fact that there are 27 EU Member States, and 31 states participating in the Community mechanism, plenty of resources are available. It is difficult to imagine a disaster that we would be unable to manage using the resources that already exist across the EU. In this regard, Germany supports the effort to carry out an EU-wide risk analysis and inventory of existing capacities. This will show us where scarce resources are. Then we should figure out how the EU can help the Member States make these resources available.

Germany has always believed that having operational crisis management based in Brussels, an MIC with the power to take command and EU-owned civil protection resources would be incompatible with the idea of subsidiarity. Germany's federal and state governments both agree on this, and we see the Lisbon Treaty as confirming this position.



### Coordination, cooperation and prevention

The joint European response to the civil protection challenges of climate change will have to take a different form. The Member States' capacities and resources must be pooled and linked like those of the federal and state governments in Germany. We need coordinated cooperation among all of the Member States to cover the entire range of civil protection tasks, from prevention and preparedness to remediation.

Germany believes that the key to protecting the civil population better against disasters lies in effective prevention. The need for response capacities is directly related to the extent and effectiveness of the prevention measures taken. If we succeed in preventing damage incidents, reducing their frequency or containing their impact, this represents a far greater gain in terms of security than can ever be achieved through capacities for response. And preventive measures typically cost just a fraction of what must be spent on response and reconstruction following a disaster. With this in mind, Germany greatly welcomes the fact that Spain has made forest fire prevention a priority of its presidency.

### Conclusion

A strong Europe can also play an important role in international civil protection, as our experience may be helpful for other nations and regions affected by disaster. Building networks with other countries and groups of countries can help in finding a common global response to the challenges posed by climate change. I invite you, as you take part in this conference, to engage in a lively exchange of information and experience and in intensive discussions, especially in the working groups.

I am certain that by working together, you will develop ideas that will lead to successful approaches for the future.



# Climate change

# State of the science

## Some basic facts about global warming

Important core findings of climate research have been so well con-firmed in recent decades that they are now generally accepted as fact by climate researchers. These core findings include the follow-ing:

1. The atmospheric CO<sub>2</sub> concentration has risen strongly since about 1850, from 280 ppm (a value typical for warm periods during at least the past 700,000 years) to over 380 ppm.
2. This rise is entirely caused by humans and is primarily due to the burning of fossil fuels, with a smaller contribution due to deforestation.
3. CO<sub>2</sub> is a gas that affects climate by changing the earth's radiation budget: an increase in its concentration leads to a rise in near-surface temperature. This has been known since the 19<sup>th</sup> Century and is well-established physics. If the concentration doubles, the resulting global mean warming will very likely be between 2 and 4°C (the most probable value is ~3°C), with the remaining uncertainty due to climatic feedback effects.



4. Since 1900, global climate warmed by ~0.8°C. Temperatures in the past ten years have been the highest since measured records started in the 19<sup>th</sup> century and for many centuries before that.
5. Most of this warming is due to the rising concentration of CO<sub>2</sub> and other anthropogenic gases. These would in fact explain more warming than is observed, were they not offset in part by the cooling effect of aerosol pollution (smog).

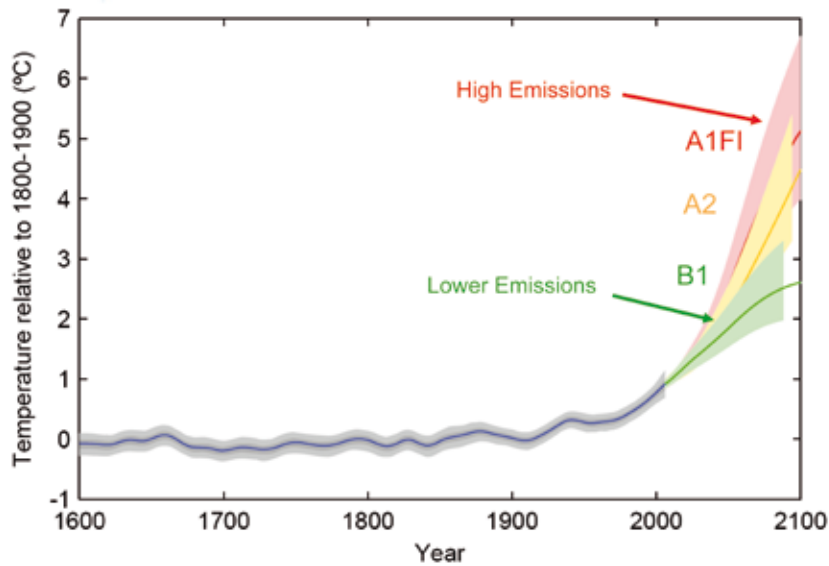
These findings are based on decades of research and thousands of studies. The extraordinary consensus reached is seen in the statements of many international and national professional bodies which have extensively and critically assessed the scientific evidence. In addition to the well-known reports of the IPCC, there are public statements of the National Scientific Academies of all G8 countries, the American Geophysical Union (AGU), the World Meteorological Organisation (WMO), the scientific Advisory Council on Global Change (WBGU) of the German government, and many others. These organisations have again and again come to the same key conclusions.

From points 1. – 3. follows that a further increase in CO<sub>2</sub> concentration must lead to a further rise in global mean temperature (Fig. 1). For a range of plausible assumptions about future emissions, by the year 2100 this rise will reach 2 - 7 °C above preindustrial values.

For comparison: the last major global warming was the end of the last great Ice Age (about 15,000 years ago); it involved a global warming of ~5°C over a time span of 5,000 years. Unchecked anthropogenic warming could reach a similar magnitude over a fraction of this time – and, of course, starting from an already warm climate.

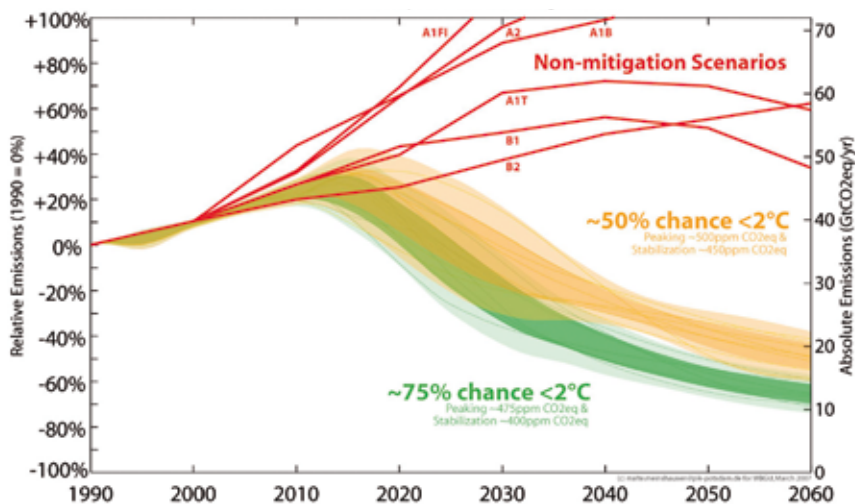
## Impacts and risks

Whether this warming is considered a “dangerous” climate change can, of course, not be determined by scientists alone, as it depends on a societal value judgment about what is dangerous. However, science can help to clarify what are the risks that arise from such unprecedented warming. Amongst the most important risks are the following:



IPCC projections for global mean temperature in the 21st Century. The uncertainty ranges for three different emissions scenarios are shown (B1, A2 and A1FI). For comparison, a reconstruction for temperatures of the past centuries is included.

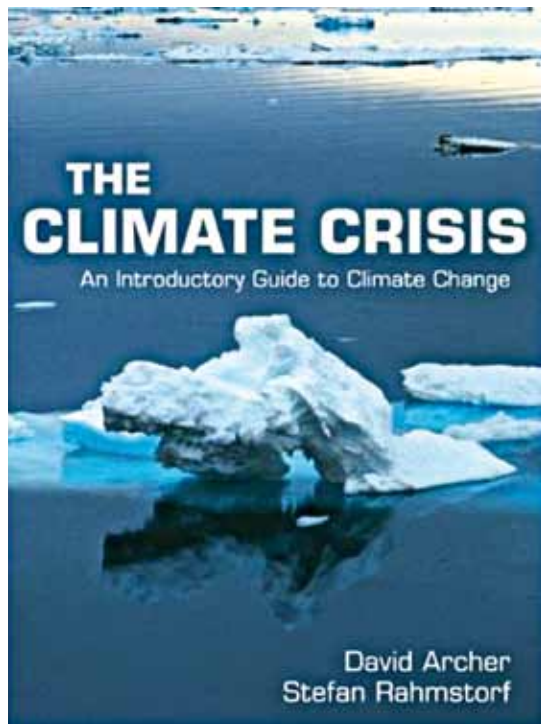
Fig. 1: The next 100 years



Comparison of different emission scenarios for the period 1990 to 2060. Red curves are the well-known IPCC SRES scenarios without climate protection policies ("non-mitigation"). Yellow is a set of scenarios leading to a 50% chance to stay within the 2-degree policy limit. The green scenarios have a 75% chance of staying below this threshold. (Meinshausen et al 2009).

Fig. 2: Global GHG emissions (Kyoto GHGs including LULUCF)

- **Sea level rise and loss of ice sheets.** In the 20th Century global sea level increased by 15 - 20 cm. Currently sea level is rising at over 3 cm/decade, faster than projected in the model scenarios of the IPCC. Future rise by 2100 could exceed one meter. Even if warming is stopped at 3 °C, sea level will probably keep rising by several meters in subsequent centuries in a delayed response. Coastal cities and low-lying islands are at risk. What is now a once-in-a-century extreme flood in New York City (with major damage, including flooded subway stations) would statistically occur about every 3 years if sea level were just 1 meter higher.
- **Loss of ecosystems and species.** Global temperatures would reach a high never seen for millions of years, and the rise would be much too fast for many species to adapt. A large fraction of species – some studies suggest up to one third of species – could be doomed for extinction already by the year 2050. Life in the oceans is not only threatened by climate change but by the equally serious problem of the ongoing global ocean acidification, which is a direct chemical result of our CO<sub>2</sub> emissions.
- **Risk of extreme events.** In a warmer climate, the risk of extreme flooding events will increase as warmer air can hold more water (7% more for each °C of warming).



Droughts and forest fires are likely to increase in some regions, as is currently occurring in the Mediterranean region, Southern Africa and California. Hurricanes are expected to become more destructive. An increase in energy of hurricanes is suggested in response to rising sea surface temperatures by both models and data. A number of recent studies has shown that the observed rise of sea surface temperatures in the relevant areas of the tropics is primarily due to global warming, not to a natural cycle.

- **Risk to water and food supplies.** While the total global agricultural production may not decline in a warmer climate, many poorer and warmer countries can expect reductions in yields due to water shortages and weather extremes. The water supply of major cities like Lima is threatened when mountain glaciers disappear.

... almost all nations of the world have committed themselves to preventing a “dangerous interference” with the climate system

These are only examples – the exact consequences of such a major change in climate are difficult to predict, and surprises are likely. In some cases, impacts have already proven to be more rapid or severe than expected,

like in case of the dramatic loss of summer sea ice in the Arctic Ocean. Ice extent in 2007 and 2008 was only about half of what it has been in the 1960s, ice thickness has decreased by 20-25% just since 2001, and in 2008 the North-East Passage and North-West Passage were both open for the first time in living memory.

#### How to avoid dangerous climate change

In the United Nations Framework Convention on Climate Change (UNFCCC) of 1992, almost all nations of the world have committed themselves to preventing a “dangerous interference” with the climate system. To avoid the most dangerous consequences of climate change, the Copenhagen Accord of 2009 calls for keeping global warming below 2°C above pre-industrial temperatures, possibly even less. To reach this goal, the greenhouse gas concentration in the atmosphere needs to be stabilised well below 450 ppm CO<sub>2</sub>-equivalent (possibly after some limited temporary overshooting of this value).

To achieve this, the global CO<sub>2</sub> emissions need to be reduced by 50-80% by 2050, compared to the level of 1990. Carbon cycle feedbacks and climate sensitivity make the exact number uncertain (see Fig. 2).

According to latest economic modeling results (see special issue of the *Energy Journal*, as well as the *Stern Review* published in November 2006), this can be achieved with minimal costs (around 1% lower GDP by 2100) by induced technological innovation, including increased energy efficiency and renewable energy technologies (wind, biomass, solar). Detailed scenarios for the required energy transition have been worked out e.g. by the Advisory Council on Global Change of the German government ([www.wbgu.de](http://www.wbgu.de)).

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For more information, see the author’s web page at [www.ozean-klima.de](http://www.ozean-klima.de) and the climate change weblog [www.realclimate.org](http://www.realclimate.org).

# Climate change and food security: challenges and solutions

During the last five years, I have been coordinating the way in which the UN system acts within two areas of risk: influenza pandemics and food insecurity. Today I focus on ways in which changing climate may influence the degree to which the world's people can access and use the nutrients they need for a productive and healthy life.

The recent OECD study on the evolving risk landscape is a backdrop to this meeting. It anticipates new types of risk appearing with increasing frequency and with substantial worldwide economic, human and political impact. This calls for evidence-based prediction, prevention and preparation which involve the collective effort of different governments, professionals and political parties. Forging the necessary consensus to tackle such novel risks requires political determination that puts the long-term security of each nation's citizens before other interests. Politicians' room for maneuver when faced with high uncertainty is often constrained: weak governments do not find it easy to build political support behind risk management. There is no substitute for intergovernmental action in the face of global risks (given the technical and economic interdependence between nations). However intergovernmental processes require trust. Often dialogue at the working level helps to create a platform on which higher-level trust can develop. This can include networks for information sharing and coordination across sectors and professional groups, building cross-links between silos at local, regional and national levels.

It takes a unique set of bureaucratic skills to work in these areas and not all professionals have the necessary expertise and experience to do this. It means working within webs of multiple responsibilities, actively seeking the pressure points which can lead to the most effective responses. It means having systems for the exchange and shared analysis of both information and intentions. It means task teams working for efficient multi-country policy responses, which means in turn trust-building personal encounters and joint projects. It means clear, open, consistent and courageous communications



(there are always those who will seek to ridicule risk assessments in areas of extreme uncertainty).

The UN system's coordinated work on food security and influenza has exposed the intense linkages between food production, people's access to food, the key role played by healthy livestock (a hedge against food shortages) and the potential threats posed by changing climates. The risks are global, but actions to mitigate or adapt to them must be taken at the local level. Within governments, these issues involve multiple ministries and typically lead to the engagement of several hundred stakeholders. My focus is on the availability and accessibility of the food needed for people to be well enough nourished to have healthy and active lives. Effective action requires (a) a common analysis that starts for the interests of poor people, especially women; (b) an understanding of the potential impact of climate;

<sup>1</sup> The work described here draws on the work of Professors Joachim von Braun and Robert Watson.

(c) an appreciation that interactions between climate change and food security are already being demonstrated in different parts of our world, including the Horn of Africa and in Eastern Sahel; (d) a recognition that these interactions can provoke tensions as communities seek to dispute scarce resources – in practice it is always the weakest (the young and the ill) who miss out and suffer the most; and (e) a willingness to use the risk approach to serve as a basis for both coordination and anticipation.



### The analysis

Food security covers availability (increased yields through agriculture, adding value and reducing storage losses in processing, and marketing procedures that benefit the poor). It also covers accessibility (can all people access the food they need when they need it and if not, can they benefit from safety nets) and nourishment (adequate energy and nutrients for maintaining health, physical function and growth – water and sanitation, public health, nutritional status). There is emerging consensus on the strategies to pursue: these are covered in the Comprehensive Framework for Action of the High Level Task Force for the Global Food Security Crisis (HLTF).

### Elements of the response

(a) Help smallholders produce more food; (b) Ensure that all people can access the food they need...and that the food has optimal nutritional impact. This implies a policy focus on boosting smallholder agriculture balanced by efforts to reduce poverty and improve food governance in the face of changing climate.

Using Robert Watson's predictions, climate change will have a major but varied impact on land productivity, livelihoods and access to food. Increased unrest is possible. The international community is committed set to climate change mitigation as a priority, encouraging equitable burden sharing, deterring free-riders, establishing a world wide price for emitted carbon, encouraging aggressive emission reductions by industrialized countries, establishing new funding streams for technology cooperation and transfer, with slower emissions growth in emerging economies and a system for monitoring and verification.

The links between climate change and food security should be addressed with a dual perspective: climate change in the context of food security and food security in the context of climate change. No longer can we afford to look at either in isolation! Common ground between developing and developed countries is possible through seeing agriculture as part of the climate change problem and part of the solution. Agriculture causes 14% of total CO<sub>2</sub> emissions, but their impact can be reduced through CO<sub>2</sub> sequestration and better soil management

(source: IPCC 2007). For adaptation to the impact of climate change on food systems, location specific (and not cookie-cutter) approaches are critical. There is a need to reconcile the limited resolution of macro-level economic models and the detailed analyses and models available on cropping patterns. This leads to more realistic modeling of climate change effects (biological and economic) on global and regional agriculture.

Climate change – together with loss of biodiversity, land degradation, water shortages and air pollution are development and security issues which undermine people's access to food, water and energy, affecting livelihoods and health, and – in some cases – triggering conflict. Climate change impacts are inevitable, but they can be mitigated, and affected communities can be helped to adapt to them. The international community is now committed to prioritizing climate change mitigation, with equitable burden sharing. The sharing procedures are currently under negotiation (and the sacrifices will not be easy).

The lessons of this work to date are (a) the need for a firm analytical base with robust strategies that acknowledges and is comfortable with uncertainty; (b) the importance of political commitment based on sound economic and social analysis; (c) the importance of sharing technologies that can transform and empower; (d) the importance of multi-actor approaches for prediction, prevention and protection, in the form of a uni-directional social movement; (e) developing viable partnerships as a base for this social movement [Civil society, farmers, government (local and national) and Private sector]; (f) Incentives for action, and (g) open and participatory communication.

In conclusion, we must recognize that good governance includes good risk management, resource shortages most affect poor people, response must put the interests of people first (not of institutions or individuals). At all times emphasis should be on joined-up action by the international community. It is worth recalling that F.M. Lappe said "Food crises are not a scarcity of food but a scarcity of democracy".

Prof. Dr. Peter Hoeppe,  
Head of Geo Risks  
Research/Corporate  
Climate Centre,  
Munich Re, Munich,  
Germany



## Regional and global natural catastrophe trends – what is the influence of climate change on risk patterns?

As extreme weather events affect the core business of insurance this industry has quite early analysed potential effects of global warming on natural catastrophe hazards. Munich Re already in 1973 has addressed this topic in a publication. Today climate change is regarded as one of the largest risks for insurance industry. Munich Re's experts have been researching loss events caused by natural hazards around the globe for over 35 years. These losses are documented in the NatCatSERVICE database currently documenting more than 27,000 single events.

In recent years we have seen many natural catastrophes with records in intensities and losses caused by them such as:

- The hundred-year flood in the Elbe region in Germany in the summer of 2002, still the most expensive natural catastrophe in Europe.
- The 450-year event of the hot summer of 2003, which caused more than 70,000 heat fatalities in Europe.
- The largest ever recorded number of tropical cyclones (28) and hurricanes (15) in a single North Atlantic season in 2005, with the strongest (Wilma – core pressure: 882 hPa), fourth strongest (Rita), and sixth strongest (Katrina) hurricanes on record.
- Hurricane Katrina, the costliest single event of all

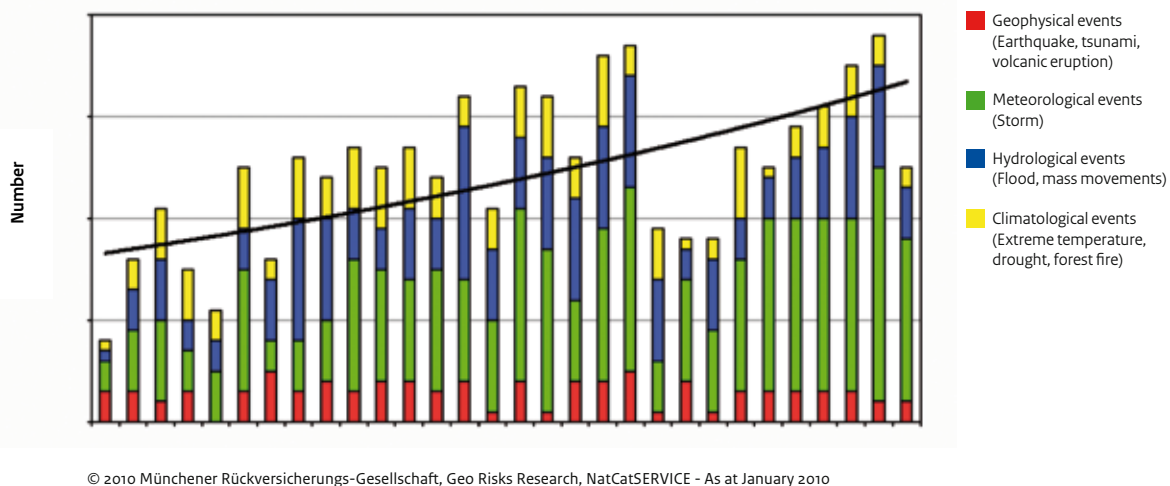
times, with economic losses of over US\$ 125bn and insured losses of approximately US\$ 60bn.

- In October 2005, Hurricane Vince formed close to Madeira, subsequently reaching the northernmost and easternmost point of any tropical cyclone.
- In 2006 record heat in July in the Netherlands: about 1000 heat fatalities.
- Winter storm Kyrill (January 2007) has caused the second largest losses in Europe caused by a winter storm.
- Largest losses ever caused by flooding in the UK in June/July, 2007.
- Hurricane season 2008: Gustav had the highest ever measured gust wind velocity of a hurricane near the ground (340 km/h measured at a site in Cuba), Ike had the highest ever calculated destructive potential calculated by the Integrated Kinetic Energy Index.
- In 2009 tropical storm Grace set a new record as never before a tropical storm has been documented developing so far north-east in the Atlantic Ocean!

The analyses of the NatCatSERVICE data clearly show a dramatic increase in the number of natural catastrophes around the globe, with ever growing losses. The trend curve indicating the number of devastating natural catastrophes (losses > US\$ 500m at current values or

## Global natural catastrophes 1980-2009

Number of devastating catastrophes with trend (catastrophe classes 5-6)



**Fig. 1: Annual number and trend line of devastating catastrophes (catastrophe classes 5-6)**  
(Source: NatCatSERVICE, Munich Re)

fatalities > 500) worldwide reveals an increase from about 17 per year at the beginning of the 1980s to about 33 at the present time and thus roughly a doubling (fig. 1). Since 1980 on average 18% of the devastating weather events have occurred in Europe, the continent affected most has been Asia with 39%, second North America with 33%. In Europe 33% of the events have been caused by floods, 32% by wind storms, 25% by other weather related events and 10% by earthquakes. Economic and insured losses resulting from weather disasters have risen even more sharply. In 2005, a record year, global economic losses were as high as nearly US\$ 180bn and insured losses around US\$ 90bn.

The main reasons for the sharp increase in losses from weather-related catastrophes are population growth, the settlement and industrialisation of regions with high exposure levels and the fact that modern technologies are more vulnerable to losses. The state of Florida in the USA, which has always had a high hurricane exposure, is a good illustration of the way that socioeconomic factors can act as natural catastrophe loss drivers. The population there has grown from 3 million in 1950 to the current 19 million.

As the rise in the number of natural catastrophes is largely attributable to weather-related events like windstorms and floods (figure 2), with no similarly strong increase in geophysical events such as earthquakes, tsunamis, and volcanic eruptions, there is some justification in assuming that anthropogenic changes in the atmosphere, and climate change in particular, play a decisive role. There has been more and more evidence to support this hypothesis in recent years. The fourth status report of the Intergovernmental Panel on Climate Change (IPCC 2007) regards the link between global warming and the greater frequency and intensity of extreme weather events as probable. The report finds, with more than 66% probability, e.g. that climate change already produces more heat waves, heavy

precipitation, drought and intense tropical storms and that such effects will be growing in the future.

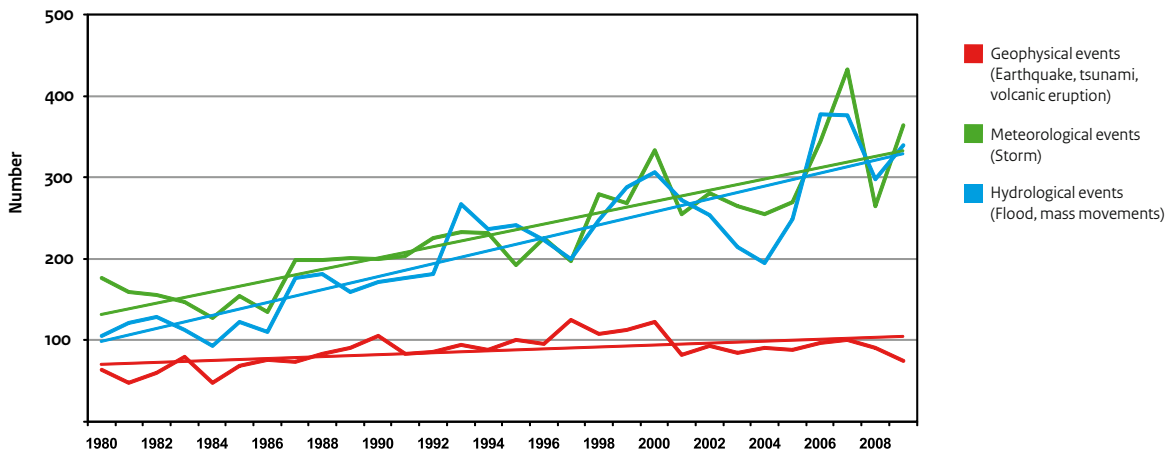
The rise in global average temperatures significantly increases the probability of record temperatures. Higher temperatures also enable air to hold more water vapour, thus increasing the precipitation potential. Combined with more pronounced convection processes, in which warm air rises to form clouds, this results in more frequent and more extreme intense precipitation events. Already today such events are responsible for a large proportion of flood losses.

Now that a number of changes have already happened and some of the predictions for the coming decades have already been seen, the key issue is no longer if and when there will be conclusive proof of anthropogenic climate change. The crux of the matter is whether the existing climate data and climate models can provide sufficient pointers for us to estimate future changes with reasonable accuracy and formulate adaptation and prevention strategies in good time. The insurance industry's natural catastrophe risk models have already been adjusted in the light of the latest findings. For instance, they now incorporate the increased hurricane hazard due to higher sea surface temperatures that will remain above the long-term average due to the ongoing cyclical warm phase in the North Atlantic and the continuous warming caused by anthropogenic climate change.

Global warming is one of the largest risks for humankind in this century. Mitigation of global warming is urgent in order to keep the changes manageable, adaptation is necessary as global warming cannot be stopped anymore. The insurance industry has been one of the first alerter of potential climate change effects and now consequently is providing solutions both for mitigation and adaptation

## Global natural catastrophes 1980-2009

Trend of events (catastrophe classes 1-6)



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**Fig. 2: Annual numbers and trend lines of loss relevant natural events broken down to the different perils (Source: NatCatSERVICE, Munich Re)**

the problem. So e.g. Munich Re together with the Desertec Foundation has initiated the foundation of the Desertec Industrial Initiative GmbH, which is developing a business case for the carbon free generation of large amounts of electricity in the deserts of North Africa. By custom made insurance covers for innovative technologies like renewable energies, incentives are given for investments into such assets. The Munich Climate Insurance Initiative, founded in 2005 by Munich Re, is working on insurance based risk management

systems for developing countries, in order to support adaptation of the most vulnerable people in respect to climate change.

With our long experience we have created unique expertise on natural catastrophe risks in the changing world and are sharing this within our industry, with government authorities, NGOs, science and the UNFCCC-community.





# Climate change and food security in the Arab region – the Moroccan case

Climate Change will accelerate, the rising stress on water and productive land, among other things threatening seriously food security. Closely interlinked, these cross-cutting issues, related poverty and human insecurity are at the core of security concerns, and debates, in the Arab region, as recent reports have shown. Beyond the centrality of food security, the Arab region is a particularly relevant area for Europe. Not only is it at the East / West and North/South cross roads, but it is also Europe's main energy supplier and is linked to it by the Euro Mediterranean Partnership.



## Climate change and food security in the Arab region

The Arab region, with only carbon dioxide emissions not exceeding 4.7% – lower than any other region except Sub-Saharan Africa, is one of those least responsible for the direct creation of the green house effect.<sup>1</sup> Yet, the region is a direct victim of climate change which will affect it in many ways. Water scarcity

and food security are already major concerns, in the region where there is the need to upscale food security, immediately for Yemen, Somalia and the occupied territories. Water security is indeed, the main challenge facing food security in the long run and will worsen the competition with other uses of water, like tourism, which is a strategic sector for Morocco, Egypt, Tunisia and Jordan!

While seven Arab Countries are among the ten most water scarce in the world, the majority of Arab Countries receives its water resources from outside their borders or shares them with other states. Total available surface water resources are estimated at 277 billion cubic meters per year, among which only 43% of which originates within Arab countries. Population will double in the next 20 years to reach 600 Million persons and will require 600 billion cubic metres a year! Combined sources will save no more than 30 billion cubic meters in the next 20 years: wastewater treatment and re-use 10 to 15 billion m<sup>3</sup>, desalinisation about 10 billion m<sup>3</sup> at a cost of US\$ 2.6 billion a year! Municipal and drinking purposes would still require 400 billion cubic meters to sustain its growing population!

While food sovereignty is declining, for Arab countries, with the exception of Sudan and Syria, food insecurity average increased from 12% to 13% of total population

<sup>1</sup> UNDP, Global Human Development Report 2008 and world development indices for 2007.

(1990- 2004) and reaches 38% in LDCs. Moreover, agriculture under military conflicts and occupation is another daunting challenge, like in Iraq and in the Occupied Palestinian territories. In all Arab countries, overall gender equity becomes central to food security policies, given the proportion of female employment in agriculture (39% in Egypt and up to 88% in Yemen).

Climate change is a particularly disturbing variable for the region. While the full range of its impacts may be debated, all agree that they would include water shortages, increased desertification and soil loss, reduced agriculture production, large population transfers to foreign countries and into the region from Sub-Saharan Africa and threats to national security.<sup>2</sup>

Egypt, Lebanon, Sudan and the countries of North Africa could be the most affected. The following few figures illustrate the magnitude of potential impacts on some areas. A raise of the sea level by one meter will entail 6 million refugees in Egypt and flood 4500 km<sup>2</sup> of agriculture land in the Nile Delta, and by only one half – meter, it could still create 2 million refugees and cause more than \$35 billion in economic losses. In the Kordofan region of Sudan, an increase of 1.5 degrees between 2030 and 2060 would reduce average rainfall by 5%, leading to a general drop in agricultural production and a decrease in maize by 70% of current levels. An increase of only 1.2 degrees Celsius by 2020 would reduce available water by 30% in the centre and south of Tunisia, 15% in Lebanon and by over 10% in some areas of Morocco.

Moreover food security, especially of the poor will be seriously endangered by the projected economic downturn due to climate change. To enhance food security, the Arab states need to invest heavily and carry out major reforms. Adaptation to climate change (research, irrigation efficiency and rural roads) in the MENA (Arab region plus Turkey, Iran and Israel) will cost US\$ 413 million under the wetter NCAR scenario and US\$ 461 million for the Drier CSIRO scenario.

### Climate change impact on food security in Morocco<sup>3</sup>

While agriculture's contribution to GDP varies around 15 % (13.5% in 2000) and can add up to two points GDP the good years, most of the land is desert and arid (78%) and semi arid (15%). Only 7% is sub-humid to humid (> 500 mm rain per year). Total cropland area amounted to 9.44 million hectares in 1999 among which, arable and permanent cropland areas represent 22.3%, and irrigated cropland 13.8%.

Impacts of climate change, which are already visible in Morocco, should be moderate up to 2030 and more severe onward.

- Extreme events - heat waves, forest fires, floods, droughts – have been more recurrent and more intense over the last 15 years. Particularly detrimental to food security, droughts have been increasing from 5 in 40 years (1940-1979) to 4 in only 7 years (1996-2002)!
- Resource degradation is accelerating:
  - Soils loss, decrease of its fertility and increased salinization will lead to cultivation of marginal lands and reduced food production.
  - Notable decrease in levels of aquifers will occur. From 2000 to 2020, renewable water resources would decrease by 12%, surface water and ground waters by 15%. Capital of water per capita would decrease by 33%, from an average of 1010 billion cubic meters to 682 m<sup>3</sup> (HCP prospects in 2006).
  - Livestock would suffer from inadequate food, insufficient stock and poor quality of water...
  - Crop yields : If a small group of irrigated crops of fruits and vegetables may benefit from climate change, most of rain fed crops- mainly cereals, legumes and oil crops- will undergo yield losses from 20% to 30% by 2050, and more beyond.

Food supply, prices and food security under climate change compared to no-climate change scenario:

- Between 2000 and 2050, international prices over costs are estimated at \$100 per metric ton for rice; over US\$ 200 for wheat; 150 for maize; 50 for soybeans and 50 for other grains;
- Calorie consumption in Morocco, in 2050 would be 15% lower;
- Child malnutrition is 34% higher (112 000 additional malnourished children).

Climate change adaptation costs - agriculture research, irrigation efficiency and rural infrastructure, mainly roads – would amount to US\$ 71million per year (47%) under the wetter NCAR scenario and US\$ 92 million (62%), under the drier CSIRO scenario. The estimates for the global costs would reach US\$ 7.1 billion per year for the wetter scenario and US\$ 7.3 Billion under the drier one.

### Main conclusions

Good development policies are necessary but not sufficient to achieve agricultural sustainability, improved resilience, and climate change adaptation.

<sup>2</sup> Estimates based on studies of the IPCC reports, using a conservative projected scenario.

<sup>3</sup> This analysis has built on various sources combined among others: National scientists, A. El Hafi High Commissioner for Water and Forests; Ait Kadi, National Agriculture Development Council; A. Moksit, Director of National Weather Forecast Agency; Mark W. Rosegrant IFPRI: "High Level Consultation" Adapting to Climate Change" (15 Oct 2009), Reports by FAO, the World Bank .



There is a crucial need for both investments in national adaptation and mitigation and a voice in international climate negotiations.

Spread public awareness of climate change to reduce communication gaps. Clarify and explain the scientific facts and terms to stakeholders and simplify scientific message into clear, concise information are among the most important recommendations.

Thanks to enhanced national expertise and improved international cooperation, progress has been considerable in Morocco:<sup>4</sup> a more reliable forecast; a better telecommunication system; improved follow-up capabilities and coordination (for example: floods in the Ourika valley, in 1995 caused 300 deaths, while the same floods, in the same place in 2007 have occasioned material damage but no dead).

After a large national debate the “Environment National Charter” will be finalised by March 2010. National strategies have been launched by Morocco to reduce global poverty, and promote sustainable development, in order to meet the citizens’ needs, in line with the political move to enhance local government in the ongoing democratisation process:

- National Initiative for Human Development (NIHD) launched in 2005;
- Green Morocco (2008) ambitions to reconcile increased agriculture productivity, sustainable development and environment protection;

<sup>4</sup> A. Moksit, the director of the National Weather Forecast Agency, is as well Vice President of the scientific commission of IPCC, Vice-President of Aladdin Consortium. Morocco is the only non European Country to be associate member of the European Centre.

- Sectorial strategies seek to increase ecosystems, water and energy efficiency: The Forest strategy’s objective is to plant 50 000 ha by 2014.

Water and energy have been reunited in the same ministerial department to satisfy national needs, through improved efficiency and sources’ diversification. Renewed water strategy, in 2009 seeks to rationalise the demand and change behaviours. The dam pioneer approach has moved to small hillside dams, with the triple objective: provide drinking water for all, protect from floods and provide water for irrigation and increase hydraulic electricity production from 8% of national capacity to 14% by 2014 (4500 MW).

Morocco, which imports 96% of its energy (mainly fossil), made a decisive move towards energy efficiency (US\$ 1 billion fund) and diversification with a target of 42% of clean energy by 2020. The ambitious solar energy plan – 9 plants of 2000MW each, at an estimated cost of US\$ 9 billion – launched in November 2009 has put Morocco on the world agenda, raising the interest of the major firms in this field, from Germany, USA, France, UK, etc. Japan is already financing (US\$ 7.5 million) the studies for a plant to be launched in 2011.

Yet, Morocco still needs huge investments to move, in this field from crises management to knowledge management as has been recommended.

Serious challenges still face the Arab World at large: competing claims on scarce resources will compel some countries, which are engaged in multiple transitions, to make difficult trade offs and choices. International cooperation, which is as necessary as difficult requires substantial improvements:

- Liberalisation and the removal of subsidies, strongly advised by International organisations are detrimental to poor nations’ food security and has led to occasional food riots and political unrest;
- The stalled agriculture negotiations need to cater for food deficit countries and allow the trading regime to “increase resilience to climate change’s impacts”;
- Agriculture requires heavy investments to make up for the two last decades’ under- investments and to the dramatic drop in Development aid to agriculture (from 17% in 1980 to 3% in 2002) which goes mainly to humanitarian and food aid). But with the economic crises the prospects are rather gloomy;
- Regional initiatives are important but still weak or not implemented in the Arab region. After the failure of Copenhagen, intense global cooperation among governments will be badly lacking.

# What we need (risk assessment)

There is an enormous quantity of published scientific risk assessments that provide evidence both that the climate is changing and that anthropomorphic forcing – human activity – is a major cause of global warming.

Perhaps the best-known body of scientific work is that of the Intergovernmental Panel on Climate Change (IPCC), whose 4th Assessment Report was published in 2007. When awarding the Nobel Peace Prize in 2008 to, jointly, IPCC and Al Gore, the Nobel Committee said that “the IPCC has created an ever-broader informed consensus about the connection between human activities and global warming”. IPCC reports are global in context, though they contain region-specific elements. There are a great many more geographically-focused reports, including Lord Stern’s review of both the potential impacts of global warming and the economics of investments in mitigation and adaptation strategies and, published two years later (2008), the Garnault Climate Change Review, which

focused on Australia. Such is the volume of scientific output that in 2009 the United Nations Environment Programme’s Climate Change Science Compendium contained 400 major scientific contributions published in the two years since IPCC’s 4<sup>th</sup> Assessment Report. There is also counter-argument. Books such as *Air Con*, *Red Hot Lies* and *The Climate Caper* assert that scientists are overstating the impact of human behaviour on global warming. US Senator James Inhofe has famously made similar points, and there are now three updates to the US Senate’s Minority Report citing scientists expressing dissent over man-made global warming claims. These counter-arguments are themselves subject to criticism. So, not only is there a wealth of risk assessment available, it is contested.

However, signs of changes to the Earth’s climate abound. These include quantifiable glacial retreat and a measurable increase in sea level. During the period 1961 – 2003, global average sea level rose approximately 1.8 mm/year and, during the last decade of that period, accelerated to approximately  $3.1 \pm 0.7$  mm/year. The result is that, for example, Venice floods more regularly. Globally, scientists are forecasting an increase in the severity of tropical storms.

IPCC’s Working Group II gives a number of estimates of the likely impacts of global warming in this century. These include (confidence level of at least 9/10) an increased risk of flash floods and more frequent coastal flooding for nearly all European regions. Southern



Europe will (also 9/10 confidence level) see reduced water availability and crop productivity. Northern Europe will (confidence level about 8/10) experience more winter floods and increasing ground instability. The European Commission-funded PESETA project published its final report in 2009. The report explores four scenarios (mean temperature rises by 2080 of, respectively, 2.5, 3.9, 4.1 and 5.4 degrees Celsius) and their impacts on, inter alia, annual mean temperature, annual rainfall, and coastal system flooding. The report also points to (for most of Europe) problems with river floods, flooding of coastal systems and agriculture, while in most parts of Europe income from tourism is expected to increase. Anticipated impacts – including civil protection and security implications – are not uniform, meaning that individual countries and regions will need different risk management strategies based on focused risk assessments.

Many countries have national climate impact programmes and have published, or will publish, national climate impact assessments. For many, there will be the need to go to a more local level, as is already happening in e.g. the US and Canada. Equally, all countries may face some form of civil disturbance caused by sections of the public protesting against either political inaction or, foreseeably, against measures intended to mitigate or adapt to the effects of global warming. Imagine, for example, reaction to a potential EU decision to approve the use of GM crops or to large numbers of migrants permanently displaced by climate change.

Earth's climate system is notoriously difficult to model (the knowledge is therefore inherently "complex"). There is also considerable "uncertainty" (a lack of clarity or quality of the scientific or technical data) and "ambiguity" (divergent or contested perspectives on the justification, severity or wider meanings associated with a given threat). Science cannot provide decision-makers with a straightforward, uncontroversial risk assessment, meaning there are no simple policy solutions.

Risk is more than a calculation of the consequences and their likelihood of occurrence: perceptions of risk are also important, influencing both how people view and prioritise a hazard as well as how a risk is managed. Values impact on the tolerability/acceptability of risk as much as the knowledge derived from risk assessments. Governments will, as a result, be extremely reluctant to implement policies that threaten the economy and jobs. With climate change, values may in fact be the dominant factor. For example, although there is broad agreement that climate change is threatening the secure supply of food, water and energy, certain behaviours suggest that people accept the generation of waste more than they fear the scarcity of essential resources. By illustration, it



takes three litres of water to produce 1 litre of bottled water and UK consumers throw away one-third of all the food they buy.

One can summarise the options for risk management as being to prevent the event occurring, mitigate the event and its impacts, and/or adapt to it and its consequences. The climate is changing. Mitigating climate change (eg reducing CO<sub>2</sub> emissions) is proving extremely difficult to agree internationally. Adaptation is essential, including the use of technologies. It will also be difficult to prevent scarcities of staples such as food, energy and water, but these scarcities will not be experienced equally by all countries, nor uniformly within countries. Mitigating scarcities is possible, through building buffer stocks, but – again – adaptation is necessary.

Today's other parallel workshop addresses the capabilities needed to meet the challenges to civil protection posed by climate change and scarcities of essential goods. Those capabilities will need to be able to deal with a greater number of more diverse events than is the case today.

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# Risk assessment: an industry perspective

The energy world is facing enormous challenges. These challenges are the result of a few fundamental trends. First, the world's energy appetite will continue to increase over the medium and long term, despite periodic fluctuations due to economic downturns. Meeting this rising demand will require massive investments in energy production and supply. Second, protecting the climate on a truly global scale is a huge undertaking, both technologically and economically. Third, because fossil resources are finite, we will need to use them even more responsibly.

The three overarching energy-policy objectives – security of supply, climate protection, and affordability – are under great pressure. To ensure that this policy triangle stays in balance, we need to take timely action. It will involve substantial investments<sup>1</sup> and a far-reaching transformation of the energy industry worldwide. The transformation will result in a new energy world, one characterized by more decentralized structures, smart systems, innovative technologies, new energy production strategies, and changes in behaviour on the consumption side. Improved energy efficiency and renewable energy sources will play a key role.

At present, decarbonisation – the major trend in the energy sector – has to be achieved in Europe against the background of fundamental changes to the framework for the energy business. Due to the liberalized European energy market and its further convergence significantly increasing pressure caused by competition and market-related risks are discernible.

Furthermore, the third pillar of the “*energy trilemma*”, namely security of supply, which was widely neglected in the past, has lately gained more attention on the political agenda<sup>2</sup>. As the cleanest of all fossil fuels and a perfect complement to renewables, natural gas will be

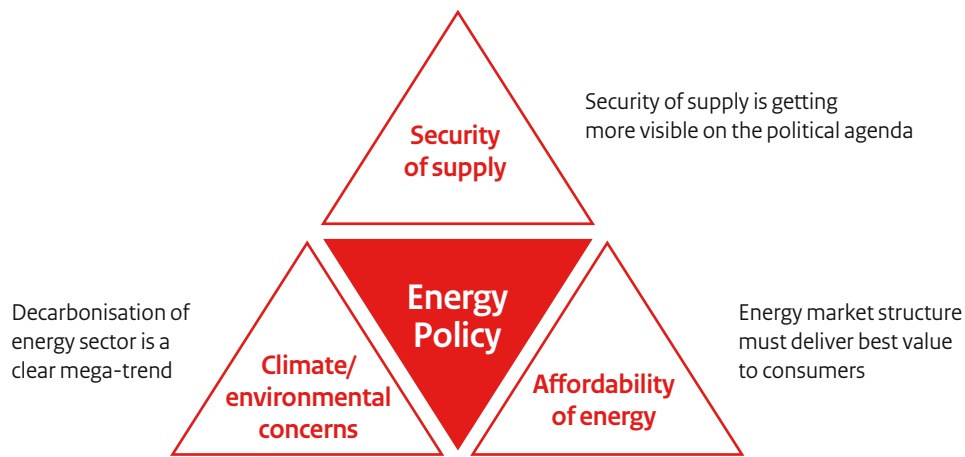


an integral part of a lower carbon world. Consequently, a substantial increase in demand for gas is expected. In view of declining indigenous gas production in Europe, forward-looking energy security strategies are required. Besides, the European electricity sector is facing dramatic long-term fundamental challenges posed by the aging of the generation fleet and the need to ensure adequate electricity production. In the process of transformation towards a sustainable energy system, electrical transmission systems in some parts of Europe already have to cope with major integration tasks as a result of climate-policy measures, e.g. due to the underestimated positive development of renewable energy sources.

These challenges and the related investment necessities lead to potential risks which have to be addressed in good time in an enabling framework. In this context,

<sup>1</sup> In its *World Energy Outlook 2009* the International Energy Agency calculated that *additional* investments in energy infrastructure of more than 10 trillion US dollars are needed by 2030, comparing the reference scenario to the 450 ppm climate scenario (reflecting the 2 degrees climate goal).

<sup>2</sup> For example, in the *Second Strategic Energy Review* of the European Commission published in November 2008.



**Fig.: The Energy Trilemma**

well functioning market mechanisms as well as “fair” regulation are key to delivering security of supply. Against this background, coherency must become the guiding principle for policy-makers and the energy industry if we want to maintain the balance of the energy-policy objectives and not jeopardize economic and social stability.

**E.ON’s contribution**

As one of the world’s largest investor-owned power and gas companies E.ON is strongly committed to the protection of the environment and to actively contributing to tackling climate change. Therefore we urgently call for an enabling framework to continue to credibly reduce the long-term risk and to reward huge capital-intensive, low-carbon investments up to 2020 and beyond. But we too have our role to play and to significantly contribute to CO<sub>2</sub> reduction. As the energy industry is responsible for nearly 40% of worldwide carbon emissions, it undoubtedly also has to deliver a large part of global CO<sub>2</sub> reduction.

E.ON aims to reduce the CO<sub>2</sub> intensity of its power generation portfolio by half by 2030 compared to 1990 levels. With an ambitious framework in place, we could possibly meet our own target even by 2020 – ten years earlier. Our approach is a future electricity generation portfolio consisting of 50% zero-carbon<sup>3</sup> and 50% low-carbon<sup>4</sup> technologies. First results are already visible with our EUR 8 billion investment commitment to renewables in the period from 2007 to 2011 as well as our initial commitments to carbon capture and storage and new nuclear development in the UK.

**Specific risk assessment aspects**

Risk assessment is an important item in the toolbox of E.ON to cope with our business challenges. Needless to say, various risk management processes are in place throughout the E.ON Group. A typical risk portfolio is structured according to market and financial risks, operational risks, external risks and strategic risks. The latter reflect, for instance, future policy and framework conditions in particular with regard to investment projects and business development (e.g. the CO<sub>2</sub> regime). Since power and gas business is strongly influenced by weather conditions, risk values related to the climate and to climate change are already of considerable relevance today, e.g. margins in the short and mid-term perspective. Higher frequency and intensity of extreme weather events, expected as a result of climate change, would have a large impact on future risk assessment results. This could additionally affect strategic decisions in the longer term, e.g. investments in the light of changing priorities. These examples indicate the important and ever growing role of climate change and its impact on business strategies and business continuity aspects in the future.



<sup>3</sup> Renewables and nuclear.

<sup>4</sup> Coal in combination with carbon capture and storage (CCS) technology and natural gas.

One of the core tasks of a state is to protect its population. In order to take adequate measures for effective and efficient civil protection, various natural and man-made hazards<sup>1</sup> have to be investigated with regard to their likelihood of occurrence and expected impact on humans, environment, economy and other fields of interest.

This is the task of risk analysis for civil protection. It aims at providing reliable information for decision support in risk management, emergency planning and crisis management.



## Risk assessment – the German approach

The German Federal Office of Civil Protection and Disaster Assistance (*Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, BBK*) has developed a method for risk analysis that can be applied at all administrative levels. To meet the growing complexity of society and the risks it faces, the method is designed so it is applicable to all kinds of natural and man-made hazards. This approach is comparable to the risk analysis methods used by other states like The Netherlands and The United Kingdom. Basically the risk assessment consists of three main steps. First, a particular hazardous event is selected. It is presented by means of a sufficiently detailed scenario, including information on type, intensity, extent and duration of the hazardous event. The likelihood of the selected event is classified within a range from *negligible* to *very likely*. Secondly, the expected impact of the selected event is assessed upon different fields of interest, including people, the environment, economy, public supply with essential goods and services as well as intangible impacts, e.g. damage to cultural heritage. Thirdly, the risk related to the selected event is located as a point in a risk matrix under consideration of its likelihood and expected impact (see Figure 1).

By applying the risk analysis process to different kinds of events, the risks related to the respective hazards can be visualised within the matrix in a comparable and intuitively understandable way. The accomplishment of risk analyses for all kinds of hazards, however, requires a variety of preconditions, including reliable scenarios, adequate parameters for impact assessment, threshold values for the classification of likelihood and impact, and adequate algorithms to assess the expected impact. Thus, integration of expertise and data from various disciplines and sources is essential in order to produce reliable and consistent risk analysis results.

The results of the risk analysis provide basic information for the treatment of risks.

The comparison of the desired level of protection and the identified level of risk reveals current gaps in civil protection. Based on this information, it has to be decided whether measures will be taken in order to reduce risks or to enhance capabilities, for example with regard to better prevention, preparedness and response. So there is a close link between risk analysis and capabilities based planning.

<sup>1</sup> The semantic distinction between “hazards” for events of natural origin, and “threats” for manmade incidents, is not common in Germany.



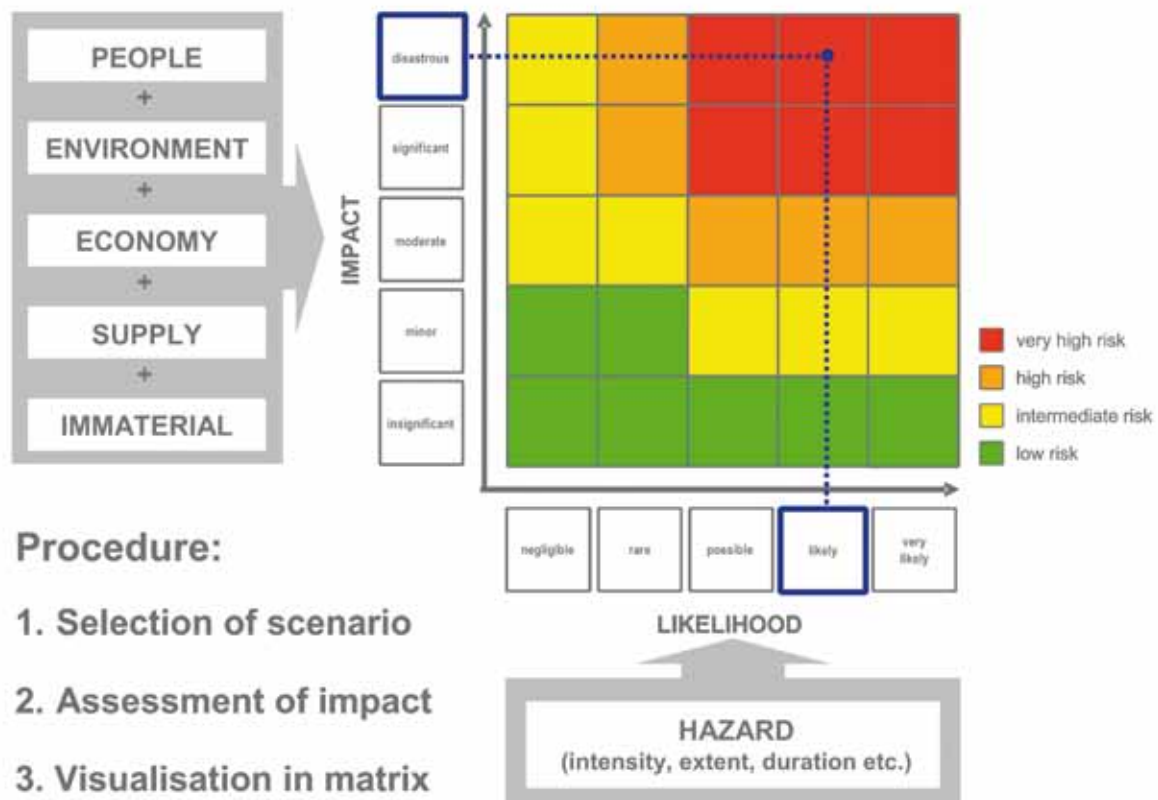


Figure: Risk analysis process

In the frame of an integrated risk and crisis management approach, the task of public authorities for civil protection is to provide reliable information and decision support to political decision makers and the general public. This includes information about hazards, risks and capabilities, the identification of deficits and the development of recommendations for risk treatment and risk communication. The task of the political level is to take decisions. This includes the selection of scenarios, agreement on desired levels of protection, decisions about adequate plans and measures for risk and crisis management as well as decisions about financial resources. Additionally, the population has to be integrated into the risk management process in order to ensure awareness and acceptance as well as to encourage activities for self protection and personal risk reduction measures.

According to the 'New Strategy for the Protection of the Population in Germany' that was agreed upon by the Federal Minister of the Interior and his colleagues from the Federal States ('Länder') in 2002, risk analyses are the basis for a modern overall concept for civil protection. Therefore, BBK will share its method and expertise on risk assessment in order to support the implementation of risk analyses at all administrative levels within Germany. The results of the respective risk analyses are

supposed to provide reliable information and decision support for those who are in charge of deciding on managing risks on behalf of the population. The new 'Law on Civil Protection and Disaster Assistance' that has come into force in April 2009 provides the legal basis for nation wide risk analyses for civil protection in Germany, and from 2010 on the Federal Ministry of the Interior will report to the parliament about the results of the risk analysis annually.

Risk analysis for civil protection is a process and continuous task. Hazards, vulnerability, coping capacities and other factors change over time. Therefore, method and data have to be updated regularly and new scientific findings have to be integrated as well as technical innovations. Mutual exchange and cooperation in the field of risk and crisis management will enhance disaster prevention and preparedness at national and international levels. Therefore, intense exchange with partner states and the scientific community on methods and best practices of national risk assessment is an essential element of a comprehensive risk and crisis management strategy.

# Mass evacuation: evidence-based decision making

## for government and public preparedness

Mass evacuation of the public is a complex activity that tests the decision making capacity of emergency managers. Potentially, the high volume of conflicting information, the lack of reliable information, and the uncertainty around key variables hinder a decision maker's identification of what is a proportional response to a major incident. Preparation for making such a decision may be enhanced through analytical modelling to help understand: the structure of the decision they face, the role of key variables, the tensions between key objectives, and the potential impact of responses in meeting key objectives.

The public also face a dilemma of how to respond to an evacuation order as conflicting information and important uncertainties may cloud their identification of what is an optimal response for them. Thus, by preparing the public the government can help potential evacuees to understand what is expected from them and what is good evacuation practice. Preparation can also manage their expectations on what they can reasonably expect from overwhelmed emergency responders during a major catastrophic incident, placing the responsibility on most to save themselves by evacuation rather than

waiting to be saved. Preparation can also set expectations of evacuation shelter arrangements that are available.

Our project, Evacuation Responsiveness by Government Organisations ([www.ergo-aston.eu](http://www.ergo-aston.eu)), aims to help governments to: prepare themselves for mass evacuation through analytical modelling; prepare their public for evacuation through applying social marketing frameworks. We are building six models/frameworks (in Figure 1):

1. A social marketing framework to encourage the public to change their behaviour and follow good practice by preparing for evacuation.
2. An analytical model to support decision makers in understanding their personal decision making preferences when deciding whether to call a mass evacuation.
3. A simulation model that analyses the dissemination of the warning message to the public.
4. A quantitative model that analyses the public's response to receiving the warning message through examining the movement of pedestrians and traffic through a city.

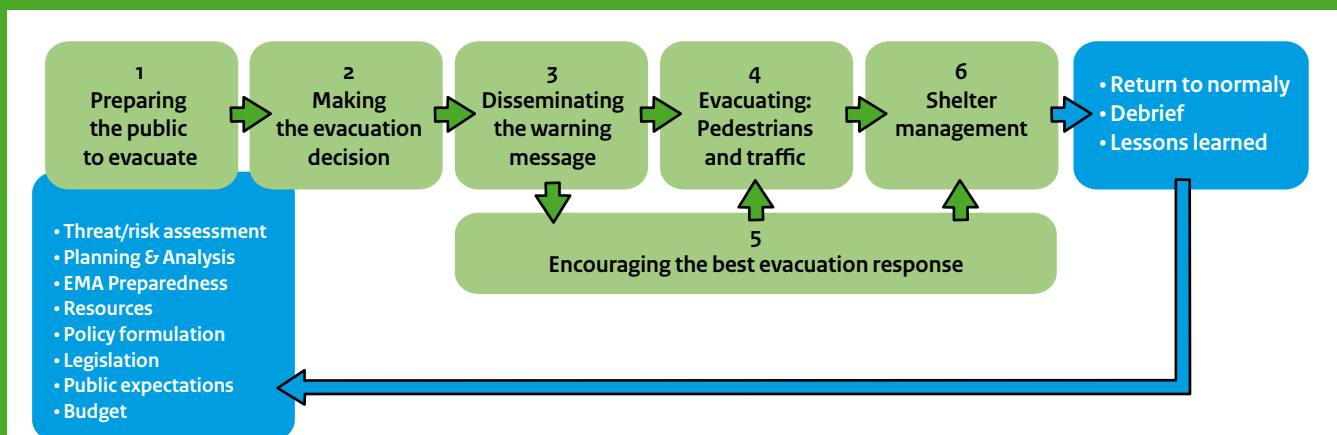


Figure 1: The ERGO model of evacuation



5. A marketing framework used during an incident to encourage the public to: respond to the warning message; evacuate through the city; prepare themselves to be housed in a shelter.
6. An analytical model that evaluates operations within a shelter and how sufficient resources can be sourced to enable the shelter to sustain itself until the public can return to normality.

Models 1 and 5 take a marketing approach to encouraging behaviour change in the public. The models begin by asking government officials to consider the behaviour change that they want the public to display i.e. the goals for their initiative. Audience research aims to understand who are the recipients of the evacuation preparedness messages, their levels of preparedness, what support they need, and how they want to receive that support. Segmentation of the public allows their categorisation into similar types of audience e.g. school children, by level of preparedness, health/disability, by language, by residence. Understanding the needs of each segment allows a mix of targeted marketing approaches e.g. providing evacuation exercises, websites, workshops, community initiatives, local signage, leaflets, brands, text message alerts. However, preparations cost the public (e.g. psychologically, financially) and so the motivation to change behaviour (and respond as desired) must be stronger than its cost.

Model 2 uses a multi-criteria decision making process where a decision maker builds a model with an analyst and, in the process, aims to more fully understand the goals in the situation and the potential tensions between those. Also, evacuation strategies are uncovered along with the potential success of each. The importance of situational factors is also explored as these are less under the decision maker's control, but may have significant impact on their decision. We can assess these aspects of the problem quantitatively using elicitation methods from social science and, thus, can calculate what might be the best strategy given different levels of situational factors. In a case where e.g. the surge forecast level is predicted to be 690cms the optimal strategy is calculated

as *no action*, but at 700cms the optimal would be an advisory evacuation order. If the surge level is expected to be 710-790cms, then a *mild evacuation order* is preferred, whilst over 790cms would suggest an *urgent evacuation order* be issued. A quantitative approach might help to identify the thresholds at which the success of the different evacuation orders become optimal, according to the inputs/assumptions made by decision makers in constructing their model.

Models 3, 4 and 6 take a quantitative approach to analysing the time it takes the public to receive the evacuation warning message, travel to a shelter, and be sustained in the shelter. Working at the city level, we can use publicly available data to understand the locations of (say) city inhabitants. We can calculate the effect of different strategies on the time it takes an inhabitant to receive the warning message, for example, the effect of different combinations of official (e.g. TV, Radio) and unofficial (e.g. neighbours, family phone calls) warning strategies. We can examine the road networks at the level of individual roads, and explore the impact of evacuation strategies on the time to evacuate. We can examine the effect of traffic control measures (e.g. traffic lights) on the flow of traffic and pedestrians. Using these results, we can examine: how long it takes traffic/pedestrians to arrive at shelters; arrival rates at shelters; potential shelter capacities during the life of an incident; resources needed to sustain evacuees in shelters. Analyses can investigate the effects of policies (and combinations of policies) on key performance indicators and the sensitivity of the performance to the effect of incorrect/changing input data.

Our belief is that evacuation decisions can be informed by structured modelling and analysis of key factors. Such models can be used months/years in advance to inform option evaluation and alternatives analysis. Analytical models should not replace the experience and intuition that inform decision making, nor should models make the decision, nor relieve the decision maker of the responsibility over the outcomes. However, analytical models may help decision makers to understand the structure of the problems they face, make explicit some of the complexities of the decision, and become aware of the conflicts and tensions with which they have to grapple and resolve – all with the view of providing a stronger evidence base to complement the experience that underpin these high value decisions.

*The ERGO Project involves Professor Duncan Shaw, Dr Pavel Albores, Dr Patrick Tissington, Susan Anson, Paul Kailiponi and Magesh Nagarajan. With the support of the 'Prevention, preparedness and consequence management of terrorism and other security-related risks programme. European Commission – Directorate-General Justice, Freedom and Security.*

# What we have: a lot of capabilities

## estimation of vulnerability and examples of capabilities

*Prof. Dr. Rolf-Dieter Wilken,*

*Scientific Director of IWW Water Center, Chair Water Resources in Johannes Gutenberg-University Mainz, Germany, Dep. Geology / Geography, Member of The Commission on Civil Protection of the Federal Ministry of the Interior, Germany*



There are five levels of vulnerability, from low level to very high level. In case of water supply the piping is low level, because it must not be affected by floods, whereas wells or other direct water sources are very highly

A vulnerability assessment of infrastructures seems to be a convincing concept to identify the possible damages and adverse effects by inundations. This concept is based on the assumption that interdependencies exist between exposition, susceptibility and capacity of accomplishment <sup>1</sup>.

affected. The results of an assessment are an important part of capabilities for action.

The vulnerability assessment for population is more complicated: a map of flooded areas must be overlaid by population density, and the capacities of tackling the event must be estimated. Helpful is remote sensing. Via satellite or plane photo the height of buildings can be calculated by counting the floors of a building. Knowing this, the vertical evacuation can be arranged. With maps of flooded areas calculated from the topography, the threat to the critical infrastructure as the population density can be known. Also infrastructure, e.g. water works, can be inundated with the consequence of well or water source contamination. This can also be abstracted from satellite /plane photos.

Another important field is availability of

volunteers in the country side <sup>2</sup>. Some years ago the local fire brigade could handle small or medium accidents or problems with the local infrastructure by volunteers in the village. The number of volunteers is decreasing, at least in Germany. Young men or women are working in the next town and are only available during night or weekends. The personal link to the village has decreased, which is dominantly a place for sleeping. We observe a decline of volunteers. Efforts should be made to improve honorary posts situation.

The other social problem is the multi-cultural society we have in our European countries. We have to find ways where we inform the public – and all of them – by a proper communication, perhaps by pictograms.

<sup>1</sup> Indikatoren zur Abschätzung von Vulnerabilität und Bewältigungspotenzialen – Am Beispiel von wasserbezogenen Naturgefahren in urbanen Räumen. United Nations University UNU-EHS, Report on behalf of the Federal Republic of Germany, AZZ BBK F2-440-00-280, September 2009.

<sup>2</sup> Arbeitsbedingungen und Organisationsprofile als Determinanten von Gesundheit, Einsatzfähigkeit sowie haupt- und ehrenamtlichem Engagement bei Einsatzkräften in Einsatzorganisationen des Bevölkerungsschutzes. Research Project by order of the German Ministry of the Interior; Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, September 2009.

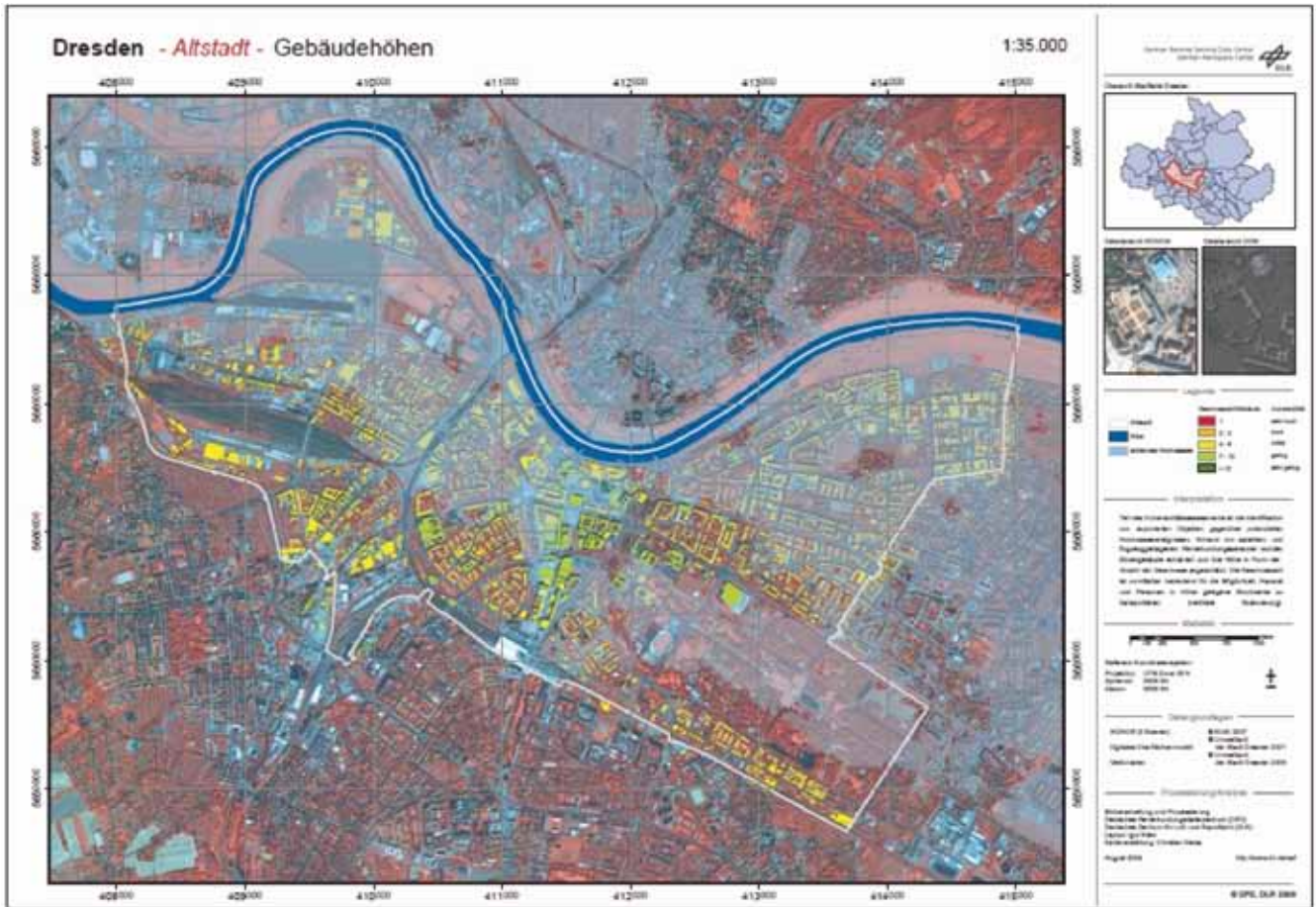
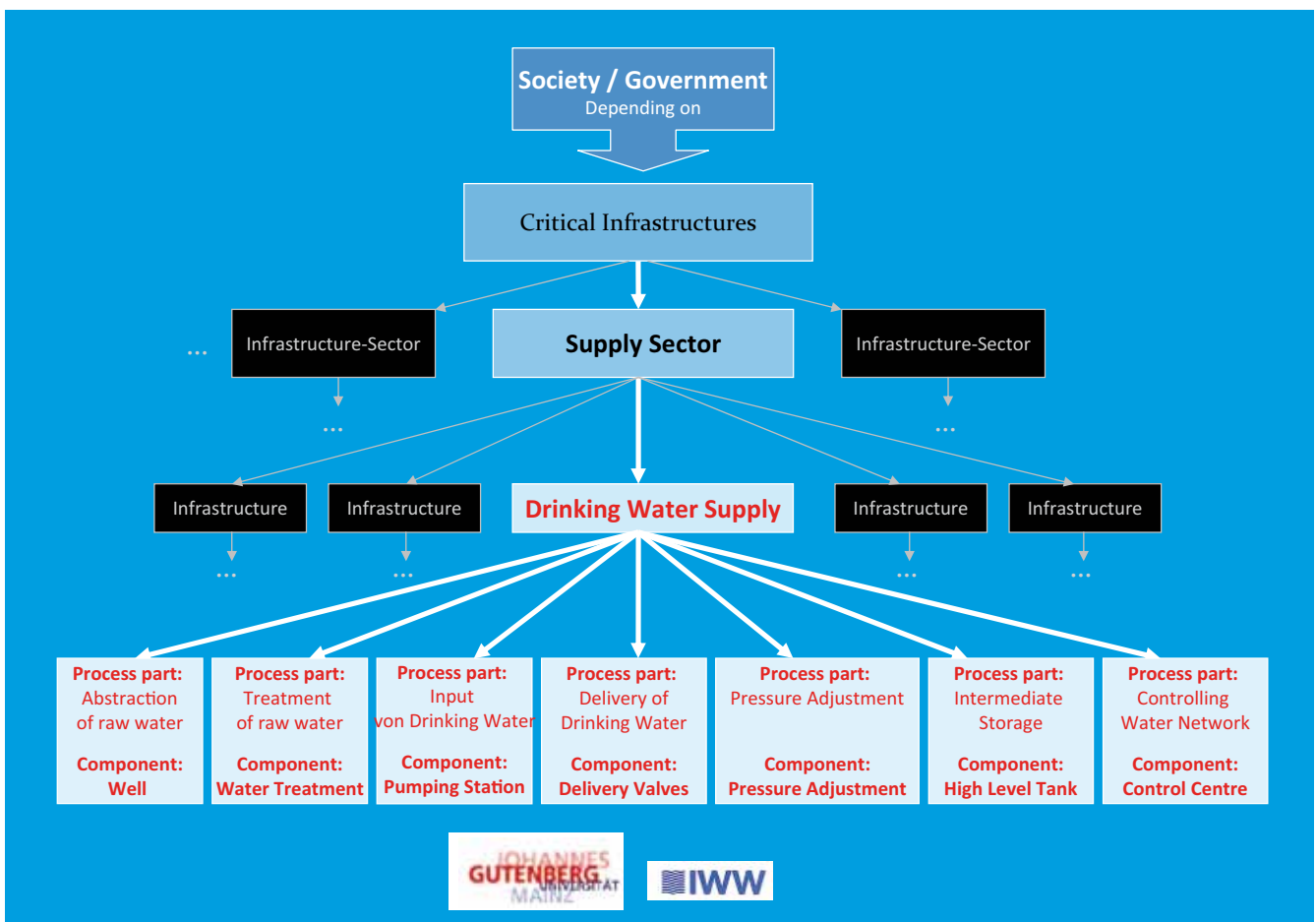


Fig. 1: City of Dresden: heights of buildings by satellite



## Civil contingencies in 2010 and beyond:

# Warning, informing & awareness



The UK Government has characterised the risks of civil emergencies for the public through the publication of a National Risk Register (NRR)<sup>1</sup>. The NRR reflects a nationwide picture of the types of emergencies to which the UK is prone, weighing the risks according to their likelihood and possible impact.

The NRR is part of an effort to communicate risk to parts of the country that the Government finds it hardest to reach and influence: individuals, families and neighbourhoods; small and medium-sized enterprises. It is best seen as an attempt to provoke local government, trade associations, and other locally respected bodies, to carry out their own awareness raising programmes, tailored to the criteria that matter most to their own constituencies.

### The duty to communicate

The Civil Contingencies Act<sup>2</sup> (the main legislation governing the UK approach to preparing for emergencies) recognises the vital role information and communication plays in improving resilience to emergencies. It placed a duty on Category 1 (“frontline”) responders (eg. police, fire and rescue services, local government, etc) to communicate, split into two aspects:

- Duty to make the public aware of the risks of emergencies and how emergency responders are prepared to deal with them – putting into the public domain information about emergency preparedness and response issues via mechanisms like the National Risk Register and local Community Risk Registers<sup>3</sup>.
- Duty for emergency responders to maintain arrangements to warn the public if an emergency is likely to occur or has occurred. This reserves the decision about when to issue warnings to the local responders themselves.

These duties have proved much easier to describe in law than to implement in practice, not least because the Act also requires responders to have regard to the need not to

alarm the public unnecessarily. But we have no evidence to prove the public is alarmed or will panic when receiving information. In fact, the public is more likely to feel concerned if they have not got information.

### The future context for community and corporate resilience

The bench-mark for public awareness-building, and for warning and informing in a crisis, is the future risk of flooding. For three reasons:

- First, because of what the 2007 UK flooding taught us about the breadth of the risk from river flooding and pluvial flooding. 2007 affected many thousands of households who were not previously aware that they were prone to flooding.
- Second, because if emergencies of the future are going to be that widespread, then placing sole reliance on the emergency services is an unsafe strategy. The first responders are going to be the public; they will need to take responsibility for some of the most vulnerable groups until the professionals arrive; and
- Thirdly, because resilience needs to be ‘l’affaire du tout’ or everyone’s business.

<sup>1</sup> National Risk Register – first published August 2008 – [http://www.cabinetoffice.gov.uk/ukresilience/news/national\\_risk\\_register.aspx](http://www.cabinetoffice.gov.uk/ukresilience/news/national_risk_register.aspx)

<sup>2</sup> Civil Contingencies Act – passed into law 2004, came into effect 2005 – <http://www.cabinetoffice.gov.uk/ukresilience/preparedness/ccact.aspx>

<sup>3</sup> Links to Community Risk Registers – [http://www.cabinetoffice.gov.uk/ukresilience/news/national\\_risk\\_register.aspx](http://www.cabinetoffice.gov.uk/ukresilience/news/national_risk_register.aspx)

That is why Sir Michael Pitt in his review of the flooding<sup>4</sup> recommended that the Government “should establish a programme to support and encourage individuals and communities to be better prepared and more self-reliant during emergencies, allowing the authorities to focus on those areas and people in greatest need.”

And why in the National Security Strategy<sup>5</sup>, there is a particular focus on building:

- Corporate resilience among small and medium sized businesses; and
- The resilience of communities and individuals themselves.

### Community resilience

The definition of Community Resilience we are using is: “Communities and individuals harnessing local resources and expertise to help themselves in an emergency, in a way that complements the response of the emergency services”

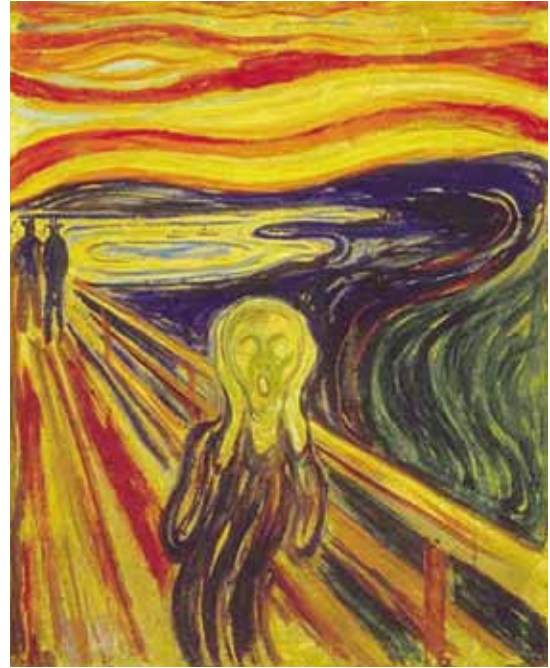
Although community resilience has been a part of many communities for decades, it is continually changing and evolving. We want to move from simply relying on goodwill and initiative, to people taking steps individually and collectively to prepare themselves, in co-operation and co-ordination with local emergency responders. We have established a Community Resilience Programme and, having spoken to many people already undertaking this work and based on their good practice, will shortly be publishing:

- A strategic framework for Community Resilience – how community resilience can work at a local and regional level, and how Government will support this work;
- Emergency planning guidance and template plans for both households and communities.

We recognise this programme will take many years to deliver, and we will never get everyone to take part. But if we can get even a small number of communities able to look after themselves, then this frees up emergency responder resources to focus on those areas and people who are most in need.

### Corporate resilience

Increasingly, we are monitoring the extent to which smaller businesses are able to look after their own resilience – both because of the impact on the economic well-being of the country, but also because local businesses are essential to local community resilience – and the National Risk Register has a separate chapter



devoted to guidance on business continuity. Surveys conducted by Government show that businesses are using the NRR in the way intended – to identify risks to business continuity and plan accordingly. The risks of most concern were electronic attacks – of concern to 58% of businesses, pandemic influenza – 58%, and severe weather – 52%. The pattern of concern varies from region to region, suggesting that there is intelligent understanding of the risks and the basis on which the government assesses them. So risk awareness is being raised, although we would be the first to admit that this is a slow process, and that it will continue to be a challenge to maintain trust in government characterisation of the risks.

### Warning & informing – now and future

I have concentrated on raising public awareness, because this is the foundation for so much that we do and – arguably – the most difficult thing to do successfully. But there is a major emphasis on warning (before an event) and informing (during an event). Initiatives range from

- Standards – trying to adopt an international standard on warning and informing.
- Social media – an area that emergency responders cannot ignore – but also have little control over.
- Improvements in technology for warning systems. The Environment Agency and Meteorological Office have moved to an “opt out” mechanism for the Flood Warnings Direct service and are looking to see if such a system could be expanded to cover other hazards – “a Warnings Direct” service.
- Cell Broadcasting – an example of emerging technologies that might provide scope to warn large numbers of people over a large area at short notice.

<sup>4</sup> Pitt Review – [http://www.cabinetoffice.gov.uk/ukresilience/news/pitt\\_final\\_report.aspx](http://www.cabinetoffice.gov.uk/ukresilience/news/pitt_final_report.aspx)

<sup>5</sup> National Security Strategy – published for the first time by the UK Government in 2008, updated last year – [http://www.cabinetoffice.gov.uk/reports/national\\_security.aspx](http://www.cabinetoffice.gov.uk/reports/national_security.aspx)

# NATO and climate change

As you may be aware, NATO's Civil Emergency Planning's activities are traditionally less focussed on prediction, prevention or early warning. They are in essence dealing with support to military, where necessary, and of course with the core business of response, the protection of the civil population and critical infrastructure, in case of a major natural or man-made disaster.

NATO does not as yet have a comprehensive concept on how to deal with the consequences of climate change or scarcity. In an intergovernmental organisation like NATO it would be rather difficult to reach consensus in abstracto on such a concept. In reality NATO often develops its approach to a new challenge in an incremental way. The notion of "practice drives the concept" comes to mind. A good example was NATO's response to a request for assistance by the Pakistani government and the UNHCR, after the devastating earthquake in October 2005. So, NATO contributed to a major disaster relief operation outside its geographical area, but it did not codify this sort of effort in a more general policy.

Probably more important than a policy is the sense that something may have to be done, that certain capabilities may be required to deal with some of the obvious consequences of climate change, such as a higher probability of floods, droughts, forest fires, etc.

In this respect, the right question to ask is: "what is NATO's added value in dealing with the consequences of climate change?" I share fully the view as expressed by State Secretary Dr Schroeder, when he referred to the role of the European Union in disaster relief, that international solidarity is important, but subsidiarity should be a leading principle. NATO's civil emergency planning does have as a leading principle that the

protection of the civil population and critical infrastructure is very much first of all a national responsibility, whereby NATO is aware that national authorities have often delegated this responsibility to provincial and local authorities.

Against this background, NATO's added value in disaster relief is nevertheless relevant. First of all, sharing of best practices between NATO's member states is of course relevant in view of improving on the relevant national policies and practice. Secondly, NATO offers opportunities for sharing of training and organises each year a major disaster relief exercise in a member state or a partner country. Thirdly, NATO and its partners facilitate international assistance to a stricken nation, if and when a) the first responders are overwhelmed and b) the country concerned makes an explicit request for assistance to NATO or the Euro Atlantic Disaster Response Coordination Centre (EADRCC).

Fourthly, NATO and the EADRCC do have easy access to some military capabilities, which may be useful, if not indispensable, in these kind of disasters. Also, NATO is a natural forum for the cooperation between, if not the coordination of, civil and military assistance. Fifthly, NATO has access to about 380 national experts in different fields such as health, CBRN, transport and critical infrastructure protection. These experts can be







helpful both in preparing for and in dealing with a disaster, respectively in so-called Advisory Support Teams or in Rapid Reaction Teams.

Last but not least, NATO's civil emergency planning is in practice done by the 28 Allies, together with the 22 Partner Countries in the Euro Atlantic Partnership Council (EAPC). The EADRCC is also a body which responds to the EAPC, and therefore has access to the capabilities of 22 Partners, in addition to the capabilities of the 28 allies. Now, the EADRCC does not have a formal register of national capabilities, but it is very experienced in coordinating assistance when a country asks for assistance. The EADRCC has also proven to be very successful in matching offers for help by nations with offers for transport, sometimes military airlift.

In major disasters outside of the EAPC area, more is needed than a simple request by the stricken nation or the UN. In such an event there is no automaticity in providing a positive response to that request by NATO or the EADRCC, since the NATO Council will have to take a decision on a case by case basis. NATO's contribution to the earthquake relief operation in Pakistan, October 2005 - January 2006, was a good illustration of NATO assistance, both civil and military.

So, let us focus on the topic at hand, capabilities, and sum up what sort of civil and military capabilities NATO could help provide in dealing with potentially disastrous consequences of climate change. Sharing of best national practices is obviously useful. Training and exercises will help in building capacity and developing capabilities. Access to the advice or support by the

almost 400 civil experts is a clear advantage. The EADRCC can help coordinate assistance and necessary transport provided by nations to a stricken country which requests help. The NATO military can also be helpful, certainly in major disasters outside of the EAPC area, as was proven during the 3 months of the Pakistan earthquake relief operation in 2005/2006.

The sort of military equipment which is useful in major man-made or natural disasters is easy to sum up: long distance airlift, helicopters (often roads can not be used after floods, storms, earthquakes or forest fires), mobile hospitals, engineer units to repair roads, bridges, etc. The advantages of using military units in extreme circumstances are obvious: easily deployable, over long distances, in difficult areas, disciplined, ready to be coordinated and self sustainable. However, at the same time it should be clear that in line with the so-called Oslo guidelines, the competent civil authorities will always retain the overall lead over a relief operation to which NATO contributes.





# Colophon

## Address

Ministry of the Interior and Kingdom Relations  
P.O. Box 20011  
2500 EA The Hague  
The Netherlands  
E-mail: [crisisbeheersing@minbzk.nl](mailto:crisisbeheersing@minbzk.nl)  
Internet: [www.minbzk.nl/veiligheid](http://www.minbzk.nl/veiligheid)

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## Contributors

Assia Bensalah Alaoui, Marije Breedveld,  
Christopher Bunting, Leonie ten Cate,  
Corsmas Goemans, Peter Hoeppe,  
Guusje ter Horst, Maurits Jochems,  
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Duncan Shaw, Simon Strickland, John Tesh,  
Christoph Unger, Johann Weidringer,  
Rolf-Dieter Wilken, Alexander Zafiriou

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# Four questions to:



Dr. Johann Weidringer,  
Chair of the German Civil Protection Commission  
and Chair of the conference

## What is the impact by global warming on national safety & security, civil protection and scarcities?

“There is inevitably a clear linear trend within the last thirty years on global warming. In this context, civil protection has to take into consideration expected future changes in intensity and frequency of weather related hazardous events e.g. floods, heat waves, forest fires. To be better prepared, corresponding scientific findings have to be integrated in the process of risk analysis and increasing capacity concerning national safety & security and civil protection. Food crises have already led to riots and political unrest across the world, including in Egypt, Morocco, Mauritania, among others in the Arab region as shown up by our key note speakers. Considerable investments are needed to adapt to climate change and alleviate poverty across the region. Safety nets will be necessary to preserve food security of the poor and secure political stability.

However, the dimension of scarcity is much broader than water and food alone. Another fundamental element in this discussion is the issue of scarcity of rare-earth metals and migration. Therefore, a holistic approach is needed which takes into consideration other aspects and their interfaces as well.”

## How can governments with crisis management react on climate change and scarcities?

“In order to develop effective crisis management policies, governments need

political determination and self confidence to act on behalf of the public weal. In some cases this will not be popular due to special interests of strong and well organised interested parties. Nations have to overcome national borders and should combine local and global risk assessment strategies to develop capabilities. There is a need for a multi-country policy approach with strong commitment. We all know that scarcities and shortage of resources hit poor people most. Crisis management with its risk management and capabilities can reduce that impact and as a side effect lead to good democratic governance. This approach was emphasized by our key note speakers, too.”

## How can other organisations like industry, business and NGO's benefit to national safety & security and civil protection?

“During the last decades (economic) losses due to natural extreme events have been permanently increasing. However, floods have become more easily insurable although they occur more often and in more places. There is a trend of diminishing stricken people because international aid organisations are taking into account extreme events by changing their policy from responding to early warning and early action before a disaster takes place. Insurance and in particular reinsurance companies have long lasting experience and expertise in this field and in their analysis they also extrapolate trends to future risks as it was said by our key note speakers as well.

Therefore, in risk assessment, industry, business, NGO's and civil protection will benefit of sharing knowledge and data on hazards and damage potentials as well as research results.”

## Where do we stand in developing risk assessment and capability planning reflecting the six stages of change from James O.Prochaska<sup>1</sup> from “precontemplation” (no intention to change) to “termination” (daily life without any threat)?

“Various organisations from science, business, industry, government and NGO's are in different stages. All participating parties in the conference passed stage 1. The countries mentioned in the OECD cross national analysis *Innovation in country risk management* are heading from stage 2 “Contemplation” (acknowledge a problem, willing to change but no energy yet) to 3 “preparation” (developing action plans and made small changes). More countries and organisations are joining. International conferences like this one, with exchange of views and sharing best practices will bring us in the near future to stage 4 “Action” and 5 “Maintenance” (following committed action plans and continuous engagement in the change process). There is still a tough way to go to reach stage 6, a daily life without threats.”

<sup>1</sup> J.O. Prochaska, Changing for Good, New York, 1994.