

Climate Change and Security in the 21st Century

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1. Introduction

From 30 October to 01 November 2006, the Führungsakademie der Bundeswehr (Bundeswehr Command and Staff College) in Hamburg held a workshop on Climate Change and Security in cooperation with the German Development Institute (Deutsches Institut für Entwicklungspolitik) and the Bundeswehr Transformation Centre (Zentrum für Transformation). The workshop had two major purposes. One was to examine whether the previous scientific findings on climate research would allow Strategic Future Analysis to be prepared on a methodical basis. The other was to examine, in relation to the existing analysis of the studies on the Armed Forces, Capabilities and Technology in the 21st Century (abbreviated SFT 21), for the years 2030 and 2035 whether the previous findings would be confirmed and further findings could be obtained from the content of the workshop. Any new findings concerning methodology and content would then be used for the 2040 SFT 21 follow-on study to be prepared by 2010.

The objective of the workshop was to examine – in an interdisciplinary approach – the climate research results and conclusions with their regional implications on economic, social and political developments, to describe any possible developments and to discuss the implications these may have on global and regional security, but also on the security of Germany and Europe.

The following findings-oriented issues were of direct interest to the participants of the workshop:

- Does climate research provide indications that would allow the identification of climate change regions and a specific type of climate change?
- Do other science branches provide leads that help identify the possible major implications for regions and adjacent areas, for example in terms of population development, settlement areas, utilisation of resources, food production, etc.?
- Can the use of models and theories help derive possible implications for economic, social and political developments?
- Do major interactions between the identified factors result in further findings on climate change?
- Can the risks involved be assessed, and what are the implications that can be concluded for global and regional security and for Germany and Europe?
- Can the findings obtained be used as conceptual ideas for SFT 21?

The dialogue during the workshop took place in an open, constructive and creative atmosphere. This was owed mainly to the fact that the participants either had a scientific background in the fields of climate research, the social, geographical, political and economic sciences or in the practical application of business, political consultancy, the military and futurology, and that they were looking for a coherent approach to finding solutions.

2. Security Scenarios: A Planning Tool for Armed Forces and Societies

Why has the Strategic Future Analysis been used for the discussion? Strategic Future Analysis makes scientific findings useful for the guidance of political, military and defence industry decision-makers. The process of analysis is based on the utilisation of scientifically approved methods. Part of the analysis, however, is based on the creativity and experience of those who participate in the studies externally and internally.

The results of the Strategic Future Analysis should at an early stage draw attention to possible actions and alternatives in order to provide decision-makers with options for the shaping of the future with regard to the capabilities of armed forces. Yet, they are advised not to anticipate solutions. The objective of enhancing the long-term planning of armed forces can be achieved only when armed forces are seen as a product of the role they are intended to play at the international level, taking into account the relevant social conditions. Therefore, the analysis on which the findings are based must embrace more than the issue of efficient options of warfare under military considerations. In this context the basic assumption is that armed forces are a portrayal of their respective social environment.

The term "Strategic Future Analysis", that is not widely used in general, leads to the question of what we can know about the future. This essay premises that, contrary to the natural sciences, the social sciences cannot make any projections with regard to events in the future that are based on general laws. Thus, empirical trends such as they are commonly used in the social sciences are not a substitute for fundamental laws. „Die Mängel soziologischer Prognosen ergeben sich hauptsächlich aus der Komplexität sozialer Ereignisse, aus ihrer gegenseitigen Verflechtung und aus dem qualitativen Charakter soziologischer Begriffe.“¹ (Translation: "The shortcomings of sociological projections are due mainly to the complexity of social events, their interlocking nature and the qualitative character of sociological terms"). Basically it will never be possible to forecast social events with the same precision as natural-scientific events in classical physics. Since we are very much a part of social events and can use projection in order to influence future events, there is no scientific basis on which to make exact and detailed social projections². The future is unknown, and all players involved help shape the future. Yet this future will be determined by the laws, basic parameters, and also by the evolutionary options in the fields of cosmology, biology and civilization. Although future developments can be projected through greater differentiation of the processes involved, none of these processes can contravene the laws and basic parameters that are associated with the three evolutionary processes mentioned previously. This means that the number of perceivable futures is finite, since not all that is perceivable is a realistic option. Considering the evolutionary processes as perceivable futures enables us to draw up an action map, to even examine why certain developments, contrary to our expectations, will have followed a different course.

Collective human action can, where there is a consistent repetition, be subsumed as trends. Trends are developments that move in recognizable directions, are defined through the analysis and experience of past events and continue. They allow statements to be made on an unknown, insecure future environment clearly defined in terms of time, space and relevance, and they describe potential events, spaces

¹ Cf. Popper, Karl R., *Das Elend des Historizismus*, (The Mystery of Historicism) Tübingen 1979, p. 30

² *Ibid*, p. 11

and structures. Trends allow reducing the complexity of the world to a few essential features. Yet the evaluation of the comprehensive literature that deals with security issues has revealed a rather large number of trends and trend projections, something that initially ran counter to the intention of reducing the complexity of the world, and that co-existed in a state of disarray in terms of quality and quantity. Trends and trend projections required to be given a structure and hierarchy so that they could be applied to the conclusions that had to be drawn and to the trend interactions that had to be defined.

The previously mentioned civilization process may offer the explanation that is the link between the trend fields. Meanwhile libraries are full with works containing explanations of the civilization process that go back as far as Adam Smith and Immanuel Kant. In the following, the definition of the phenomenon given by Norbert Elias in his work “Über den Prozess der Zivilisation”³ (Translation: “On the process of Civilization”) will be used. He defines the process as the “plans and actions, emotional and rational impulses of the individual that consistently interlock in a friendly or hostile fashion”. The fundamental interlocking of all individual plans and actions can lead to changes and designs that are neither planned nor created by one individual alone. The interdependence of the individuals results in a specific order, an order that is more forceful and stronger than the willpower and reason of all the individuals that make up the order.⁴ This civilization process will change the behaviour and feelings of the individual towards a specific direction.

With this in mind, the instrument of the Strategic Future Analysis investigates a broad spectrum of trends with a view to the relevance its has to security and the armed forces, a relevance that has been deduced from scientific research in different disciplines and the fields of its application. The model „Zivilatorische Entwicklung“⁵ (Translation: Civilization Developments) helps assessing the trends and organizing them into trend fields⁶. This is done by defining seven trend fields that subsume all trends and trend projections. The seven trend fields are the:

1. Demographic developments,
2. development of the resources and the environment,
3. development of sciences and technology,
4. cultural developments,
5. social developments,
6. economic developments,
7. political developments.

They all result in an analysis that shows how individual trends, but also a tangle of effects may impact on future warfare scenarios.

The trends and the theoretical explanations offered will be deduced from publications from various scientific branches, data collections and studies of national and international establishments as well as from other publications. They offer an inexhaustible potential for the Strategic Future Analysis at very different levels of

³ Elias, Norbert, Über den Prozess der Zivilisation, Vol. 1 + 2, Frankfurt am Main 1991

⁴ Ibid, p. 314

⁵ Cf. SFT 21, loc. Cit., Part III of the Study, Chapters 1.3.3 and 1.3.4

⁶ Cf. ibid, Part III of the Study, Chapters 2 and 2.1 ff

abstraction and with highly differentiated options to reduce complexity as defined by Luhmann.

The results obtained with the trend analysis will be translated into security scenarios and describe a fictitious security-relevant environment of the future with a time horizon that goes beyond the Bundeswehr planning process of approx. 15 years. Some trends are long-term in nature (e.g. demographic trends), abrupt changes are unlikely to occur. Other trends may have a shorter reach and can change relatively fast when fresh trends emerge. The latter is particularly true for complex trends such as globalization which makes their assessment more difficult. Moreover, there are only few findings concerning the relations and interaction between the various trends. These deficits can be removed only by way of long-term and empirical research. The permanent monitoring of complex trend-setting factors and their impact that define a specific development will create the necessary prerequisites for conducting the relevant research. This means that the process of the Strategic Future Analysis must be continuous in nature.

The scenario technique that is being used for the Strategic Future Analysis is a method that in the future will help to systematically develop and subsume isolated conceptions of possible changes in individual or linked development factors in order to create detailed scenarios and models, i.e. possible and probable “futures” that are comprehensible for others as they are being shaped. This reduces the complexity of the matter and at the same time counters the danger of reducing the future to merely one single development aspect (the pitfall of the monocausal link).

Hence, scenarios are neither *projections* that revert to quantitative information from the present or the past and that by way of forward projection of the current structures and behavioural assumptions estimate future scenarios, nor are they escapist utopia and phantasy. In fact, the scenario technique links quantitative data and information with qualitative information, assessments and opinions so that the result is a sufficient number of detailed descriptions of one or several possible future situations from a holistic view that allow a verifiable assessment and evaluation of any given issue.

The scenario technique helps develop a well-defined event space for the future with regard to specific issues and the resulting number of possible events that can be expected and in turn indicate options for action.

3. Global and Regional Climate Change and Its Challenge for Local Communities

Based on the examination process of the 2040 SFT 21 Future Analysis, the workshop produced the following findings that should be deepened further.

3.1 The Link between Climate Change and Social Developments

Scientists have ascertained that during the 20th century the average temperature rose by 0.6 °C. For the 21st century climate researchers have projected a global

temperature rise of between 1.5 and 5.8 °C should conditions remain unchanged⁷. The temperature rise of the 20th century and the temperature average to be expected for the next years (which is a function of further CO₂ emissions into the atmosphere) will lead to climate change in many parts of the world.

The main effects will be⁸:

- Temperature rise in the northern regions such as Europe, Siberia, North America, specifically Canada.
- Regional changes in the rainfall pattern with consequences for the water table.
- Melting of the glaciers and arctic regions with the consequence of a rising sea level and effects on the sea circulations.
- Rise in the number and intensity of extreme weather situations (e.g. storms, thunderstorms, heat waves, deluges, flooding, extremely heavy swells, etc). Extreme weather situations, in particular storms, will be typical for certain regions.
- A further rise in the sea temperature with consequences for ecosystems (e.g. corral riffs, changes in regional flora and fauna, etc).
- An approx. 30 to 40 cm sea level by the end of the century.⁹

Climate change and the changes in the weather as a result thereof will have major consequences for the affected regions. The general assumption is that climate change and changes in the weather control the natural and anthropogenic ecosystems. As a rule, the rather warm and regionally rather humid climate periods in prehistoric and historic times were favourable to cultural and settlement developments¹⁰, while climate pessimum epochs led to unstable weather and seasonal patterns, and the high variability of the climate and low temperatures resulted in regionally aggravated aridity. At lower latitudes the drop in temperature and less rainfall resulted in draught periods and desertification as well as the degeneration of savannah areas used for hunting and pasturing.

Favourable climates (particularly medium latitudes)¹¹ meant:

- Very good conditions for agricultural societies in thermal hygric terms.
- Reliable and predictable seasons, also multiple harvests.
- Establishment of villages and towns, rise in trade and commerce and the introduction of the division of labour.
- Vertical social structures.
- Architecture as a sign of prosperity.
- Cultural exchanges, foreign trade relations.

Climate pessimum epochs, "unfavourable" climate periods (medium latitudes)¹² meant:

- Bad harvests, supply crises / famines, epidemics.
- Population losses.
- Breakup of social structures, social unrest, wars.

⁷ IPCC Studies of 1990, 1995, 2001

⁸ Stefan Rahmstorf, presentation during the FüAkBw workshop in September 2006

⁹ Cf. Max-Planck-Institut für Meteorologie (Hrsg.), Klimawandel für das 21. Jahrhundert, Zusammenfassung, p. 5, Hamburg 01/2006

¹⁰ Cf. Wolf Dieter Blümel, 20000 Jahre Klimawandel und Kulturgeschichte – von der Eiszeit zur Gegenwart, in: Jahrbuch 2002

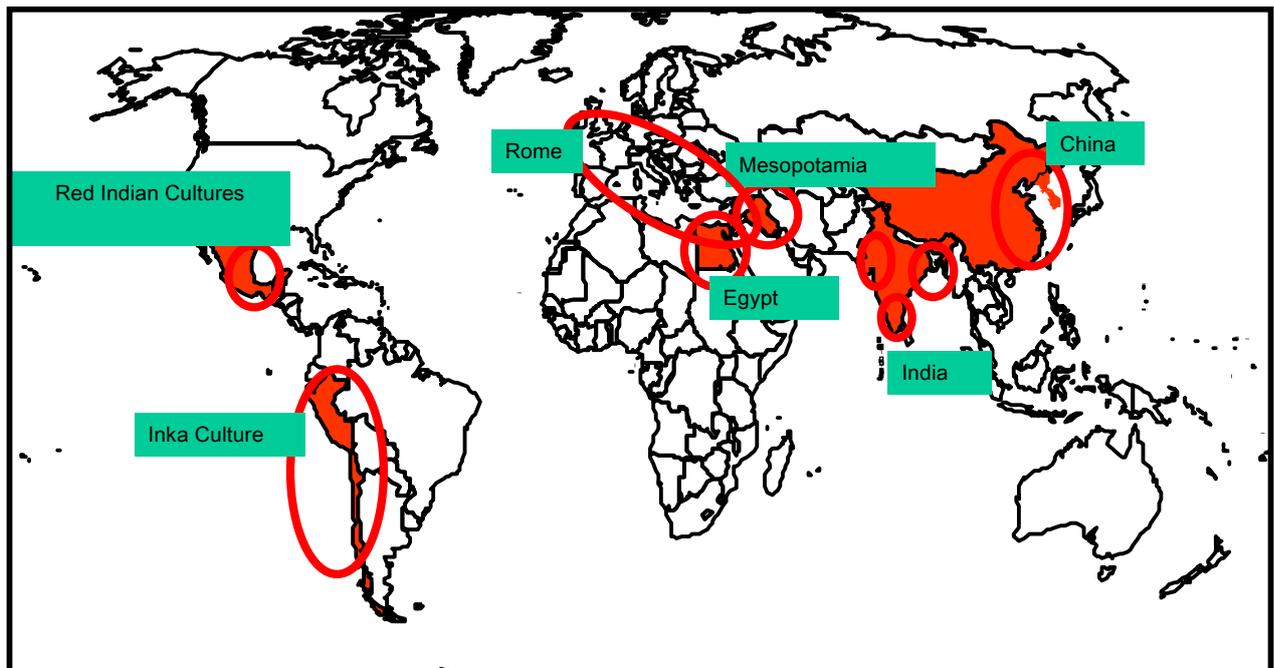
¹¹ Cf. W. D. Blümel, presentation during climate workshop at the FüAkBw in Sept 2006

¹² Ibid, Blümel presentation

- Withdrawal from habitable areas, increase in desertification.
- Migration, large-scale population movements (“vandalism”).
- Few artistic documentations in the field of architecture.

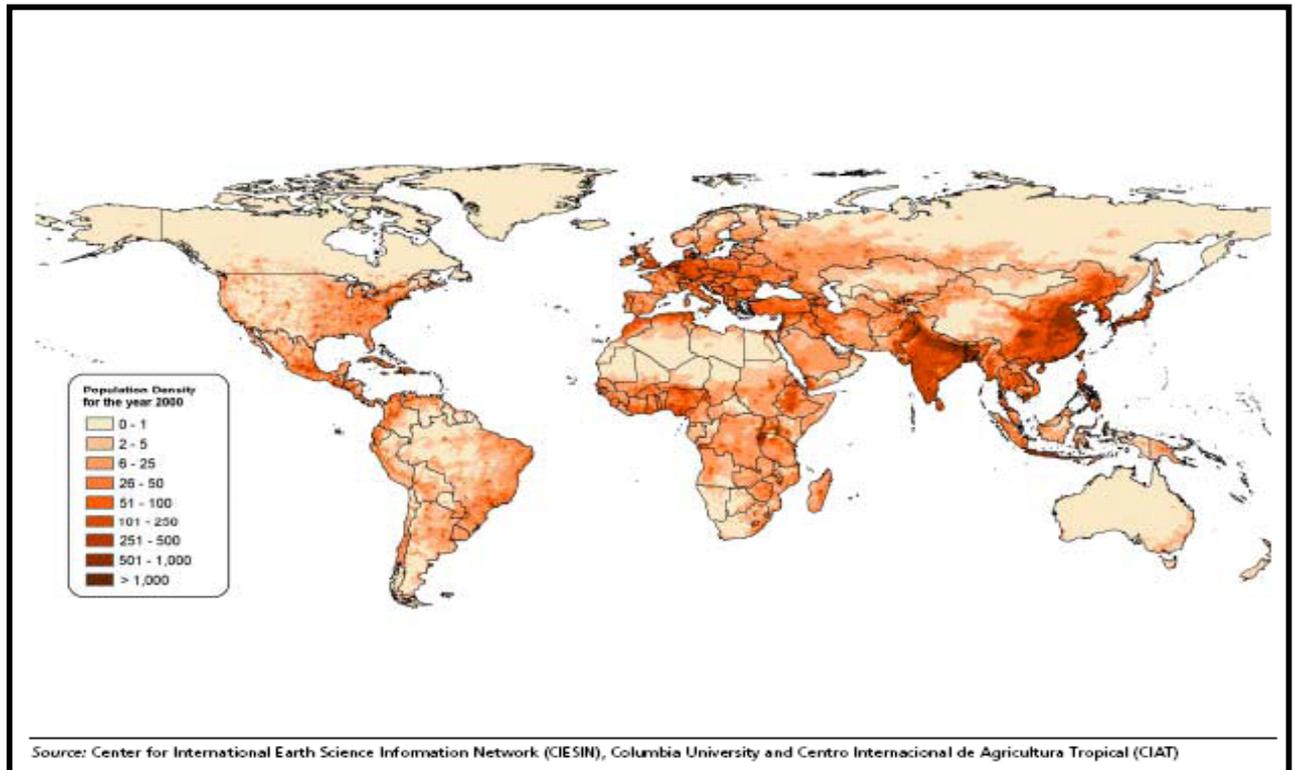
The paleographic retrospect is not generally suited for drawing analogous conclusions, but quite useful for discussing deficiency analysis, climate models, geographic differentiation, the assessment of space potentials in order to arrive at regional theorems with regard to the consequences that climate change is likely to have on societies, and for developing complex adaptation strategies that take all these aspects into account.

Modern societies are not agricultural, but industrial or post-industrial societies with normally a highly aggregated agricultural sector. This means that the latter is rather vulnerable when affected, yet rather efficient when not affected. However, the current overall population (in excess of 6 billion) and the rapidly increasing population growth (an average 9 billion by 2050) have led and will continue to lead to a colossal drain of land resources. The latter is accompanied by changes in the surface (e.g. forest losses, larger agricultural areas, expansion of urban and industrial areas, etc) and high energy and water consumption. These factors intensify the degradation of the countryside. The areas of interest for civilization settlements are coastal regions and flood plains. Here the first advanced civilizations (see Map 1) developed and even today countries with such settlement patterns are the most powerful or are candidates for growth.



Map 1: Historic Cultures

The population explosion commencing during the 19th century meant that these areas became densely populated (see Map 2). At the same time, they were always at risk from natural disasters such as flooding, storms, etc. and human settlements therefore rather vulnerable.



Map 2: Current Population Density

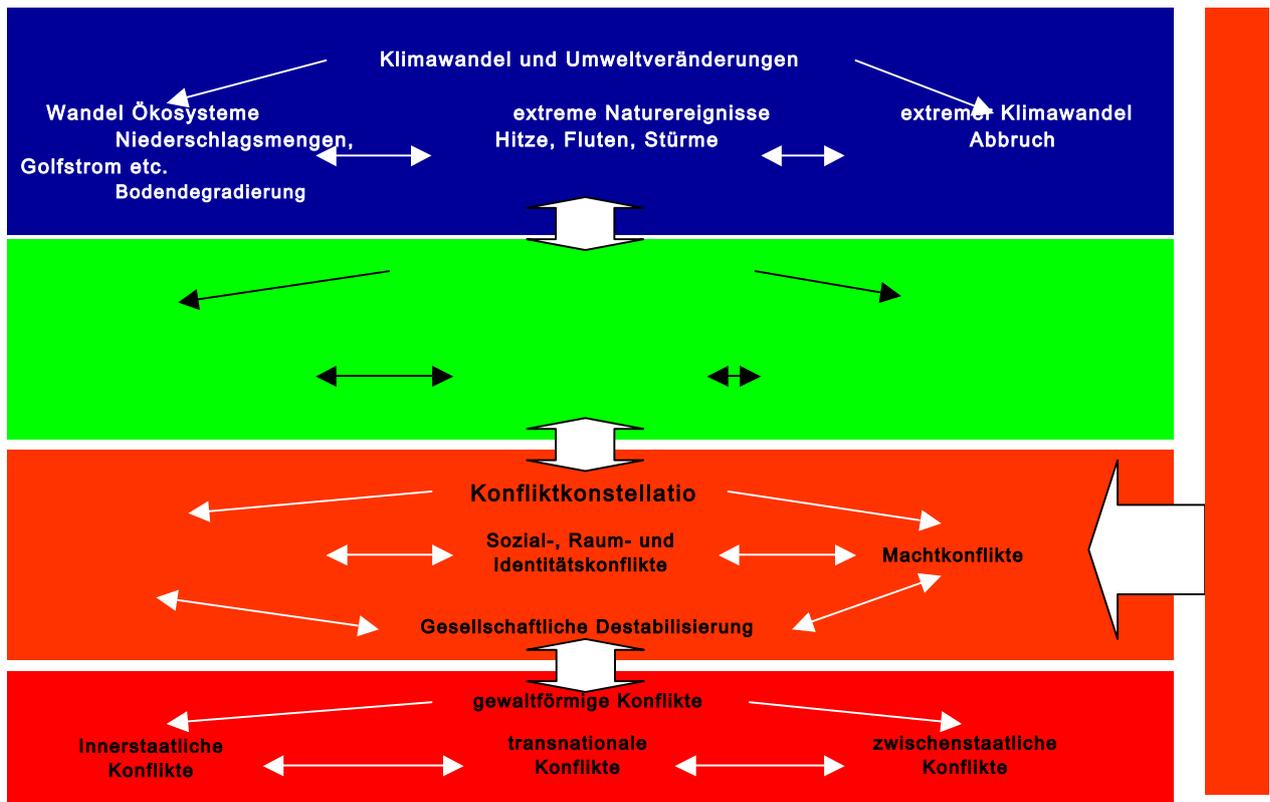
3.2 Model of a Causal Link between Climate Change and Security

Based on the afore-described consequences of climate change, defined in the model as climate change and environmental changes, the intention is to demonstrate the implications for central functional areas of human societies.

Based on an enhanced basic model of the German Development Institute¹³ one such model (see viewgraph 1) can be described as follows: Climate change and its associated environmental changes impact on the ecosystem, cause extreme weather and natural disasters, and have in turn the potential to bring about extreme climate change (e.g. cessation of the gulf stream, trigger of regional glacial periods). Such events impact on civilizations in the form of climate optimum or pessimum (see above). They cause stress to the security within societies, lead to conflicts that may be result in violence. Extreme changes in the utilization of space may, in addition to poverty-related migration and qualitative changes within populations, also push marginalization and eventually social and political disintegration.

¹³

see. Dirk Messner, presentation slide 3, FÜAkBw workshop on climate change, Sept 2006

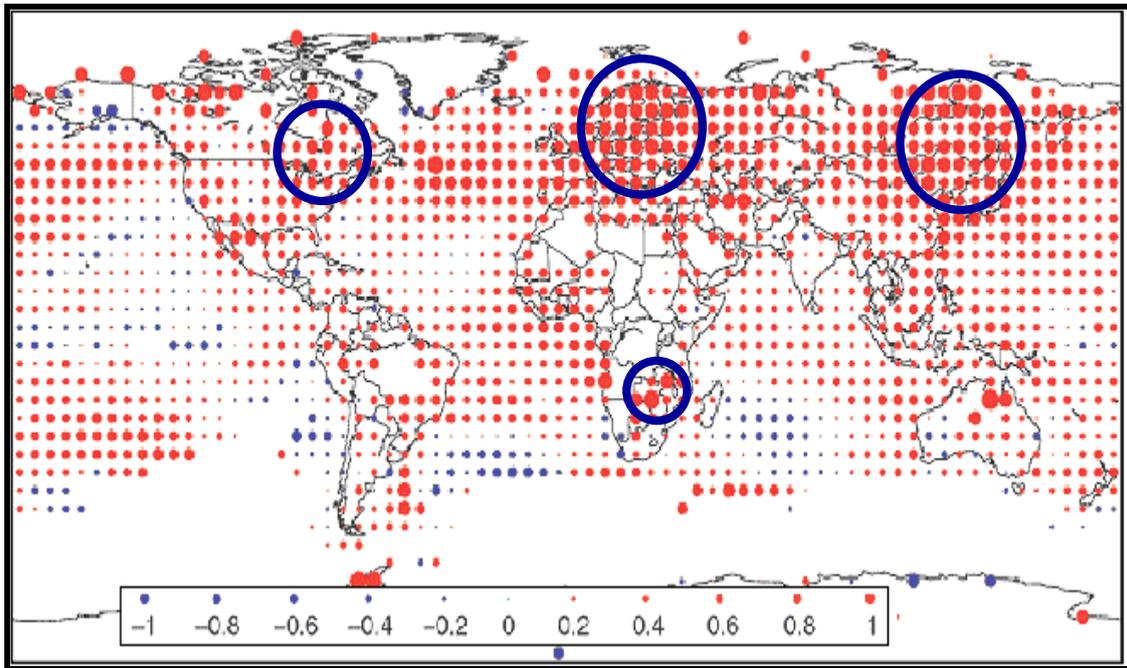


Viewgraph 1: Model on the Link between Climate Change and Security

Against this backdrop, the following question must be asked: Who in what form will be affected by climate change and what are the consequences for the economic, social and political developments? With regard to these issues the workshop presented some general findings, but in particular the geographic framework offered clues as to potential future areas of conflict or trigger of conflict (e.g. environment-related migration).

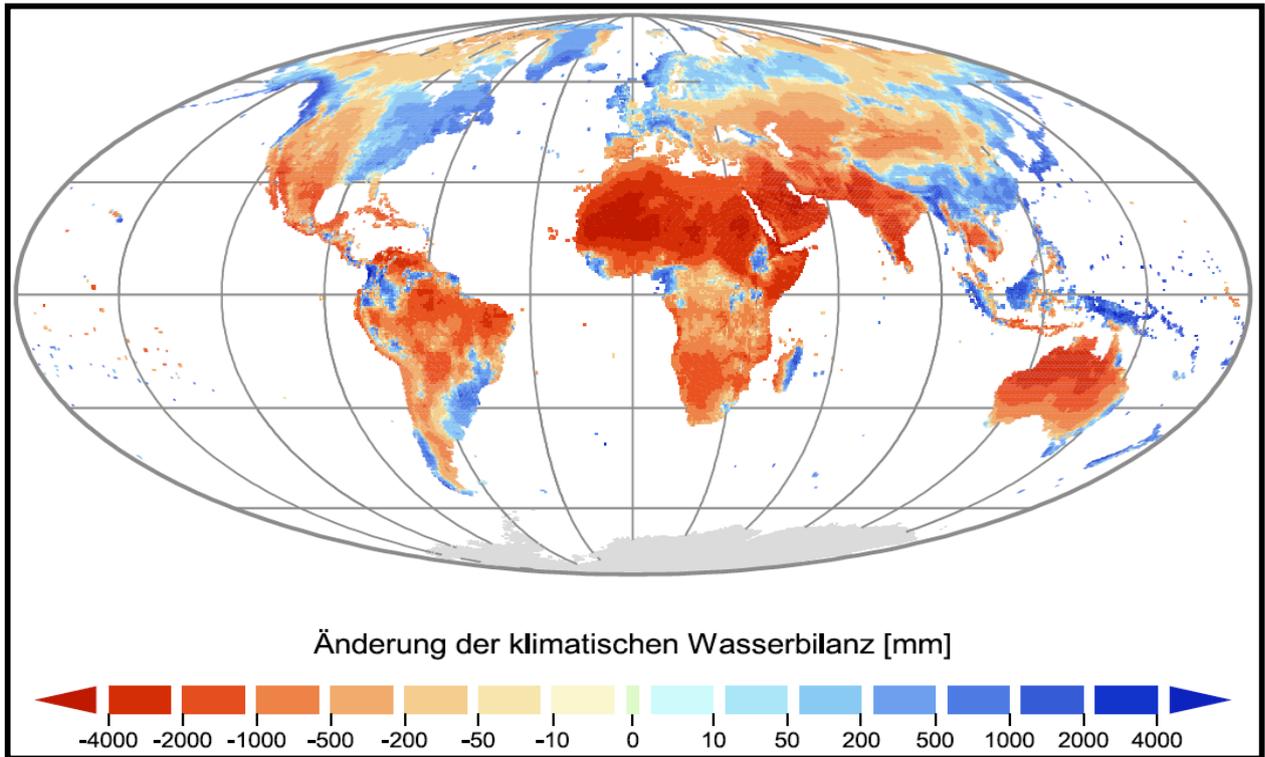
4. 4. The Geographic Framework of Climate Change and Its Consequences

The described climate change will have different consequences for the regions. The following Map 3 shows the geographic distribution that is to be expected. This suggests that the warming of the landmasses will be focused on Central Europe, Eastern Siberia, the eastern parts of North America and the Southwest of Africa. All in all, the northern latitudes will be affected more than the southern latitudes.



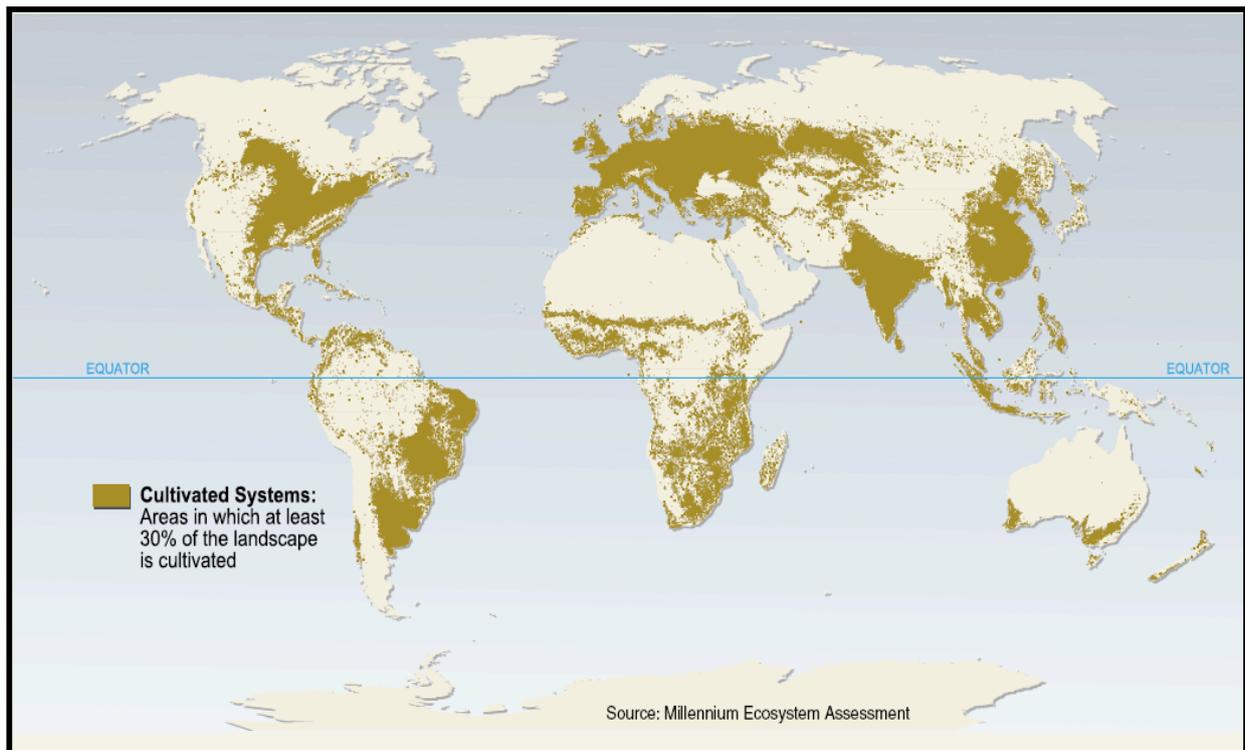
Map 3: Geographic Distribution of the Warming Process

The distribution of the expected precipitation suggest that "in humid climate zones (tropical areas and geographical areas at medium to high latitudes) precipitation will be on the increase, in dry climate zones (subtropical areas) on the decrease, and the precipitation intensity and the resulting threat of flooding will rise worldwide"¹⁴, with the consequences that certain regions will be in danger of suffering draughts (see Map 4) with direct impact on agriculture and the water reservoirs.



Map 4: Potential Draught Zones 2040-2070 as Projected by Hadley Centre

A comparison of the potential draught zones with the agricultural areas currently utilized (see Map 5) shows that there are considerable shifts in the

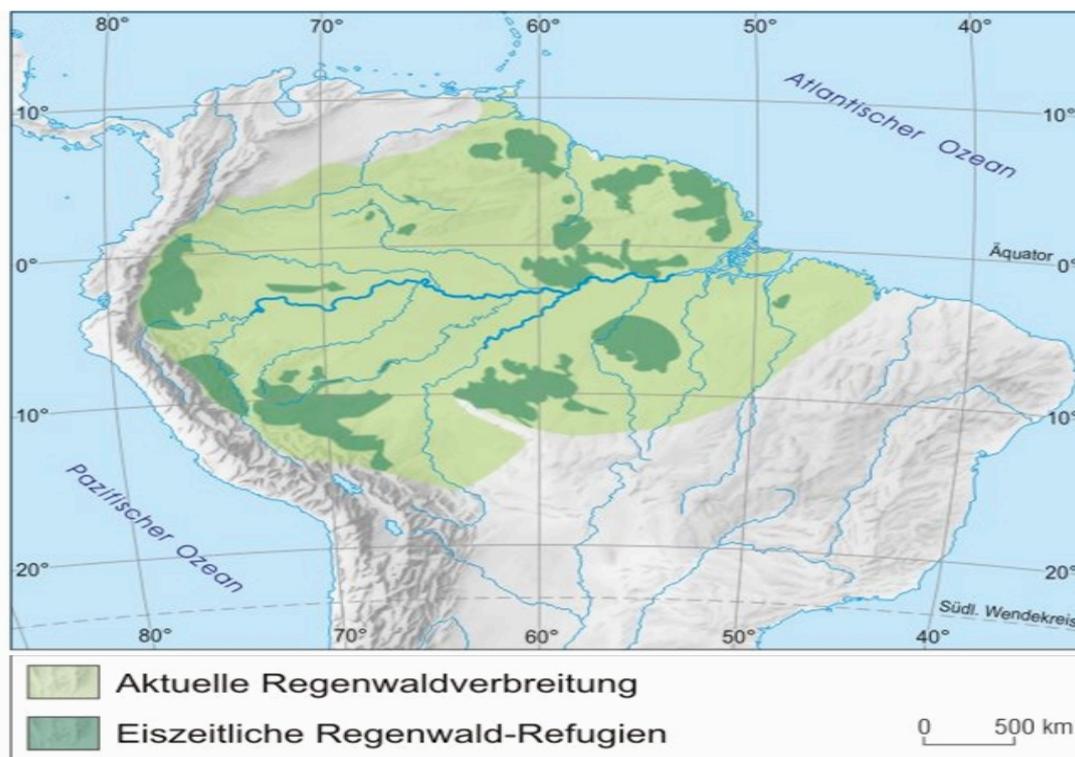


Map 5: Major Agriculturally Utilized Areas

areas previously used for agriculture. Hence, large parts of North America that are the granaries of today's world will no longer be able to deliver. Parts of Southern

Europe (Spain, parts of France, Italy and Greece) and Eastern Europe will cease to be used as extensively utilized agricultural areas. The areas in North Africa, the Near and Middle East that are used for cultivation will no longer be sufficient to feed the rapidly increasing populations in this region. But also major cultivation areas in India and China will lose their previous importance for agriculture and suffer massive water problems. By contrast, there could be fresh agricultural potentials for Northern America, Europe and the eastern parts of Siberia.

However, there is a need to investigate whether the issue of food that nowadays is simply a “distribution” problem may change to become a fundamental shortfall in view of the fact that the population worldwide is likely to have grown to between 8 and 12 billion by 2050.



Aktuelle Regenwaldverbreitung = Current Rainforest Distribution
Eiszeitliche Regenwald-Refugien = Rainforest Regugies from the Glacial Period

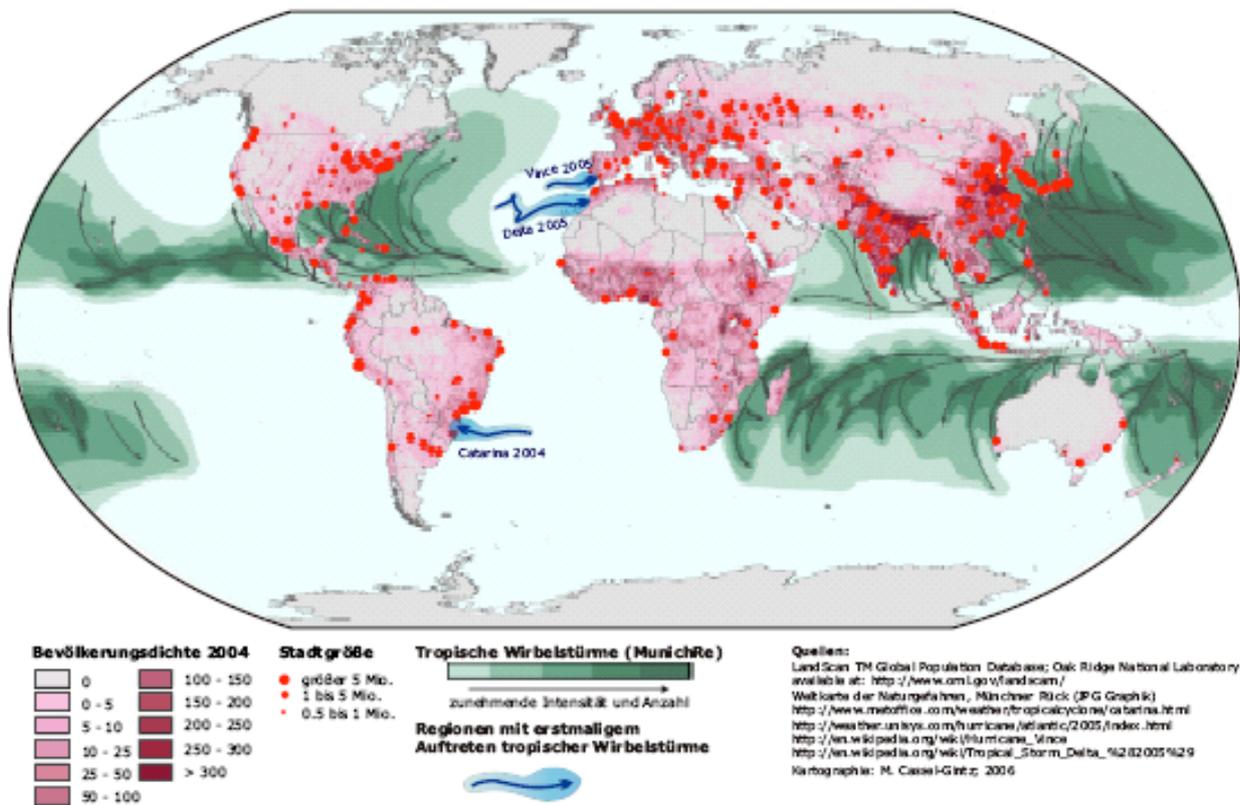
Map 6: Rainforest in the Amazon Region Today and after the Glacial Period according to Haffer 1969 quoted by Blümel

Similarly to the time after the great glacial period 30.000 years ago, South America may see a massive retreat of the rainforest (see Map 6) and the Amazon region become a steppe. Some highly fertile agricultural areas may be lost, and South America would have to secure its food situation through imports. Large sections of the Central African rainforest may also be lost. Against the background of rapidly increasing populations in Sub-saharan Africa and chronically bad governance in the region, favourable conditions for positive growth scenarios are unlikely to occur despite, or just because of the richness in natural resources in a significant number of sub-saharan countries.

Extreme weather conditions such as heavy rainfall, storms and heat waves carry further risks for densely populated regions (see Map 7) as Hurricane Katrina has shown, and even our modern complex societies with their “just-in-time” supply mechanisms may suffer severe crises. Such a process will destroy the trust which the

society has in the state as the solver of its problems. This could lead to the temporary or even permanent loss of law and order.

While the storm intensity in the Mediterranean Sea is projected to lessen, the study by the Hamburg-based Max-Planck-Institute expects an increase in winter storms in Central Europe. Heat waves and forest fires as a result thereof can be a major threat to the affected populations and highly detrimental to national economies.

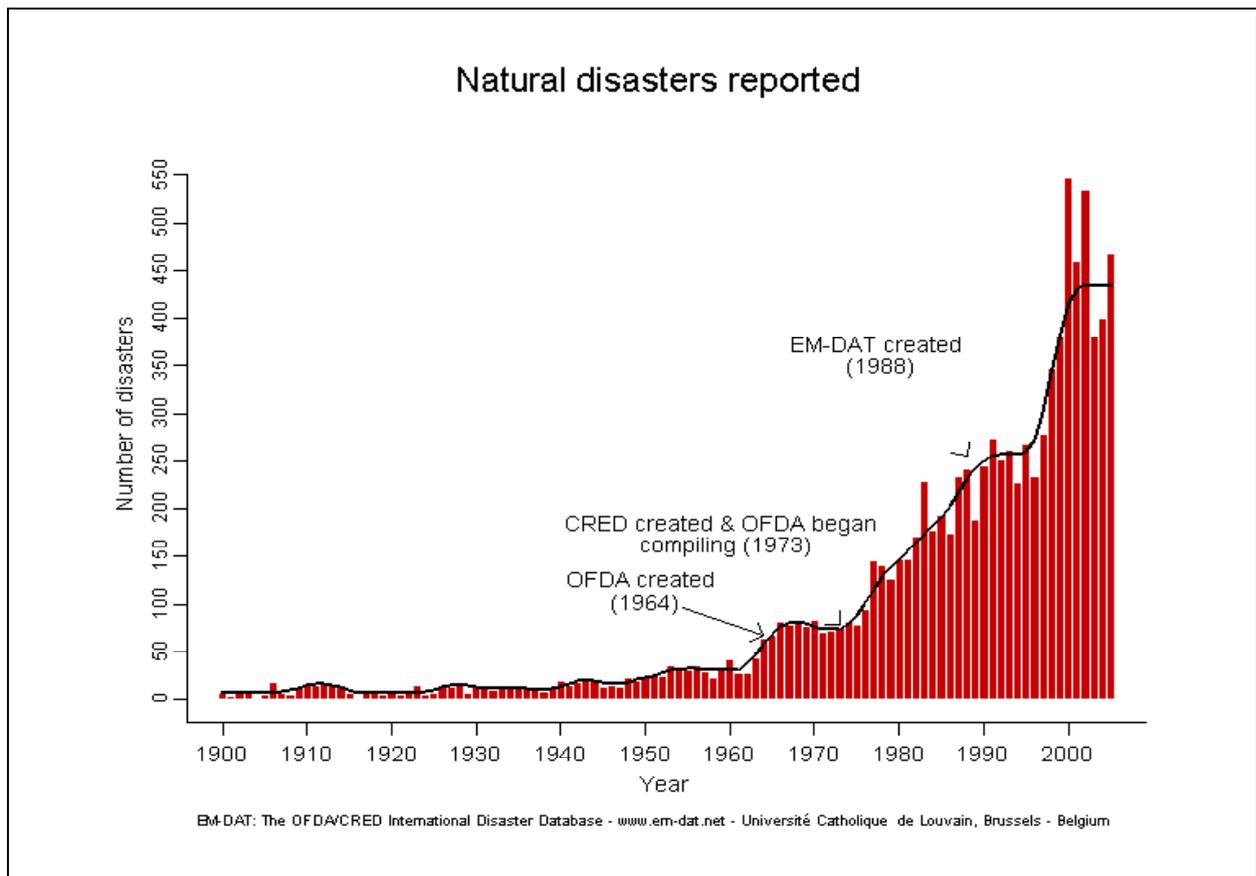


Bevölkerungsdichte 2004 = Population Density 2004 Stadtgröße = Municipality Size
 Tropische Wirbelstürme (MunichRe) = Tropical Cyclones
 Regionen mit erstmaligen Auftreten tropischer Wirbelstürme = Regions with First-time Occurrence of Tropical Cyclones
 Quellen = Sources

Map 7: Tropical Cyclones and their Geographic Distribution
 quoted from Messner

Cyclones will threaten the densely populated regions of the American east coast and the southern west coast, the European conurbations and the densely populated settlement areas along the Eastern costs of East and Southeast Asia.

Natural disasters (see viewgraph 2) and the associated costs for national economies will increase considerably. Frequency and intensity of extreme weather may affect also post-industrial nations with their complex mechanisms and result in the loss of law and order.

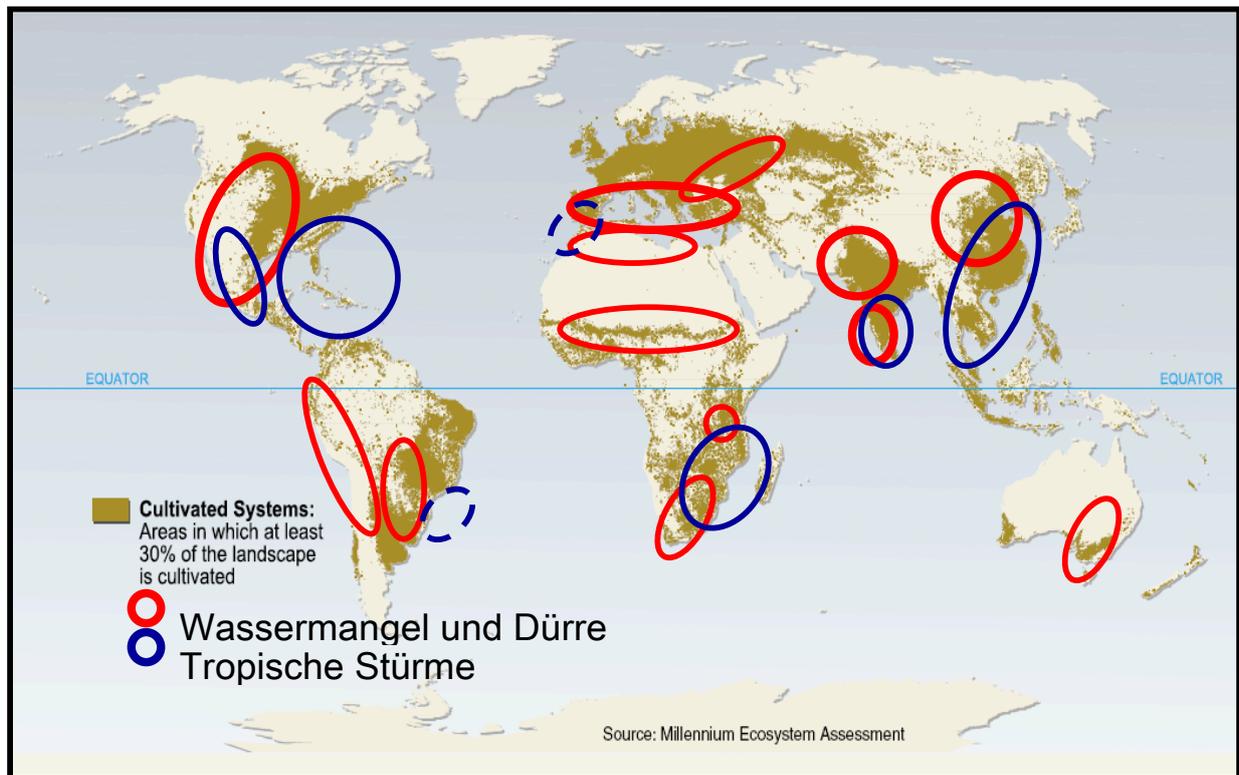


Viewgraph 2: Natural Disasters since 1900

Less developed nations in particular will, to a varying degree, be hampered in their attempts to catch up.

If one subsumes extreme occurrences such as draught, water shortages and tropical cyclones and looks at them against the backdrop of agricultural and settlement areas, one will obtain the following picture of regional threats caused by the climate change to be expected in the next 30 years (see Map 8).

India and China that are already affected by soil degradation, draught and water shortage will face serious challenges due to the projected continuing population growth (by 2050: India approx. 1.6 billion, and China approx. 1.4 to 1.5 billion, with a population worldwide of approx. 9 billion) and the consequences of climate change. Both, the issue of whether the currently projected economic growth will be sufficient or can be sustained, and of whether the implications resulting from the serious challenges may threaten social cohesion, are vital not only for these two countries as they could, in the event of adverse developments towards the loss of law and order, have far-reaching consequences for the remaining and in particular for the OECD world in the form of migration, loss of export and import markets (collapse and regionalization of globalization).



Map 8: Geographic Distribution of Draught, Water Shortages and Tropical Cyclones

While the role of the USA, Southern Europe and parts of South America as the leading suppliers of agricultural produce worldwide is likely to be significantly reduced, there are no recognizable successor countries. Although the agricultural prerequisites in Central and Northern Europe as well as in Canada and Eastern Siberia may improve, there is currently the lack of interest (Europe) or the lack of the basic parameters (Siberia: population, knowhow). Moreover, it is unclear whether this would balance any possible losses and achieve the economic growth that is required to sustain a worldwide population of approx. 9 billion in 2050. This would need a more thorough examination.

4. Impacts on the Transformation of Global Regions

In view of the security challenges already identifiable in the various regions, climate change is an additional burden of considerable magnitude. The loss in significance projected for the USA as the world's granary may also lead to the USA suffering a further loss in influence that is already happening for a number of reasons. Canada, Europe and Siberia may in this field gain in importance, particularly in view of the new food importing countries such as India and China. However, this would also mean that the importing countries would be exporting their problems related to the availability of water. In terms of security policy this means that the two countries are dependent on a worldwide functioning agricultural market, a fact that should increase their willingness to cooperate in the field of security policy long-term.

For South America, that ranks among the threshold countries, the following scenario is perceivable: should the massive and rapid retreat of the rainforest as a consequence of climate change continue in Brazil, the current challenges such as

from the economies of violence and social decline may be aggravated by an insecure food situation. This would make the two first-mentioned problems worse.

Europe does not present a uniform picture. Southern Europe will see the loss in significance in the field of food production and will be in need of subsidies. The failure to meet that need could mean that further European integration (EU) may be severely hampered. The problem is aggravated further by the fact that the EU population will experience foreseeable qualitative changes in that by 2025 at least 20 percent of its population will be Muslims. This figure may increase significantly if the migratory pressure mainly from the Greater Middle East regions continues to rise. To accomplish the necessary integration, the EU will have to achieve an outcome unique in history when one disregards the epoch of the migration of peoples. The possible economic marginalization of a number of regions in Europe and the marginalization of certain sections of its national populations could push the EU to its limits in terms of political integration, exacerbated by immigration and the failed integration of the Muslim sections into its populations. Should the EU fail to achieve this internal integration, it would no longer be a security-producing global factor (multipolar influence). The loss of EU Europe as a global anchor of stability would have a dramatic dimension: one of the richest regions worldwide with the financial potential to support a stable world order and one that appears to benefit rather than suffer from climate change would no longer be an effective factor.

The Russian Federation will have to realize that the previously harsh climate of Siberia, in particular of Eastern Siberia, is likely to change to such an extent that in addition to its raw materials the region may also become renowned as a preferred settlement area. Whether or not the population in this region will want to exploit the situation in cooperation with Moscow or independently will mainly depend on the internal cohesion of the Russian Federation. This could either lead to Moscow's rising again to become a global power with, however, the focus on Asia, or to independent rich Siberian republics with considerable potential for growth due to the improved regional settlement conditions. A prerequisite for either scenario would be a large number of immigrants in search for personal opportunities. Yet Asia currently has no shortage in well-trained people.

The Greater Middle East region with all its problems described in detail in the "Arab Human Development Report" make the region even more susceptible to the consequences that are to be expected from climate change. These are likely to aggravate the social, economic and political problems of the region. The political systems characterized by their low degree of stability and the absence of their willingness to ensure good governance will, as a consequence of climate change, further intensify the intrasocietal and economic antagonisms with a tendency to showing strong signs of disintegration. This will contribute to making the region one of the most unstable ones worldwide. The projected increase in the number of young people (youth bulge) and the almost absent capability of the political systems to offer some kind of perspective to their young people will lead to more migration and more internal and/ or exported violence (government controlled or non-government controlled economies of violence). This will also be a likely scenario for countries in Subsharan Africa, thus intensifying the tendencies to migrate to Europe.

China and India will experience rising problems such as water shortage, draught, soil degradation and extreme weather situations which means that the availability of food

will increasingly depend on imports. This also means that a large number of jobs in the subsidized agricultural sectors will be lost. As a result, the ranks of the unemployed will swell, constituting a further threat to the internal stability of the two countries. Despite the fact that both countries had experienced economic growth in recent years offering hope for self-sufficient economic and social developments, the pressure emanating from climate change may lead to a rapid social transformation, but also carries the risk of destabilizing the political systems. The effects would be major turbulences in Asia, but also for the rest of the world. In a world defined by high mobility, the migration from both countries (in particular in the form of a brain drain) may saddle the affected regions with the burden of having to adapt to a degree that would be impossible to achieve. By contrast, regions such as Siberia that, as a result of climate change, can make available new settlement areas could benefit from the migration movements.

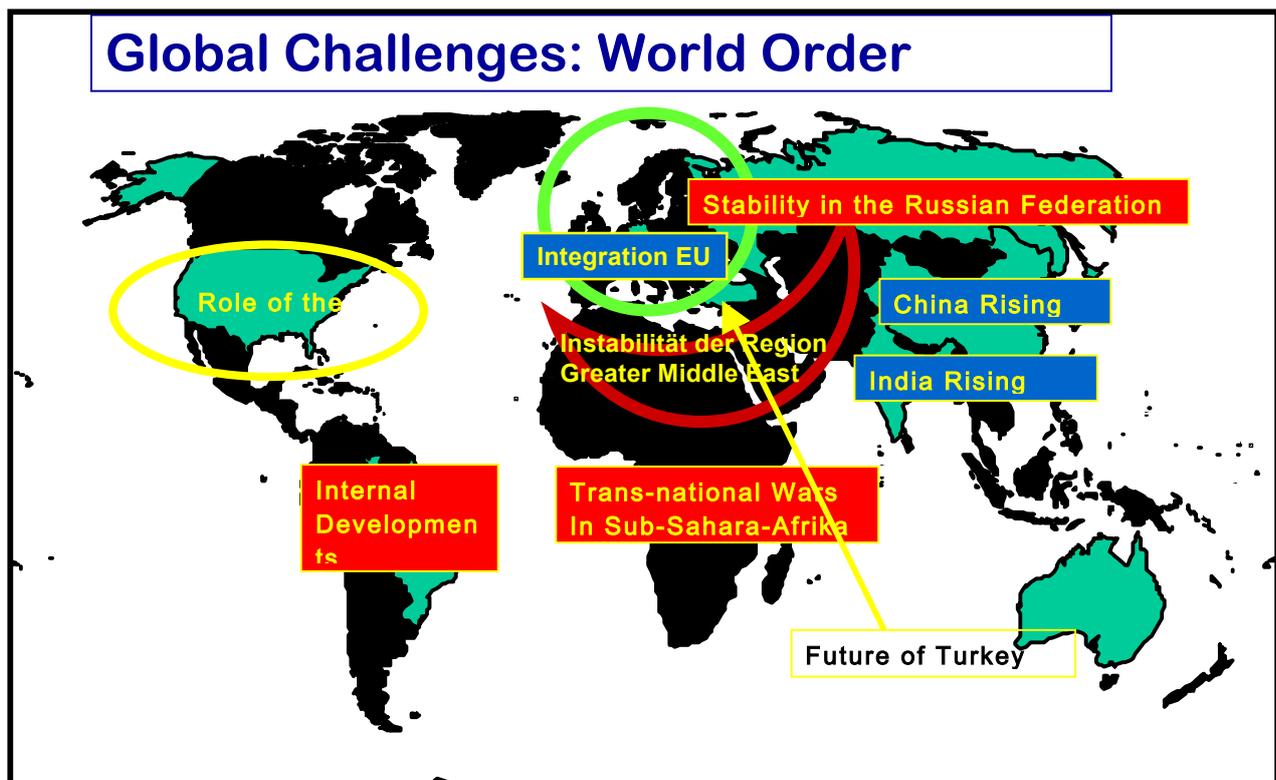
6. Projected Impacts of Climate Change on European Security

What does this mean for Europe? The overview of the security challenges (Map 9) with which the various regions of the world are likely to be faced with suggests that the security of Europe may be affected sooner and more intensely than anticipated.

It is arguably the region of the Middle East and North Africa (MEAN) where the causes that are likely to impact on the security of Europe have their roots. The youth bulge projected for the region will markedly intensify the pressure of migration on Europe and require Europe to accomplish large-scale integration. The proportion of the Muslim populations within the EU could in a relatively short time span reach 30 percent.

Further disintegration of the Russian Federation would affect Europe mainly in the energy supply sector. Once again the issue of the security of strategic nuclear weapons and their unintended proliferation would be raised.

That what remains of Russia would have markedly fewer resources of energy and raw materials, a population of between 60 and 80 million people, and were the current trend of deindustrialization to continue, considerable problems to meet the needs of its population. Organized crime, migration of the well educated and an economy of violence could be the consequences. All this would also affect Europe.



Map 9: Political Developments in Geographic Regions

The integration of the Russian Federation into the international economy through the reconstruction of parts of its industry and the introduction of information technology and other modern commercial sectors would create ideal conditions and make Russia an interesting partner for the EU.

The previous economic growth experienced by China and India could, as a result of climate change and its associated challenges, slow down markedly and thus intensify the willingness to migrate among the populations of both countries. Should its strategy of achieving internal stability through economic growth be unsuccessful China could pursue, albeit temporarily, a strategy of confrontation in order to sustain cohesion on the domestic front. This would have far-reaching implications for the global order. The EU could be faced with having to choose between security or economic interests.

The consequences of climate change for Subsaharan Africa could mean that the political leaders of the region already overtaxed could be faced with additional problems that will make their failure even more probable. Economies of violence at the regional level and migration as a consequence thereof would be a major challenge for Europe.

The consequences of climate change could dramatically affect the prospects of South America to catch up with the OECD nations. Political institutions are already competing with criminal, but also with the political and social organizations for the societally and economically deprived. Should the consequences of climate change reveal the inability of the political class to provide prospects for their populations

these will look for alternatives. The likely implication would be a rising migratory pressure on North America, particularly on the USA.

Over the next thirty years the latter may lose its previous cohesion. This would have significant implications for its role as a global player in politics. The discussion of imperial power politics will cancel itself out in view of the internal problems. The USA will be seeking partners in all parts of the world that could help decrease the financial burden of being a regulatory global power. This suggests a new form of hegemonic power that is forced to accept the rising of other regions in order to be relieved of financial and other burdens. The other regions could include Europe (EU), China and India. The result could be a multipolar world that deals with the world's problems (scenarios) in a climate of either cooperation or confrontation. A significantly weakened role of the USA as a global power would mainly affect the European Union that would then be required to spend more money on a world order (developments) or a world disorder (security).

The overall difficulties that the political systems (community of states) will experience in the exercising of their control function as a result of climate change and the associated consequences will be aggravated further by the projected migratory pressure (due to poverty, famine and epidemics caused by water shortage, draught and soil degradation). Migratory movements could reach the scale of the population movements of the 4th, 5th and 6th centuries. Migration in combination with economies of violence, international organized crime and the tendency towards a diminishing feeling of solidarity between the poor and the rich could – through the privatisation of violence – create regions characterized by the absence of the state's monopoly on the use of force.

7. Conclusions

To summarize, the primary objectives and results of the workshop on climate change are highlighted once again with a view to the Strategic Future Analysis. The intention of the workshop was to present the current status of long-run analyses in the field of climate research in order to derive possible security implications. An important objective is the advancement of the applied methods and the enhancing of the tools used for the Future Analysis. The issue to be examined was whether climate change has previously been sufficiently reflected in the Strategic Future Analysis. With this in mind, the intention is to show the major corridors that can be used for future development paths with a time horizon of up to 30 years. They will then have to be applied to potential war images.

War and its instruments are understood as the portrayal of social developments, that is, the transition from post-industrial societies to information and knowledge societies will be the starting point for the analysis. The model "social changes and the sociological processes" will be the basis that generates not only linear developments, but also allows retrograde developments. The overall process has produced an ever increasing complexity, with the latter entailing the susceptibility to conflict and, in the shape of interaction, the vulnerability of societies.

The methods used allow to conclude that the results of climate research in conjunction with historic findings on the experiences of societies where such phenomena have occurred give rise to the hope that valid explanations for future

development potentials can also be found in the field of security. Therefore the results should be used to not only answer the question of how they might affect certain regions and impact on local conflicts, but also how they might help identify the type of conflict and possibilities to prevent it.

In security terms, climate change offers a number of corridors showing how strategic resources can be used. The security phenomena will be analysed at various levels including specific countries and regions. Conurbations are the EU, the Greater Middle East (approx. 70% of energy resources), East Asia, Southeast Asia, the Sub-Saharan region and Central and South America.

The projected climate change should therefore initiate intense discussion about the security scenarios that have been developed to date. These offer lessons learned for the Future Analysis of regions, types of conflict and of the direct and indirect implications for the security of societies.