NATOs Parlamentariske Forsamling (2. samling)
NPA alm. del - Bilag 27
Offentligt

ECONOMICS AND SECURITY

059 ESC 05 E
Original: English

NATO Parliamentary Assembly

POLICY IMPLICATIONS OF THE RISK SOCIETY

DRAFT GENERAL REPORT

JOS VAN GENNIP (NETHERLANDS)
GENERAL RAPPORTEUR*

International Secretariat 22 April 2005

* Until this document has been approved by the Economics and Security Committee, it represents only the views of the Rapporteur.

TABLE OF CONTENTS

I. ECONOMIC TRENDS AND THE POLITICS OF RISK ASSESSMENT

1. This Committee has long argued that the economic dimension of security is too often relegated to the second tier by those engaged in the business of security. This is mistaken for a number of reasons, perhaps most importantly because national wealth is the primary underpinning of national power. But there is a welter of other important links.

2. Indeed, economic trends can be highly useful tools for those engaged in long-term strategic planning. To take perhaps the most obvious contemporary case, the sheer pace of China's current economic growth will alter in fundamental ways the international system as we know it. The implications are broadly based and will affect Western strategic and foreign policy planning, economic strategy and national macro-and micro-economic policies for decades to come. China's competitive challenge will ultimately alter the way Western societies organize their own domestic institutions and even educate their children. In short, change in Asia could well have an impact on virtually every level of public policy making in the West.

3. This is only to illustrate how dynamic economic phenomena can quickly alter the very foundations and assumptions on which foreign policy is predicated. The case is important though because it points to the kind of dilemma policy makers and parliamentarians confront in their deliberations. Those responsible for making policy need not only to consider immediate demands but also whether particular policies are appropriate given longer-term economic trends and risks.

4. In fact, coping with risk represents one of the most complex aspects of national policy-making. Risk itself is an intangible phenomenon. Our understanding of it lies on our capacity to fathom past phenomena and experience and to project lessons learned into a framework for thinking about the future. Doing so is a highly problematic process and is rendered only slightly less so through the use of statistical analysis and probability theory--tools which can help analysts extrapolate relevant data from past experience in order to provide a foundation for dealing with future risk or opportunity. The hope is that a reasonably clear picture of the future emerges from past trends thereby allowing public policy makers to fathom risk and hedge against it, or in strategic terms, to anticipate potential challenges and begin to cope with them before they become explosive. To continue with our example, one might project recent Chinese economic growth rates into the future, and compare these with projected Western economic growth rates to arrive at a better sense of how global economic power will be distributed in twenty years, and then breakdown the implications, for example, by looking at what this means for global energy markets and the so-called great game of international energy rivalries.

5. Of course, such straight line projections can be highly misleading, particularly if they fail to consider other factors—in our case, China's internal stability, limits to growth imposed by energy supply constraints, technological revolutions or unanticipated natural disasters. Still, simplified models have their use in risk analysis as they can suggest how the world might evolve, "other things being equal."

6. Economic trends, like demographic trends, are statistically relatively easy to capture. Indeed economic phenomena yield a wealth of computable data that can be extraordinarily useful in anticipating new challenges. To take a domestic example, discussions about pension and health care reform in North America and Europe are premised on the confluence of three data sets that in combination paint a rather worrisome portrait of what will happen if reform is not undertaken soon. Those trend lines relate to rates of economic growth, projected government revenues in light of those growth rates, projected taxation rates, and the demographics of aging societies. The

picture those trend lines draw is so startling clear that there can be little debate about the shortages that will soon befall national pension and health spending in many Western societies.

7. The future risk to national pension funds is relatively easy to discern because the variables that are driving the looming crisis are already in play. Yet even in this case, forging national or international responses to the coming crisis is proving inordinately difficult. In the US, the administration has proposed creating a parallel system of private retirement accounts coupled with massive public borrowing (tax increase have been politically ruled out) to underwrite the transition period from a single social security fund to a mixed public-private system. In Europe, the discussions and proposals are generally even more timid although the demographic time bomb there is even more apparent.

8. All this suggests that even with a very clear picture of "risk", democratic societies can be very slow to respond. Deeply imbedded interests in the status quo invariably resist change. This is less so for the insurance industry which is far more sensitive to risk and risk management. It is interesting to note how quickly the catastrophic insurance business has broadened its scope from insuring against natural disasters like hurricanes and floods to man-made disasters precipitated by terrorism. At the same time, sophisticated financial innovations like derivative markets are helping further spread risk in order to manage it more efficiently. (Felsted)

9. It is interesting though that one can also cite those paradoxical cases in which potential risk is far more amorphous, and yet societies mobilize very quickly and efficiently to ward off that risk. Europe's response to genetically modified food might be an example here. The scientific data of health and environmental risk of Genetically Modified Organisms (GMOs) in some cases seems far less compelling than does the evidence that current national pension systems are unsustainable. Yet the capacity of the GMO risk to mobilize society and its political representatives in Europe represents a startling contrast with the failure to mobilize political action to deal with the pension crisis.

10. On the face of it, this might seem like a totally irrational phenomenon. A near certainty fails to trigger a compelling response while an uncertain one somehow moves to the centre of the political and international trade agenda. There are several possible explanations for this. It is certainly the case that a society's capacity to respond to risks partly corresponds to the correlation of interests engaged in the issue. Yet other more amorphous factors like culture, tradition and the perceptions these nurture also play a part. Why do Europeans perceive GMOs as so risky while Americans do not? Certainly the fact that American business is playing a leading role in the development of the technology provides one element of the explanation. The risk of GMO is not only a risk to European consumers and the environment but also a risk to vested European commercial and agricultural interests. In this sense, trumpeting the risk of GMO's might also be a means of protecting certain powerful interests in the society. Yet, it is also the case that Europe has a centuries old culture around food, one that is not very amenable to rapid change. Anything purporting to offer a revolution in the way food is cultivated or eaten in many European societies will be greeted with a high degree of scepticism if not outright hostility. In the case of the recent GMO debate, consumers rather than governments mobilized most quickly to resist rapid adoption of GMO food.

11. It is also worth noting that some developing countries approach the GMO issue with another set of interests and needs. At least for some developing countries, the prospect of a high yield vitamin crop might outweigh potential risks. Others, however, might take their cue from the Europeans, largely because they sell in that particular market and do not want to adopt technologies that might jeopardize those markets.

12. The notion of societal risk is thus inherently political. Governments and parliamentarians are constantly asked to engage in risk assessment and to hammer out legislation, regulation and

policies designed to hedge risk or even eliminate it. On the face of it, this could be understood as an inherently rational process in which all available statistical analysis is used to forge appropriate strategies to minimize or eliminate risk. But if things were this simple, one might see the elimination of motorcycles in Europe or the eradication of gun permits in the United States. As neither seems very likely, one has to admit that an array of other factors condition society's capacity to accept or not to accept risk.

13. Another important factor, of course, is cost. We accept some degree of risk because the cost of eliminating a particular hazard might simply be too high. It might be possible to manufacture a perfectly safe car, to take one example, but the costs of doing are commercially prohibitive. Societies establish car safety regulations with implicit risk/costs trade offs. We accept some risk both because risk and tragedy for that matter are inevitable in a fallen world, and because the cost of eliminating even preventable risk can be prohibitive. Given those constraints, societies seek to minimize risk as best they can.

14. Therefore, risk is not some objective or scientific concept that can be routinely quantified, socially agreed upon and then eliminated or minimized. Coping with risk is culturally conditioned; it is a process shaped both by prevailing interests in a given society and the potential costs of the options. One also often speaks of "risk perception" --an important concept in strategic military affairs and certainly in Alliance politics. States respond to risk only insofar as there is a certain correlation of interests and culture dispositions within a given society that helps it to acknowledge the risk and agree upon a course of action to cope with it. Finally, different societies will set the bar at different heights—something that is evident in the GMO controversy where European consumers perceive great risk and want to eliminate it, while American consumers see little risk and if anything perceives commercial opportunity. This paradox inherently complicates multilateralizing risk management.

II. THE THEORY OF THE RISK SOCIETY-THE WORK OF ULRICH BECK

15. Globalisation, mass production and technological advance are fundamentally changing the way Western societies fathom and cope with risk. They are, according to some academics, also changing the very nature of risk. Risk is increasingly understood by some sociologists as an almost automatic result of goods production and technological advance. Incalculable risks are emerging from nuclear, chemical, defence, and genetic sectors and from the generalized use of carbon based fuels. Indeed industrialization as a whole is putting the world's climate at risk of catastrophic change of incalculable cost to human society. As these risks mount, the institutions designed to manage risk and protect citizens seem increasingly unable to do so. Threats have begun to outweigh socially agreed upon safety norms, and there seem to be no rational means to achieve a rebalancing. (Harries-Jones) This phenomenon has been the subject of a new academic line of inquiry in economics, sociology and political science. Ulrich Beck, a German sociologist has played a leading role in developing this new approach.

16. Beck argues that a fundamental change is underway that will dramatically alter the way risk is identified and managed or rather, not managed. In the age of industrialization, nation states had been the primary players in coping with risk. Progress, certainty and security were understood as mutually reinforcing, and the nation state along with the market played a central role in ensuring all three. Managing risk generated public trust in the state, as well as within markets, which were structured not only to generate prosperity but also to cope with risk--an obligation perfectly embodied by the insurance industry.

17. According to Beck and his colleagues, a new form of modernity is now emerging. It is characterized by increasing speed, ever more intense transnational interdependence, and the emergence of economic, cultural, political and societal “globalisation” in which the dividing lines between Western and non-Western societies are ever less valid. As the old bipolar order has retreated, new challenges arising out of technological change and global integration are compelling governments and societies to deal not so much with enemies as with risks. The rapid pace of technological advance coupled with an ever more dense web of global linkages are driving risk in new and largely unforeseen directions. Many of these risks elude national control because they are truly global in character and because they can be the totally unforeseen consequence of rapid innovation and technological change.

18. Indeed, Beck characterizes today's global market as a form of “organized irresponsibility”. For all intents and purposes global governance does not exist, and risk in this global setting has become terribly difficult to manage. This deficiency, however, will recast politics, as we know it. Transborder politics rooted in local concerns but quickly moving to international contexts are increasingly understood as perhaps the only way to manage trans-border risk, particularly as globalisation and technological advance are weakening the autonomy and power of the state. This raises new challenges to global governance, or, as Beck calls it, “cosmopolitan democracy”.

19. Beck discerns a shifting balance between what were once considered global issues and those typically understood as local challenges. Increasingly, the latter need to be posed, discussed and resolved through *transnational* frameworks. Politics and states have not caught up with this imperative, although many non-governmental actors have begun to think and operate on these terms. Beck suggests that over time, we could see a reinvention of politics. The creation of *cosmopolitan* parties, for example, might be more adept at representing transnational interests trans-nationally as well as nationally and locally. To some extent, this is already beginning to happen in Europe, but Europe of course, is bound by common institutions and a shared sense of mission.

20. Beck suggests that risk management will be the central catalyst of transnational politics. He speaks of the emergence of "risk communities"--groups of people united by a shared risk even if divided by borders. In a highly integrated and technologically advanced international order, these risk communities are already appearing and are increasingly active. These groups are linked by the fact that they are compelled to accept the risks generated through the actions of others. Beck clearly discerns a new fault line in modern political life. In the emerging global order, there are small groups that produce and profit from risk while many are effectively exposed to risk without gaining any discernable benefit. The consequences and dangers of developed industrial production are now global, and from this perspective, the "world risk society" reflects forced global socialization arising out of the very dangers that civilization produces.

21. Beck believes that transnational institutions capable of responding to the global scope of these challenges will ultimately be needed to cope with global risks. In dealing with new uncertainties, however, it is also important to distinguish between risks that in principle can be brought under control, and those that are beyond the capacity of human institutions to manage. But even drawing this line is not easy. Ecological crisis can be the results of shortcomings in norms and institutions of industrial society, or, it could be intrinsic to the very nature of that society. The former suggests that solutions can be found by tinkering with the rules of the game, while the latter raises more systemic questions.

22. Beck distinguishes among several types of global environmental threats:

1. Wealth-driven ecological destruction undertaken to advance the consumer- society (hole in the ozone layer, greenhouse effect etc.);

2. Poverty -driven environmental destruction (felling of tropical rainforests, toxic waste, the use of environmentally destructive obsolete technologies);
3. The potential use of weapons of mass destruction - nuclear, biological and chemical.

23. He argues that it is uniquely difficult to fathom, quantify and manage the interaction between ecological destruction, war, and the consequences of incomplete modernization. Tried and true safety calculations now seem inadequate to the catastrophic forms of risk global society presently confronts. Containing damage in the event of dramatic global warming, for example, may well be beyond the capacity of humankind and its institutions.

24. Beck suggests that there are powerful interests arrayed against the construction of new trans-border coalitions to deal with these challenges. Great industrial concerns generate environmental risk, although the costs are not reflected in prices nor in contemporary legal systems, while the public debate often minimizes the extent of real risk, particularly since the interrelationships among various environmental phenomena are not well understood. When these matters are neglected in formal politics, extra-parliamentary forces and citizens groups are left to take up the challenge. Such groups may have greater flexibility to operate across borders.

25. Beck also concerns himself with how society calculates the trade-offs between industrial production or military activity and the risk of setting off catastrophic chains of events that evade human control. Mad cow disease might be understood as a representative case where industrial agricultural processes helped trigger a disease that proved very difficult to control once it was unleashed. Control has been made all the more difficult because of international trade.

26. This raises another question regarding the kinds of instruments that society might use to manage risk. Can society devise the financial means to hedge against mega-risk or to develop policies to mitigate the risk? Or are certain risks simply too great to insure against? Alternatively, should one conceive of social compacts designed to discourage the development of industrially produced hazards before they can even pose catastrophic risk?

27. Beck argues that two contrary lines of historical development began to converge in the late 20th century; a level of security founded on the perfection of techno-bureaucratic norms and controls, and the rise of historically new "mega hazards", which slipped through existing legal, technological, intellectual and political filters. Since the beginning of the 20th century, the social institutions of industrial society have had to account for the historically unprecedented possibility that human kind could engineer the destruction of all life on this planet. We now live in an age of nuclear, chemical and genetic technology, and this poses more complex barriers to insuring against the worst imaginable cases. Ultimately there is no institution that would be prepared for the worst imaginable accident. The risk society, he writes, has become the uninsured society.

28. Rising hazard technocracy, Beck writes, undermines risk calculation. Risk definitions are inadequate, and there are no standard rules attributing causes and effects in conditions of high complexity, integration and contingency. Modern societies have found it easier to ignore risks they cannot fathom than seek to understand them, particularly when these are consequences of industrial action and production.

29. According to Beck, there are also important time lags in understanding the nature of risk. The hazards to which society is currently exposed may have been produced in another era. Equally, the risks generated by atomic, genetic and chemical technologies are being handled with concepts derived from early industrial society of the 19th and early 20th centuries.

30. Another interesting dimension of mega risk is that it does have a "democratic" character insofar as all are ultimately rendered vulnerable. That said, the poorest in the world are still more vulnerable and would be the least able to adapt, for example, to sudden changes in the

environment. This could lead to new global divisions between risk winners and risk losers. Risk conflict or resource war stemming from catastrophic events might emerge as the ultimate form of political conflict.

31. Beck is interested in how these mega risks are altering politics. He foresees the rise of a new kind of "life" politics, in which civil society seeks to reassert itself over the risks the global order has generated. In the words of Beck, the emergence of large scale hazards and "manufactured uncertainties set off a dynamic of cultural and political change that undermines state bureaucracies, challenges the dominance of science and redraws the boundaries and battle lines of contemporary politics." Beck and other risk theorists have suggested that global risks exacerbated by a liberal order cannot be harnessed by the regulatory state. He appeals for a new kind of "bottom up" politics capable of participating in decisions once left to the “Western technocracy”. He concludes that civil society driven localism and multilateralism may offer the only means for individuals to reassert some control over the risks they are increasingly forced to accept. (Harries-Jones)

III. THREATS AND OPPORTUNITIES ASSOCIATED WITH GLOBALIZATION

32. Beck is interested in developing new fields of social and political inquiry as well as offering a strong critique of the liberal global order. He has developed a useful theoretical foundation to study how risk is altering political dynamics in the West and particularly in Europe. National governments, however, will likely continue to be the primary protagonists for coping with risk; the nation state will accordingly remain a primary means of ordering society even though NGOs and transnational organisations have influence and will continue to change the context in which states operate. Moreover, science should be understood as offering a potential way out of rather than simply as a creator of risk. Science itself is a neutral phenomena; humanity provides the context in which it is used. Governance, however, is likely to emerge as a key problem simply because many of these risks cannot be adequately met given current national frameworks for assessing and coping with them. At the very least, this will alter the way states interact with each other and could indeed provide the foundation for renewed multilateralism. States will also need to forge new partnerships with the private sector, non-governmental organizations and citizens.

33. In any case, globalisation and technological revolution pose some of the most compelling challenges to the way societies anticipate and manage risk. The problem is that as the world grows more economically integrated and as technology becomes the very fabric that binds distant countries and cultures together, the points of vulnerability multiply. A number of governments as well as independent commissions and academics are now trying to anticipate some of these challenges. The remainder of this report will briefly review some of the analysis that shaping long-range government planning.

34. Strategic forecasters increasingly speak of “drivers”—that is those areas of risk that will most likely emerge as important catalysts for long-term strategic change. These include: demographics, natural resources and the environment, food and agriculture, science and technology, the evolution of the global economy and globalisation, disease and health, and the way national and international governance copes with these and other risk areas. It is interesting to note that many of these areas have implications for the way we understand and cope with terrorism--one of the primary strategic threats the West currently faces.

IV. NATURAL RESOURCES

35. This April, the first ever-global inventory of natural resources was published. The Millennium Ecosystem Assessment (MA), underwritten by the UN, the World Bank and the World Resources Institute, cost $24 million to complete and engaged 1300 scientist working in 95 countries. According to the assessment, human activity has changed global eco systems more rapidly and profoundly over the past 50 years than at any other time in human history. 60% of the planet's resources that support human life such as water are being degraded or used in a fashion that cannot be sustained and by 2032, more than half of the world could be afflicted by water shortages. (OSCE 28 May 2002)This degradation is increasing the possibility of dramatic and sudden environment change or the disappearance of the world's fisheries—something perhaps foreshadowed by the collapse of Atlantic cod stocks in the early 1990s.

36. The most apparent changes to natural eco systems stem from the conversion of natural habitat to farmland and the destruction of forest. In 25 countries most forests have been completely eradicated, and in 29 other countries the area of forested land has fallen by 90%. The report also suggests that water and fisheries are currently so degraded that they cannot even adequately meet current demands- a situation that will worsen without profound policy change. Irrigation has doubled since in 1960 and ground water resources are also seriously strained as a result. Fertilizer use has exploded and is leading to oxygen depletion in lakes and portions of the ocean floor. More worrisome still, is the fact that these processes are interrelated sometimes in ways, which are not fully understood.

37. According to the CIA, by 2015 nearly half of the world's population of 3 billion will live in water stressed countries--most of which are in Africa, the Middle East, South Asia and northern China. In developing countries, 80% of water is used in agricultural production. This is not sustainable. 1000 tons of water are needed to produce a ton of grain. Water tables are falling some times precipitously, in northern China, to take one example, water tables have been falling at a rate of five feet per year. Indian water tables are falling between 3-10 feet per year. Such depletion rates cannot be sustained, and water will have to be used more efficiently in many areas of the world. Technological fixes may be part of the solution. Some genetically modified plants, for example, require less water than normal varieties to bring to harvest.

38. Water shortages also pose potential challenges to security. Nearly one half of the world's land surface consists of river basins shared by more than one country, and more than 30 nations receive more than one third of their water from outside their own border. Water rights issues have become an important source of tensions in the Middle East, Central Asia, North America and elsewhere, and one cannot rule out the possibility that in future, tensions over water rights could escalate in certain regions to military conflict. So far, however, this has not transpired, and so such resource wars are more a potentiality than a reality. (Gleditsch and Urdal)

39. Meanwhile biodiversity poses another serious long-term challenge. Extinction rates are now a thousand times higher than the norm for evolutionary history, and between 10-30% of the world's land vertebrates are now under threat. According to recent models, extinction rates are slated to accelerate in part because of habitat destruction. Again, man-made alterations in one eco-system spill over to other systems.

40. The MA could do for the crisis of global resources what the Inter governmental Panel on Climate Change did for global warming—place the risks with which it deals at the centre of the international agenda. The difference though is that the MA was not ordered by governments, as was the study on global warming; rather it is an initiative of the scientific community itself. The study however provides important background information for four international environmental

treaties including the UN Convention on Biological Diversity and the Ramsar Convention on Wetlands, (Graham-Rowe and Homes)

41. Rapid industrialization in developing countries, the proliferation of automobiles, rising weather related insurance settlements, and ever more compelling scientific evidence suggest that global warming is not only a reality but one that will exact a terrible toll on human habitats. Before the industrial revolution, carbon concentrations in the atmosphere stood at 275 parts per million. The current ratio is 380. Scientific models suggest that environmental catastrophe will likely be triggered when the figure rises above 550. This is the red line that should not be crossed according to many experts. (McKibben) One Pentagon paper on its security implications recently suggested, "There is substantial evidence to indicate that significant global warming will occur during the twenty first century." The paper painted a worse case scenario of resource wars arising out of global warming/cooling catastrophe in key food producing regions. Some defence planners are apparently taking the risk of global warming very seriously, although others do not. (Schwartz and Randall). This particular paper concluded that alternative fuels, greenhouse gas emission controls, and conservation efforts might help ameliorate the situation although any solution poses its own set of challenges.

42. According to many scientists, the ratification of the Kyoto Protocol in itself will not be nearly sufficient to reverse the trend described above. The international community will be increasingly pressed to take more dramatic measures as conditions worsen, and this will mean weaning economies from their utter dependence on carbon-based fuels, or at least lowering their use through conservation and new technologies. Many scientists assert that global warming has already begun to burden the global economy and is intensifying other environmental challenges like water shortages and weather related problems. (McKibben)

43. These problems are already serving as a catalyst to research on non-carbon energy sources including solar, wind, and nuclear energies. Investment in these technologies is likely to increase as petroleum prices rise and both improved technology coupled with the higher energy prices could facilitate their mass introduction. Technology advance in these fields should be one of the pillars of any long-term strategy for coping with environmental risks and balancing these with rising energy requirements. But all these technologies have their limitations, and none are poised to substitute fully for carbon fuels.

V. SCIENCE AND TECHNOLOGY

44. The world is still in the midst of a technological revolution, which is introducing rapid change in computer and telecommunications, material sciences as well as, genetic and biological engineering. The implications of these scientific revolutions cut across numerous sectors of human activity including military affairs. The effects of these advances are difficult to foresee. Technology can both help resolve old problems while creating new ones. Global integration and the proliferation of information technology are ensuring that technology is spread more widely and more quickly. The time lag between technological innovation and commercial adaptation also appears to be narrowing. Meanwhile these advances are helping forge new links across national borders and between rural and urban centres. These changes, in turn, are eroding the capacity of governments to control information and could well bolster democracy movements in authoritarian countries--a pattern that was evident in Eastern Europe at the end of the Cold War. On the other hand, terrorist groups will also be positioned to avail themselves of these technologies. The risk of cyber crime and terrorism are already understood, but they too point to the risks associated with an ever more integrated or networked global economy. (Rees.) Given the mounting level of networked communication and information systems, the capacity of a relatively small number of

determined terrorists to inflict catastrophic damage with global implications has increased almost incalculably. This calls for constant vigilance as well as efforts to build in back up redundancies to vulnerable networks. Finally privacy issues could also become a larger concern given the centralization of information and the temptation of governments, businesses and others to use that information in ways that might be antithetical to citizen's rights to privacy.

45. Genetic sciences will also continue to progress, and startling advances are likely in medicines and also in agriculture. But risks abound in these areas. Recent tests on herbicide-tolerant GM rapeseed and sugar beet, for example, found that these new hybrids posed a greater threat to biodiversity than conventional crops, while GM maize actually encourages biodiversity--results that were only known after very extensive testing. (Financial Times, October 17, 2003.) More malicious forms of genetic engineering are also within the realm of possibility. In the hands of millenarian terrorist movements or even individual fanatics these technologies could threaten vital eco systems and public health. There are serious strategic concerns about human designed pathogens. Finally, technological advance will continue to pose moral and ethical dilemmas as seen in the recent stem cell debate in the United States

VI. DEMOGRAPHICS

46. Since 1961 the world's population has doubled. Although, food production has more than doubled in that same period, environmental stress has increased dramatically as a result. Demographic explosion points to real problems of environmental sustainability and the capacity to produce sufficient wealth to lift an increasing share of the world's population out of poverty—one of the fundamental objectives of the Millennium Development Goals. Indeed, one ecologist who participated in the MA suggested that reducing poverty with such a large population will inevitably place further stress on the environment and thus compromise the capacity for long-term poverty reduction. This is particularly the case in dry regions where water shortages will likely impose limits on poverty eradicating economic growth. But even in general terms, generating wealth will almost invariably drive new demands on eco-systems. This could lead to environmental calamities if not properly managed.

47. The World's population in 2015 will be 7.2 billion, up from 6.1 billion in 2000. Ongoing advances in health care mean that people will live longer. Developing countries will see the largest increase in population, although some countries may see declines due to pandemics like Aids and Malaria as well as war. These broad population trends will generate serious stress in countries where political systems are less robust. The developing world is also undergoing a massive migration from the countryside to urban settings. Urbanization, in turn, is generating unprecedented pressures on infrastructure and environmental resources that could well generate political and social instability. China, for example has recently experienced a set of environmental protest riots. Large-scale infrastructure investments will be needed to minimize urban chaos and insure reasonable urban standards that protect public health. Finding jobs for young people is also vital to achieving security; high unemployment is highly destabilizing and can have a range of knock on effects with international repercussions.

48. Most developing countries will also undergo a significant increase in their working population. This theoretically increases the potential for economic growth but it can be harnessed only if a context for growth and opportunity is created both nationally and internationally.

49. As suggested in the introduction, demographic trends in developed countries are moving in the opposite direction, and this is generating serious strains on pension and health care systems. New social tensions and the rise of more stark generational politics might undermine existing

social contracts that have been so critical to internal stability in Western countries. The pressures on defence and aid budgets will clearly mount in Europe as the budgetary effects of an aging society begin to become evident. New deals will clearly have to be struck, but the transition will likely be politically very difficult. (CIA Report)

50. Divergent demographic trends in the North and the South finally suggest that migration from developing countries to developed countries is likely to continue given wealth disparities and the inevitable need for new workers in aging developed countries. Although the economics here might make sense, the politics of integration are more daunting, and here again, new political and social compacts will be needed to mediate the social, political and military tensions that will inevitably arise.

VII. ENERGY

51. Anticipating trends in energy markets is a highly contingent process; critical factors like future demand conditions, new discoveries, energy policy changes, political stability in supply countries, refining capacity, weather patterns, the evolution of technology and energy efficiency are all difficult to anticipate. That said, it is becoming increasingly clear that demand for oil and gas over the next twenty years will be far greater than estimates made several years ago. The explosive growth of China, India and other Asian countries and their energy intensive development is effectively revolutionizing global energy markets. Forecasters in recent years have had to significantly adjust their assumptions to accommodate shifting long-term market conditions. The US Department of Energy's (DOE) most recent forecasts suggest that global oil demand will rise from 80 million barrels per day in 2003 to 120 million barrels per day in 2025. OPEC production will rise by 80% in that period while non-OPEC production will increase from 49 to 65 million barrels a day in that same period. The DOE anticipates in its reference model that oil prices in 2025 will approach $30 a barrel in 2003 prices or $52/barrel in nominal prices. Their high price scenario puts the price at $48/barrel--a price that could trigger significant activity in alternative energy production. (DOE). Other analysts are forecasting far higher price rises both because of dynamic demand and emerging concerns about supply.

52. Indeed, recent price increases point to highly dynamic demand conditions in parts of the world, which international watchdogs may have been underestimating (Binks). Refining capacity limitations as well as political uncertainties have also contributed to recent supply problems. Chinese oil demand increased by 11% in 2003 and 15.6% in 2004--increases that are certainly helping to tighten the market. (Oil Market Report, International Energy Agency). Last year alone car demand there rose by 50%. Exploding Chinese demand coincides with still rising demand in the US, the world’s largest oil consumer, and mounting demand in other Asian countries including India. Capacity has simply not kept pace (Binks). The International Energy Agency has indicated that short-term risks to energy security will increase over the coming decade as ever-larger shares of oil and gas comes from political unstable regions. OPEC will likely see a return to its oligopoly powers. (Keven Morrison) Developing countries will account for most of the increase in future demand, and these countries will account for nearly half of total demand by 2030. Carbon emissions will likely be 60% higher in 2030 than they are today with 2/3 of the increase coming from the developing world. Western economic trends point to a diminishing ratio of energy use to GDP, in part, because services rather than energy intensive manufacturing have become the engines of growth and because technological innovation has bolstered energy efficiency. Still, the United has seen its domestic oil output fall by 40% in the past 30 years, while domestic oil consumption increased by 40%. Accordingly the share of imports in US consumption rose from 35% to 56% in that same period. Moreover, within the next twenty years, the US will be importing more than a quarter of its natural gas compared with 2% today. All of this suggests that even the

world's most powerful country is burdened with a grave energy vulnerability, and currently lacks a demand side strategy to cope with it – this at a time when the supply side is increasingly out of its control. (Buchan and Hoyos)

53. There is thus a range of long-term energy supply risks that governments today need to consider. Perhaps the most important of these is instability in the Middle East, where authoritarian governments are consistently failing to meet the expectations of restive and disenfranchised publics. Mounting demand from developing countries like China also points to the potential for new strategic rivalries over access to energy. A recent CIA report suggests that that energy suppliers and demanders will link up in new ways; eventually, the Gulf, Russia, and Central Asia will primarily supply Asia consumers while Atlantic producers will be serve the European and North American markets. (CIA) But how this division of labour might be achieved is not at all clear, and one can easily imagine an ever more fierce competition for resources particularly if demand growth begins to outstrip supply increases. Finally, mounting dependence on carbon energy clearly conditions Western approaches to highly authoritarian regimes that happen to sit on large petroleum or gas reserves. Western countries are perhaps less likely to push for positive political change when they are dependent on these regimes and their elites for energy. But failure to deal with highly repressive regimes leads to a broad range of other threats including long-term instability.

VIII. DISEASE

54. Population growth and environmental stress are also affecting the speed at which pathogens develop and spread. Today, half the urban population of Africa, Asia, Latin America and the Caribbean suffer from diseases associated with inadequate water and sanitation. Deforestation is leading to increases in malaria because water run-off is increasing swampland areas where mosquitoes flourish. Almost 5 million people were infected with HIV in 2004 alone while 3.1 million died of AIDS that year. Between 39 and 44 million people are now infected. The pandemic is spreading in different ways around the world, thus making prevention all the more difficult. Africa today has more than 60% of the world's HIV infected people while India and China now appear to be on the edge of an explosive expansion in the number of cases. (Fek et. Al) Globalisation and particularly ever more efficient and rapid transportation links have complicated the task of containing epidemics. SARs became a global problem when international travellers helped rapidly spread the disease, gravely complicating efforts to contain it. Health policy makers are now closely monitoring the outbreak of avian flu with this in mind.

55. Go here as well, technology represents something of a two edged sword. On the one hand, breakthroughs in medical research are generating new treatments for serious diseases. On the other hand, viral resistance to some of these treatments suggests that nature has ways to circumnavigate human innovation. But science also potentially puts the power of circumnavigation in hands of terrorists groups as well. The North-South divide in health care will also likely be exacerbated over time. Infectious disease will ultimately pose a greater problem for developing than developed countries, although, again, containing the spread of disease will be difficult. Expensive treatments will remain a luxury of the richer countries. Tuberculosis, malaria, hepatitis, and AIDS will continue to ravage parts of the developing world and the fight against these diseases will consume important shares of GDP in the worst of regions. Some countries will undergo important reduction in life spans as a result.

IX. TENTATIVE CONCLUSIONS

56. States will remain the single most important organizing unit of political economic and security affairs over the coming decade. But governance will emerge as a major challenge in an ever more global environment in which decisions made beyond one's borders will have powerful local implications. The ever-freer flow of information, capital, goods, services, and people as well as the rise of global risks will erode the capacity of governments, corporations and individuals to manage risk. Increased international cooperation on an ever-lengthening list of transnational issues may prove to be the only way to reassert control over phenomena that might otherwise evade all control.

57. One of the great problems in managing risk is forging broad social agreement about the nature of risk in time to actually manage problems before they become catastrophic. This is particularly difficult when one is talking about enormously complex phenomena involving many variables, some of which pertain to core habits of civilization. To take one example, a political consensus on global warming is still not fully achieved even though the scientific community has been united on the nature of this threat for some time. Even when risk is generally understood, however, taking measures to cope with them can be highly contentious, particularly when costs are involved, and invariably, they are. Yet, a lack of agreement and delays in implementation can make risk even more compelling. Proactive rather than reactive policies are clearly needed in order to contain the risk of catastrophe and to lower the long run costs of prevention. It is estimated, for example, that it will cost $32 billion to protect European coastlines from the effects of global warming while Tanzania would need $14.6 billion to fend off the effects of a 1 meter rise in the sea level. (Harvey) With numbers like these in mind, politicians need to take environmental science more seriously if they are to exercise genuine stewardship over a fragile planet and manage humanity's ever mounting capacity to upset nature's balance in catastrophic ways. It is no coincidence that religious movements in the West are increasingly concerned with the important moral question of global environmental stewardship. Laissez-faire approaches to energy use are failing because markets have not been structured to account for the real costs of environmental degradation.

58. More comprehensive externality costing, therefore, must become a priority. In other words, the environmental and security costs of consumption need to be better incorporated into pricing. One recent estimate suggested that Western countries *subsidize* fossil fuel use to the tune of $73 billion. (Harvey) At the same time, new partnerships among governments, scientists and economists must be forged in order to come to a better understanding of the real costs of ecosystem degradation and biodiversity loss. Gas and oil prices should better reflect their environmental opportunity costs as well as the huge national security costs involved in ensuring the uninterrupted flow of oil to market. In many countries, gasoline prices fail to capture these costs, and consumption patterns are consequently environmentally hazardous and, in indirect ways, exacerbate military vulnerabilities. Energy pricing should reflect these costs even if they have to be introduced through taxation. Governments should also demand higher fuel efficiency in consumer vehicles and adopt policies to encourage energy saving transport alternatives. Such measures can have both enormously beneficial environmental and security effects and can spawn new environmentally friendly industries. (Samulson)

59. If countries can justify military spending as a means to achieve security, they should also consider public support for the development of renewable low polluting energy sources including wind and solar power. Already the wind energy market is doubling every two and a half years and could be supplying as much as 12% of the world's energy by 2020. Solar panels are becoming more efficient and less costly by the year, and rising oil prices will make them increasingly competitive. The problem is that their inherent intermittency results in power interruptions, which means that they cannot become anything like the sole source of power for the world. Only critical and indeed unanticipated technological breakthroughs will help the world move away from carbon

based energy. In the meantime, governments need to support that research while doing all in their power to foster energy conservation. (McKibben). Nuclear power, of course, has some benefits but it also introduces very fundamental risks as was made clear in the Chernobyl catastrophe. They are vulnerable to human error and inviting targets for terrorists.

60. By extension, we need to better understand the benefits that natural habitat accord humanity in order to begin to assign values to these as well. Most economies fail to incorporate into their broad view of the economy the benefits that stewardship of the environment accords. This is why rapid economic change and globalisation seems so at odds with the environmental health of the planet and the real risks that our human economic activity poses to it. It might even be helpful to include such factors in GDP calculations. China may be growing at 9% a year but its growth is also exacting a huge toll on it environment and generating daunting costs that future generations will have to pay. Shouldn't such enduring and real costs be reflected in any reasonable statement of a country's current and future prosperity? The old communist system was particularly notorious in utterly ignoring these costs and the clean-up bill faced by new democracies is terribly daunting. We need to learn from that brutal experience.

61. Kyoto has helped encourage the creation of emissions trading schemes that are helping to incorporate “environmental scarcity” costing into normal production costs. Such initiatives needed to be broadened into other areas where human activity is speeding the world toward potentially dangerous catastrophic environmental events. More systematic thinking is also needed to develop the means to generate wealth by preserving rather than destroying eco systems. Welfare and bio-diversity should no longer be seen as being exclusively in conflict. Information sharing on how to best preserve environment while sustaining wealth generation needs to be further developed. Along these lines, the recently created public Private Climate Group has provided a model of how governments, cities, states, and businesses can pool environmental experience and build coalitions of emissions reducers. (Houlder) The trans-Atlantic dispute over Kyoto, however, is also a reminder that seeking to cope with catastrophic threats won’t necessarily unite even close allies. Indeed, if the nature of the risk and the remedy are not agreed, the issue can undermine solidarity.

62. Water security should be another area of priority. Here local as well as national and international efforts are needed to improve water quality and access. Conservation strategies are critical because the current rate of water table depletion is unsustainable. Water conservation and quality should thus remain a key priority of the global development agenda.

63. Some have suggested that one way to reduce risks posed by modern production methods and the science behind it is to impose further controls on science itself. Generally speaking, it is very difficult to slow scientific advance although safeguards in specific instances are certainly needed. One need only look at the problem of nuclear weapons proliferation to recognize the dangers. Both prudence and ethics should guide authorities in these areas, but clearly global dialogue is needed before research moratoria are put in place. Once a technology is effectively "out of the bottle", it becomes extraordinarily difficult to contain its development over time. The problem is that technology is advancing even more quickly today than at the dawn of the nuclear age. Moreover, most technologies can be used for good or iniquitous purposes, and applications are not always apparent in research phases.

64. This does suggest, however, that in future, scientists themselves will have tremendous implicit power, particularly when working with profoundly powerful new technologies, ill-understood by the public and their leaders, that nevertheless have the potential to run away from their own control. Scientists certainly should not have the final word in those cases where the downside of research outcomes might be global catastrophe. In the words of Martin Rees, Professor of Cosmology and Astrophysics at Cambridge University, "In view of our current scientific and technological capabilities, what is the safest and most responsible way to develop them further? Humanity is

more at risk than at any earlier phase in its history, and this is a critical time. Our future as a species may depend on the choices we make in the next hundred years." (Reese)

65. Risk management requires a deepened dialogue between government and the private sector and a recognition that preparing for one catastrophic scenario can also help cope with an unanticipated one. This was case in New York where the financial community had spent millions of dollars building in redundancies in preparation for YK2. The passing of the millennium ultimately proved uneventful as far as information systems were concerned, but the redundancies built in the years running up to 2000 proved enormously useful in the immediate wake of the September 11 attacks. (Partos) Such redundancies need to be extended internationally because catastrophic risk itself does not recognize national borders. Along these lines, risk in a global age requires global management strategies. Purely national approaches to matters like global warming, fisheries depletion and epidemic management will invariably fail. The imperative for multilateralism is rising not diminishing. Global governance is increasingly necessary and foundations need to be laid for greater multilateral dialogue on everything from shared environmental threats to technology governance.

66. Although many of those currently invoking the emergence of the risk society are doing so to offer a critique of neo-liberalism, one should not discount the role markets can play in mitigating risk. The challenge is that governments need to provide the context in which markets operate, and it is up to states to establish the broad goals of risk reduction while allowing the markets themselves to take up the cause once the incentives are in place.

Bibliography

"America Still Unprepared-America Still in Danger, Report of an Independent Task Force sponsored by the Council on Foreign Relations, Gary Hart and Warren B. Rudman.

Annual Energy Outlook 2005, US Department of Energy, http://www.eia.doe.gov/oiaf/aeo/pdf/0383(2005).pdf

Ulrich Beck, *World Global Risk Society*, Blackewell Publishers Ltd. 2001.

“The birds, the bees and biotechnology," *Financial Times*, October 17, 2003.

David Buchan and Carola Hoyos, "Sleepwalking into greater oil dependence," The Financial Times, December 18, 2003.

Andrea Felsted, "How to measure the immeasurable," *The Financial Times,* October 27, 2004.

Nils Petter Gleditsch and Henrik Urdal, “Don’t blame environmental decay for the next war,” *International Herald Tribune,* November 22, 2004.

Peter Harries-Jones, "The "Risk Society": Tradition, Ecological Order ant Time-Space Acceleration," http://web.idrc.ca/es/ev-64536-201-1-DO_TOPIC.html

Bill McKibben, Crossing the Red Line," *The New York Review of Books*, June 10, 2004.

Kevin Morrison, "World to become more dependent on Middle East Oil," *Financial Times*, October 27, 2004.

Oil Market Report, International Energy Agency, March 11, 2005. http://omrpublic.iea.org/currentissues/full.pdf

Lindsey Partos, "Wanted: Less bang for your buck," *Financial Times,* October 27, 2004

Martin Rees, "The Final Countdown, *New Scientist,* May 3, 2003.

Duncan Graham-Rowe and Bob Homes, “The World can’t go on living beyond its means,” N*ew Scientist*, April 12, 2005.

Robert Samulson, “High Priced Oil May be Here to Stay: American should conserve more through stricter fuel economy rules, higher taxes,” *Detroit News*, March 31, 2005. http://www.detnews.com/2005/editorial/0503/31/A11-134261.htm

Peter Schwartz and Doug Randall, "Imagining the Unthinkable: An Abrupt Climate Change Scenario and its implications for United States National Security," http://www.ems.org/climate/pentagon_climatechange.pdf

Piet Strydom, *Risk Environment and Society,* Open University Press, 2002.

"Strengthening Capacity to Manage Ecosystems Sustainability for Human Well-Being," Millennium Ecosystem Assessment Synthesis Report, Pre-publication Final Draft Approved by MA Board on March 23, 2005.

2002 OSCE Economic Forum focuses on water and Security," OSCE Press Release, May 28, 2002.