

Essay 2. The non-military threat spectrum

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Introduction

The series of terrorist attacks in the United States on 11 September 2001 was an event of enormous salience. Governments became deeply concerned not only about the risk of further attacks but also about the implications for the entire global security system. The demand for preventive and defensive action was correspondingly strong: mobilization and the war against terrorism have dominated headlines and the international political agenda ever since. Against this background, it becomes urgent to assess the seriousness and size of new threats to societies in order to be able to establish an adequate security strategy.

There are risks and challenges in all fields of human activity. Developments of very different types—political, military, human-dimension, economic, social and environmental—all have the potential to pose security risks. Many of them are interconnected; consequently, a risk within one dimension may affect the situation in other fields. Most of the risks and challenges in one region of the world are also common in adjacent areas. A truly comprehensive security strategy should take into account the full range of direct or indirect threats to a given nation or society, assess their relative importance, also in terms of their interconnectedness, and allocate resources accordingly.

This essay is based on research conducted mainly in Switzerland, but the methods used there can easily be adapted to risk assessment in other countries and to other areas of interest. Because the possibility of direct internal or external armed conflict has been rated low for Switzerland since the end of the cold war, the analysis focuses on the non-military threat spectrum.

Most international attempts to identify and monitor risk factors have been applied to crisis regions and dysfunctional states where armed violence is prevalent. Even in these cases, however, the roots of conflict are found in maladjustments in many other areas of life. Similarly, the damage wrought on nations, their people and their resources by conflicts is often magnified or even multiplied through its spillover effects in other dimensions of human security, where it may be even longer-lasting and more difficult to repair. Moreover, while the *relative* salience of non-military risks might seem to be lower for states in developing, combat-torn regions, their *absolute* vulnerability to these dangers is generally much greater than for developed states in the West. One need only mention the urgency of the AIDS epidemic for African states or the direct effects of climate change and the exhaustion of basic resources on all developing states.

The Comprehensive Risk Analysis Switzerland project

The Comprehensive Risk Analysis Switzerland project, an initiative of the Swiss Parliament, was launched in 1991.¹ Parliament had commissioned the Federal Council

¹ Swiss Parliament, Kommissionsmotion 90.061, Kommissionspostulat 90.061 [Motion and Postulate to the Federal Council, P90.061], 18 Apr. 1991, *Amtliches Bulletin der Bundesversammlung* [Official Bulletin of the Federal Council], 5 June 1991. See also 'CRN: Process—Case Study Switzer-

(the Swiss Government) to conduct a permanent risk analysis and evaluation in order to use national resources as effectively as possible. In 1992, an interdepartmental project team composed of representatives from all interested federal offices was given the task of preparing a comparative risk survey, to assess the vulnerability of Switzerland and to present possible solutions for the deployment of available resources. The former Central Office of General Defence was charged with management and coordination of the project.

There are many approaches to safeguarding and planning security. Past experience has shown that—depending on the problems, the complexity of the system, and the type, extent and previous record of risks—there are various ways of enhancing security. At least three different approaches are possible: (a) the empirical approach; (b) the measure-oriented approach; and (c) the risk-oriented approach. The first two approaches are used in more traditional methods of security planning. The risk-oriented approach relies more heavily on analytical processes and is therefore applied mainly for new and particularly complex situations.

The basic idea of the risk-oriented approach is that the risks pertaining to all possible incidents or developments are systematically and quantitatively assessed with respect to their frequency and expected impact. The definition of risks—those that could seriously endanger the basic national structures of the country and the livelihood of the population—allows for a comprehensive and comparative assessment of security factors. This was the methodological basis for the Comprehensive Risk Analysis Switzerland project: the aim was to form as objective a picture as possible, by developing scenarios in which the entire spectrum of possible risks and developments was described and their expected impact and frequency were quantitatively estimated.

A systematic dialogue on Swiss collective national risks began in 1993. The process involved representatives of all the relevant federal authorities and experts from the administrative, political, research and business sectors. In 1993–94 the federal administration, supported by external experts, carried out a comprehensive risk investigation in which over 200 risks were identified and evaluated as constituting existential threats to Switzerland. In order to ascertain the significance of the scenarios for Switzerland's security policy, it was necessary first to estimate the extent to which they could impinge on security policy goals. This was assessed primarily in terms of 'impact' (taking account of existing experiences, policies, resources and measures) and of 'probability'. By linking these two elements, the degree of risk in terms of the expected impact on security policy goals could be ascertained for each scenario.

After the results of the Enquiry were analysed and in-depth discussions had been held, nine groups of risk—each with three to four scenarios—were defined to describe the 'risk situation' for Switzerland: (a) natural catastrophes, (b) technological risks, (c) destabilization of the ecological system, (d) crisis in the supply of energy, food and strategic goods, (e) economic crisis, (f) demography and the health system, (g) migration and integration, (h) crisis in the political and social system, and (i) internal security crisis (see figure 2).

All the scenarios within a risk group were selected so as to combine a high level of damage with a considerable probability of occurrence. No worst-case scenarios were included. The scenarios did not attempt to provide forecasts but rather examples of possible future events, building up an overall risk picture defined in terms of the impact on Switzerland in 1993. Since then, the overview has been updated and complemented, and a total revision of the overall risk situation for Switzerland was conducted in 1998² because new developments made it necessary to take into account new risks for Swiss security policy.

In order to describe the diverse impacts of the scenarios, four simplified indicators were defined. Their definitions are closely linked to the security policy goals of Switzerland. They describe the possible impacts on the population, the economy, the environment and political life.³

1. The indicator 'population' measures the number of physically affected people and includes fatalities, injuries and evacuees as well as people in need of help.

2. The indicator 'economy' measures impairment of the economy's efficiency and prosperity, as well as possible damage to the infrastructure and curtailment of the supply of important resources.

3. For the indicator 'natural environment' the main factors evaluated are the gravity and duration of the damage done to the vital elements (soil, water and air). In order to make the damage assessment as simple as possible the impact is measured in square kilometres.

4. The indicator 'politics' measures the impairment of the political freedom of action of citizens and authorities. It describes the extent (measured in person-days) to which Swiss citizens are partially or totally prevented from exercising their basic democratic rights (i.e., freedom of movement, freedom of speech, etc.). It also describes the consequences of a scenario in a political sense (i.e., new laws to be worked out, strengthening of law enforcement, etc.). This indicator can be seen as reflecting the degree to which Switzerland would remain able to function as a democratic state. The use of the indicator 'politics' is unique in this context. Traditional risk analysis approaches used by banks and insurance companies tend to measure political damage in terms of financial loss. In the evaluation model used for the Swiss study, the indicator relates to the extent to which personal freedom of action and sovereignty are lost and hence the overall risk to democracy.

Figure 1 presents an overview of the non-military risk situation of Switzerland in 2000. It shows the impact and probability of the most relevant risk factors on a logarithmic scale; that is, the size of each step corresponds to a factor of 10. The farther to the right of the figure a risk is placed, the more devastating are its effects, and the nearer it appears to the top, the more probable is the particular scenario.

This is not the place for a detailed analysis of the quantitative results of this study,⁴ but the figure clearly shows that many risks and challenges could have a high

² See URL <http://www.isn.ethz.ch/crn/basics/process/documents/CaseStudySwitzerland_777KB.pdf> (note 1), section 'Risk Profile Switzerland (as of 1999)', p. 9.

³ See URL <http://www.isn.ethz.ch/crn/basics/process/documents/CaseStudySwitzerland_777KB.pdf> (note 1), section 'Indicators', p. 7; and Braun, H., 'Comprehensive Risk Analysis Switzerland—a project as basis for the further development of Swiss security policy', ed. C. Löffstrand, *Civil beredskap: risk, kris, säkerhet och sårbarhet i samhället* [Civil defence: risk, crisis, security and vulnerability in society], Samanställning av ÖCB:s forskardagar 1997 (Överstyrelsen för civil beredskap (ÖCB): Stockholm, 1998), pp. 64–73 (article in English).

⁴ See note 2.

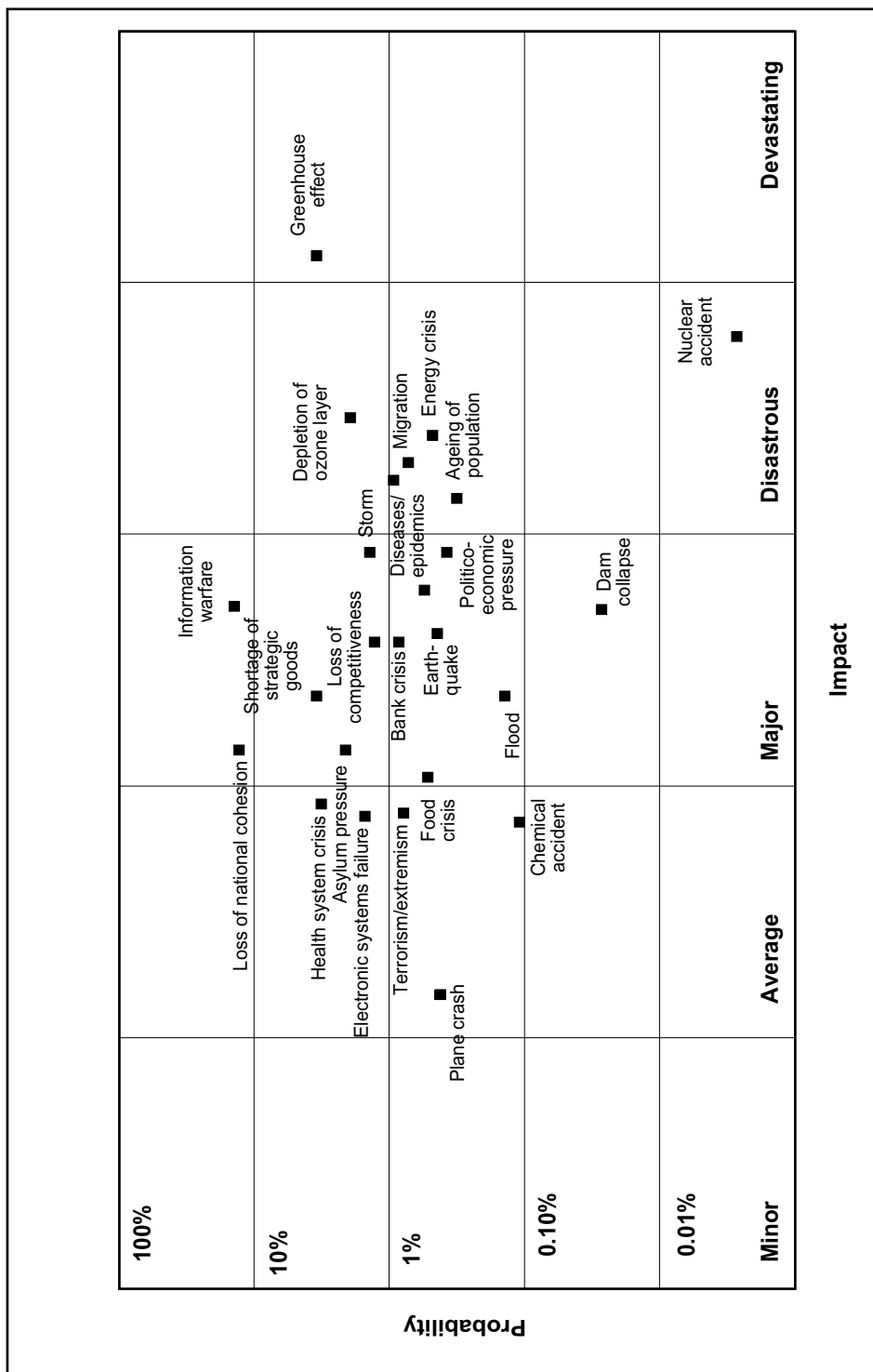


Figure 1. Overview of the scenario for Switzerland in 2000

impact on society in different fields. Some scenarios are of the nature of accidents, while others represent longer-term developments. Owing to the method chosen, all these factors are comparable and can become objects of a comprehensive security policy. Other criteria also have to be considered. For deciding on exceptional allocations of resources, the time frame of a scenario is important, including information on the possible alert time before the events in a scenario take place. More also needs to be known about the load (i.e., how long special resources need to be assigned to deal with the risk) and the expected recovery time. The severity of a scenario's impact on security policy goals cannot be taken as the only basis for planning. Consideration based on the impact of a scenario fails to take into account the varying probability of incidents. Whether a scenario takes place once in 10 years or once in 1000 years is important for any assessment.⁵

In the autumn of 1999, the Swiss Federal Department of Defense, Civil Protection and Sport (DDPS), decided to place the Comprehensive Risk Analysis Switzerland project in an academic context and also to internationalize it, in line with the Swiss *Foreign Policy Report 2000*.⁶ The project was therefore transferred to the Center for Security Studies and Conflict Research at the Zurich-based Swiss Federal Institute of Technology (ETH). Placing the project in an academic context emphasized the wish to focus its content on a *comprehensive* risk analysis, which had two major implications: first, that a wide spectrum of contemporary risks and hazards was to be addressed; and second, that the characterization and analysis of the hazards was to be based on a holistic approach, incorporating both natural science and social science aspects, such as the perception, acceptability and communication of risks.

The main target group for the follow-up project is national and sub-national security policy analysts and researchers. Although the expertise which the project aims to develop relates primarily to Swiss administrative authorities, the network of contacts includes representatives from all entities interested in and affected by the project, that is, those of the administrative, business, and research sectors as well as society at large. Close contacts have been established with the governments of Austria, Norway, Sweden and other states. The project clearly highlights the objective of international cooperation as a means of controlling new security risks. Particular attention is given to the preventive risk analysis activities of a range of international organizations concerned with security policy (e.g., the United Nations, the Organisation for Economic Cooperation and Development, the Organization for Security and Co-operation in Europe, and the European Union). Participants in the project now include numerous Swiss federal authorities and international partners.⁷

The current state of, and trends within, the non-military threat spectrum

Natural disasters. Natural disasters have gained in importance in recent years, with growing concern about the way in which such events could aggravate risks for

⁵ In the Swiss case study, estimates are given of the probability of scenarios taking place within 25 years. See note 1, p. 8.

⁶ *Foreign Policy Report 2000—Presence and Cooperation: Safeguarding Switzerland's Interests in an Integrating World*, 15 Nov. 2000, an unofficial English summary of which is available at URL <http://www.eda.admin.ch/eda/e/home/recent/rep/forpol.Par.0003.UpFile.pdf/rp_001113_foreign_pol_e.pdf>. The Swiss Federal Council approved the new report at a closed meeting on 15 Nov. 2000. (The report replaces the *White Paper on Switzerland's Foreign Policy in the 90s*, 29 Nov. 1993; see URL <<http://www.eda.admin.ch/eda/e/home/foreign.html>>.)

⁷ Information on the Comprehensive Risk Analysis and Management Network (CRN) is available at URL <<http://www.isn.ethz.ch/crn>>.

ecologically sensitive regions. As the modern world faces the effects of climate change, the likelihood of natural disasters increases.

For Switzerland, an earthquake in the region of Basel, for example, with its high concentration of chemical plants, would have severe consequences. Drought and heatwaves gain greater importance with changing climate conditions. The mountain region of the country is very vulnerable to temperature changes, and the thawing of mountain permafrost in the high mountains of Europe is a major geo-technical risk. In a warming global climate, permafrost degradation on steep mountain slopes is likely to increase both the scale and the frequency of processes such as slow soil movements and rapid failures such as shallow landslides, mud flows, debris flows and rock slides.

Technological risks. In an era of increased technological advancement, technological risks are becoming more evident and are increasing the fear of new accidents such as the one that occurred at the Chernobyl reactor in 1986. As a result of population and economic developments, the biosphere is characterized by a high degree of concentration of assets and extreme interdependence. As industrialization advances, the potential sources of catastrophic events increase, the vulnerability of the system grows, and the protection of endangered areas becomes more and more difficult.

Advances in science and technology will pose new national security challenges of uncertain character and scale. The integration of information technology, biotechnology, materials sciences and nanotechnology will generate a dramatic increase in innovation, and the effects will introduce a new dimension to the technological risks.⁸

Destabilization of the ecological system. Globally, the quality of the environment is deteriorating in practically all areas. Through human activities, mankind is increasingly undermining its basic needs. From a global point of view, climatic change, the reduction of the ozone layer, the destruction of tropical rainforests, the loss of species diversity and the over-exploitation of natural resources are the main issues of concern. Since the anticipated consequences will occur over the longer term, there is a danger that sustained efforts to protect and conserve the environment will be repeatedly postponed for the sake of short-term development and growth. Since environmental problems respect no frontiers and threaten the health and prosperity of all mankind, they should now be a part of national security considerations.

Supply problems. Renewable resources are being used up faster than they can be regenerated, and non-renewable resources are being used at a rate which disregards the needs of future generations. Switzerland—a country with practically no natural resources of its own and no direct access to the sea—is particularly vulnerable to the interruption of the supply of raw materials. An interruption in energy supply would, given the economy's strong interdependencies, affect the entire society. Inadequate supplies of foodstuffs and water are a great problem for many countries throughout the world.

Economic crisis. The preservation and promotion of economic competitiveness and prosperity are of vital interest for industrialized nations today. Considering the intense and multiple interconnections of the world economy, international globalization and market liberalization as well as technical progress are bound to have a strong influence on the economic development of all industrialized countries. In the medium term, worldwide economic problems will reduce the wealth of the industrial-

⁸ See, e.g., Joy, B., 'Why the future doesn't need us', *Wired*, Apr. 2000, available at URL <<http://www.wired.com/wired/archive/8.04/joy.html>>.

ized nations, mainly at the expense of their low-income populations, thereby affecting social stability and eventually national security.

Demography and health. The ageing of the population is a serious problem for societies today. Over the next half-century the world proportion of people over 60 years of age is expected to more than double. By 2050, for the first time in human history, the elderly will outnumber children on the planet.⁹ The impact of this transformation will be felt in every area of life, including economic growth, labour markets, taxation, the transfer of property, health, family composition, housing and migration. At the same time there is every reason to expect that a growing share of the population will be threatened in the medium term by the loss of social security.

New types of disease and new outbreaks of infectious diseases believed to have been eradicated could present a considerable threat to our society. Chemical and biological weapons may be acquired and used by terrorists or religious fundamentalists and pose a great threat to civilian populations.

Migration. The growing migration pressure is the result of the economic, social and ecological gulf between poor and rich countries and of the tensions between politically unstable and stable regions. The fast-growing population in emergent and developing countries, civil wars, ethnic conflicts, economically induced conflicts and conflicts over the distribution of resources such as soil, water and energy are rapidly increasing the pressure of immigration on Europe. The worsening ecological situation in many developing countries will add to the severity of the situation. In the Swiss population, these demographic trends will be an obstacle to the further integration of refugees. In a country with three different cultures and languages, and in which over 20 per cent of the population are of foreign origin, further immigration will create great strains on the well-balanced Swiss social and political system. On the other hand, the diminishing relative number of children will put the welfare system at risk within the next 50 years unless there is a significant growth of the working population. These dilemmas are common to nearly all European countries.

Political system and internal security. In politics, the growing apart in important matters of the German- and French-speaking parts of Switzerland as well as of urban and rural segments of the population points to an increasing disintegration of the country's national cohesion. Extremist acts as well as open and latent xenophobic tendencies in parts of the population, accompanied by an increasing readiness to use violence, are causes for concern. In Switzerland as well as in other countries, some autonomous groups are preparing and coordinating protest actions against globalization and may resort to violent means. Crime has attained a high degree of international organization, with interrelated drug trafficking, illegal arms trade, money laundering and other offences. Government agencies could also be subject to infiltration.

Information age threats. The telecommunications systems on which major parts of economies depend are threatened by the prospect of a 'cyber war' against electronic systems. Complex and interconnected networks sometimes have features that make their behaviour unpredictable. Networks often react in non-linear ways to perturbations, meaning that a shock somewhere in the system produces disproportionately large-scale disruption. In the ongoing Information Revolution, the increasing value of information and the availability of electronic means to manage its ever growing volume have made information and information systems not only an invaluable

⁹ Laurance, J., International Child and Youth Care Network, 'Why an ageing population is the greatest threat to society', *Today*, 10 Apr. 2002, URL <<http://www.cyc-net.org/today/today020410.html>>.

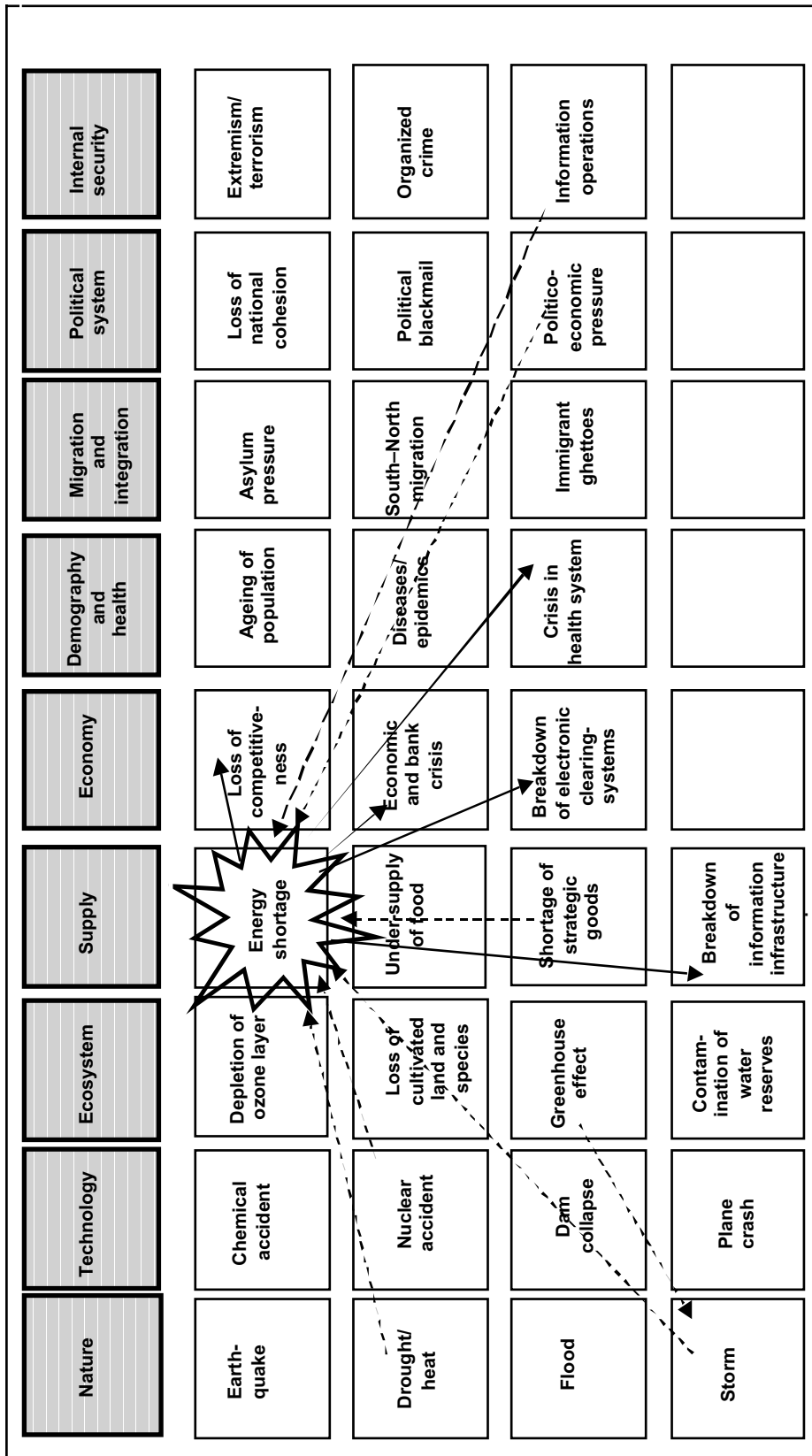


Figure 2. The interconnected 'energy crisis' scenario

Key: Solid-line arrows point to the consequences of energy shortage; broken-line arrows point to possible contributing causes of a shortage.

able asset but also an important target. This is a crucial security issue for societies that depend on a spectrum of highly interdependent national and international software-based control systems. So-called critical infrastructure—systems on which the economy, national security and quality of life depend—rely on computer and information networks for smooth, reliable and continuous operation. With this dependence comes new kinds of vulnerabilities as a result of threats posed by a variety of different aggressors: certain of these ‘cyber threat’ scenarios pose genuine risks to national security, often with global dimensions.

The interconnection of risks

Any attempt to identify, analyse and evaluate risks calls for an interdisciplinary approach. It is not enough to consider isolated risks: it is crucial to have the whole picture; that is, risk has to be seen as a holistic phenomenon. This is of particular importance for Switzerland, a country that is highly integrated at both the national and international levels because of its geographical location, its high economic and technological standards, and its social composition. Critical national infrastructure such as nuclear power plants, hospitals, information and telecommunication networks, transportation infrastructure and reservoirs constitutes a complex, interdependent system. Thus, fairly small strikes against, for example, the transport infrastructure can cause a chain reaction that is difficult to estimate or predict. These dynamics have not been sufficiently considered or understood.

While the Comprehensive Risk Analysis Switzerland project confirmed what was already known, it also revealed new lessons. Considerations regarding the interconnectivity of scenarios are of special interest. Because of their interactions, even scenarios with a seemingly low probability of occurrence can endanger security—political objectives. A good example of the interconnectivity between scenarios is shown in figure 2, which illustrates possible new sources of an energy shortage and its impact on other parts of the economy. Because the electricity grid is very highly linked throughout Europe, the loss of one link in the grid means that other links immediately have to carry a higher load, which can cause them also to fail. This ‘chain reaction’ may be triggered by an accident or by a planned attack, for example, on the computer-based control system. The interconnected scenario for energy shortage is of special interest to Switzerland, because it is highly dependent on the import of energy. All the aspects of this scenario were discussed with a group of specialists in the field at special workshops.

A similar assessment should be worked out in the future for all scenarios with a high probability and a major or catastrophic impact. The framework of figure 2 can be used as a morphological matrix for the identification of dangerous chain reactions and domino effects.

Another interesting and highly interlinked scenario is population ageing. Ageing is occurring in developing countries as well as in higher-income countries. Substantial long-term changes in the age structure of a nation will lead to major, multiple effects on family structures, labour markets, educational and health systems, and—in a country with direct democracy such as Switzerland—will also influence the political process. The implications of ageing population are deep and pervasive. The future problems of social security and public health service are the most striking: reduced growth can be expected, as fewer workers must support more pensioners;

fiscal strain will raise issues of fair allocation of resources between the generations; and international relations may even change in scope and character.¹⁰

These examples show that, in a future-oriented security policy, individual threats must not be considered in isolation. Modern societies typically seem to be incapable of focusing attention on more than a few problems at the same time. A leitmotiv always dominates priorities in security policy. Terrorism, 'rogue states' and weapons of mass destruction are the obvious current examples.

An overall assessment of Switzerland's risk situation

The international situation has changed fundamentally over the past decades. The conventional military threat in Europe has decreased. At the same time, the range of other dangers and risks has expanded considerably. Today's security problems cut across borders. Insidious developments with long 'warning times' demand preventive measures. For this purpose an early-warning system and a permanent risk analysis are required to monitor developments so that possible dangers can be identified in good time and suitable solutions can be proposed. The responsible services must decide whether and how they want to control these insidious developments, that is, to what extent the resources available for crisis prevention and management can be invested today for the sake of future generations.

In the past, the threat to territorial integrity and national sovereignty was at the fore, while today the principal danger is to the performance of industrial society and to the legitimation of the state as a protective institution. Although the focus should be on the scenarios with a high probability and a major or disastrous impact, the major risks shown cannot be dealt with by any single nation. Rather, collective approaches are called for, and the instruments of crisis prevention and management must be strengthened so that the most important risks can be recognized and defused in good time.

Formulating requirements to be met by the means for preserving existence

The way in which scenarios are defined inevitably risks giving more weight to past experience than to factors of uncertainty. Assessments of specific situations have a tendency to underestimate insidious long-term developments such as climatic changes or population development. In estimating them, a mere extrapolation of present conditions into the future is not sufficient. Apart from the factor of interconnection, there is the question of the system's overall capacity. Thus, in connection with ecological, economic and social risks, the 'butterfly effect' of chaos theory (by which a minute, localized change in a complex system can have large effects elsewhere) and the 'tilting effect' of natural systems (in which a complex system changes its behaviour fundamentally) must also be taken into account.

A nation must have an adequate degree of preparedness, but the costs have to be kept as low as possible. The political authorities decide on the points of main emphasis and on priorities and in doing so must take into account the fact that the efficiency of strategic instruments results from the interplay between different resources. Which and how many capacities are needed at a given time, and what requirements

¹⁰ See, e.g., Coomans, G., *Europe's Changing Demography: Constraints and Bottlenecks*, Demographic and Social Trends Issue Paper no. 8 (Institute for Prospective Technological Studies (IPTS), Joint Research Centre, European Commission: Seville, June 1999), available at URL <<http://www.jrc.es/cfapp/reports/details.cfm?ID=4>>.

are to be set for time-scales and coordination, can be deduced from the risk analysis of all existential threats. The following three factors are particularly important.

1. The *consequences* of events determine the capacities needed to cope with them in terms of personnel support, financial and material management of damage as well as possible compensation.

2. The *sequence* of events determines the likely warning times to be expected, the speed with which resources have to be mobilized, and how long these resources must be available.

3. The *area of origin* affects decisions on the possible need for national and international coordination.

From risk analysis to an optimal strategy

Experts believe that in the future the basic load on society—the overall costs of demographic development, the social security system, migration, security policy, and so on—will grow continually, as will the costs of natural and man-made catastrophes. Major insurance companies are already considering refusing to cover excessive risks in dangerous regions. On the other hand, people's willingness to pay higher income taxes continues to diminish, and the political parties which promise to cut taxes are winning elections. Extrapolating from these developments, it can be seen that in the not too distant future the total load on the system will exceed the limits of the capacity to repair it.

In the discussions of an optimal allocation of resource based on risk analysis, the objective definition of risk is increasingly being replaced by the question of the extent to which society is prepared to live with this risk. Scientific risk assessment thus differs from its political counterpart. The question of how to optimize the use of resources for risk reduction cannot be answered only in a scientifically objective way but must also be addressed in political–moral discourse. Both aspects are important and complementary.

The comprehensive risk analysis presented in this essay is a pilot project within a policy programme to provide for the preservation of stability above and beyond the range of traditional security policy. The methods used are simple, transparent and comprehensible. All the results and recommendations were prepared in close cooperation with the competent offices and are intended to contribute to better decision making.

