National risk assessment 2023

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Abstract

The purpose of the national risk assessment is to anticipate relatively sudden incidents potentially targeted at Finland that call for activities deviating from the norm from authorities or even requesting help from other countries. The national risk assessment identifies risks that have a wide national impact and assesses their impact on the vital functions of society.

The preparation of the national risk assessment is based on Decision No 1313/2013/EU of the European Parliament and of the Council on a Union Civil Protection Mechanism. Fin-land's first national risk assessment was prepared in 2015. The next national risk assess-ment was prepared in 2018 and then revised in 2022–2023.

Prepared in broad-based cross-sectoral cooperation, the risk assessment is linked with national preparedness and lays the foundation for preparedness in line with the Security Strategy for Society. Different branches of administration identified threat scenarios and disruptions that impact the vital functions of society at the national level. The risk assess-ment includes consistently structured verbal descriptions of these threat scenarios and disruptions.

The national risk assessment lays down the bases that define what kinds of risks different administrative branches and other parties must be prepared for.

Keywords vital functions of society, disruption, threat scenario, preparedness, risk assessment, comprehensive security, risks, internal security

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Kansallinen riskiarvio 2023

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Julkaisija	Sisäministeriö		
Yhteisötekijä	Kansallisen riskiarvion tarkistamiseen asetettu työryhmä (VN/23326/2021)		
Kieli	englanti	**Sivumäärä**	95

Tiivistelmä

Kansallisen riskiarvion tarkoituksena on ennakoida Suomeen mahdollisesti kohdistuvia suhteellisen äkillisiä tapahtumia, jotka vaativat viranomaisilta normaalista poikkeavia toimia tai avun pyytämistä muilta mailta. Kansallisessa riskiarviossa on tunnistettu riskejä, joilla on laajaa kansallista merkitystä ja arvioitu niiden vaikutusta yhteiskunnan elintärkeisiin toimintoihin.

Kansallisen riskinarvion laatiminen perustuu Euroopan parlamentin ja neuvoston päätökseen unionin pelastuspalvelumekanismista (N: o 1313/2013/EU). Suomen ensimmäinen kansallinen riskiarvio laadittiin vuonna 2015. Vuonna 2018 laadittiin seuraava kansallinen riskiarvio, joka päivitettiin vuosien 2022–23 aikana.

Laaja-alaisessa poikkihallinnollisessa yhteistyössä laadittu riskiarvio linkittyy kansalliseen varautumiseen muodostaen perustan yhteiskunnan turvallisuusstrategian mukaiselle varau-tumiselle. Eri hallinnonalat ovat tunnistaneet yhteiskunnan elintärkeisiin toimintoihin kansallisesti vaikuttavia uhkamalleja ja häiriötilanteita, jotka on kuvattu riskiarvioon sanallisesti yhtenäistä rakennetta noudattaen.

Kansallinen riskiarvio osaltaan muodostaa perusteet sille, millaisiin riskeihin eri hallinnonalojen ja muiden toimijoiden on varauduttava.

Asiasanat	yhteiskunnan elintärkeät toiminnot, häiriötilanne, uhkamalli, varautuminen, riskinarviointi, kokonaisturvallisuus, riskit, sisäinen turvallisuus		
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Nationell riskbedömning 2023

Inrikesministeriets publikationer 2023:6		**Tema**	Inre säkerhet
Utgivare	Inrikesministeriet		
Utarbetad av	Arbetsgruppen för granskning av den nationella riskbedömningen (VN/23326/2021)		
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Referat

Syftet med den nationella riskbedömningen är att förutse händelser som relativt plötsligt kan drabba Finland och som kräver att myndigheterna agerar på ett sätt som avviker från det normala eller att de ber om hjälp från andra länder. Den nationella riskbedömningen går ut på att identifiera risker som har bred nationell betydelse och bedöma deras konsekvenser för samhällets vitala funktioner.

Den nationella riskbedömningen bygger på Europaparlamentets och rådets beslut om en civilskyddsmekanism för unionen (Nr 1313/2013/EU). Finlands första nationella riskbedömning bereddes 2015. År 2018 utarbetades följande nationella riskbedömning, som uppdaterats under 2022 och 2023.

Denna riskbedömning, som utarbetats genom förvaltningsövergripande samarbete, har en koppling till den nationella beredskapen och lägger grunden för den beredskap som avses i säkerhetsstrategin för samhället. Förvaltningsområdena har identifierat hotmodeller och störningssituationer som påverkar samhällets vitala funktioner nationellt, och dessa beskrivs enligt en enhetlig struktur i riskbedömningen.

Den nationella riskbedömningen bildar en grund som anger vilken typ av risker de olika förvaltningsområdena och de övriga aktörerna ska förbereda sig på.

Nyckelord samhällets vitala funktioner, störningssituation, hotmodell, beredskap, riskbedömning, övergripande säkerhet, risker, inre säkerhet

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1 Preparation of the national risk assessment

1.1 Introduction

The purpose of the national risk assessment is to anticipate relatively sudden incidents potentially targeted at Finland that call for activities deviating from the norm from authorities or even requesting help from other countries or international organisations. The national risk assessment identifies risks that have a wide national impact and assesses their impact on the vital functions of society.

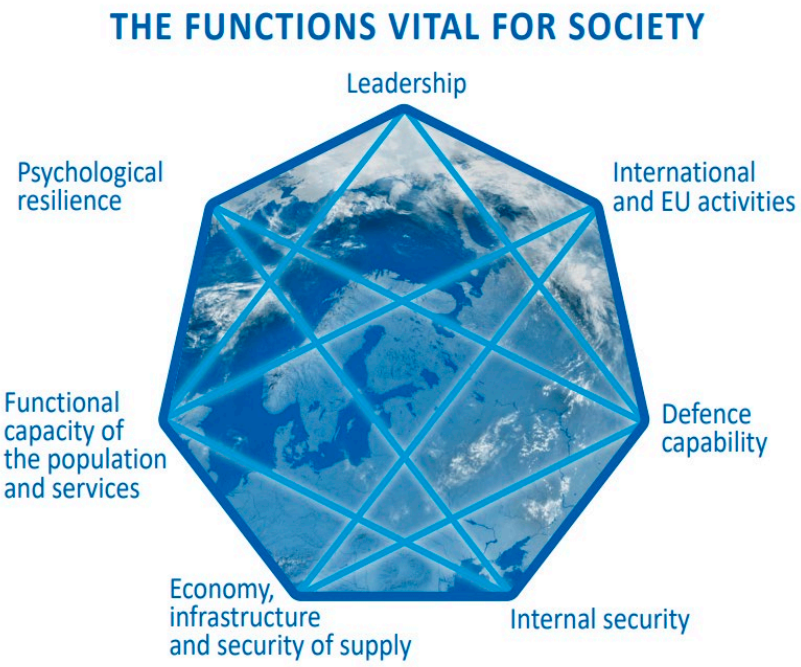
The preparation of Finland's national risk assessment is based on Decision No 1313/2013/EU of the European Parliament and of the Council on a Union Civil Protection Mechanism[1]. In accordance with Article 6 of the Decision, Member States shall develop risk assessments at national or appropriate regional level and make available to the Commission a summary of the relevant elements thereof every three years and whenever there are important changes. The first national risk assessment was prepared in 2015. The second national risk assessment was prepared in 2018 and then revised in 2022–2023.

Prepared in broad-based cross-sectoral cooperation, the national risk assessment is essentially linked with national preparedness and the Security Strategy for Society: the national risk assessment lays the foundation for preparedness in line with the strategy. Preparedness refers to activities ensuring that all tasks can continue with minimum interruptions and that the required exceptional measures can be performed during disruptions occurring in normal conditions and during emergencies. The aim of preparedness is to prevent accidents and disruptions, to prepare for the measures required during an accident or disruption and plan the recovery process. Each party and sector is responsible for its own preparedness and continuity management as well as for its international and EU obligations in compliance with statutory responsibilities.

1 See Decisions No 1313/2013/EU and (EU) 2019/420 of the European Parliament and of the Council and Regulation (EU) 2021/836 of the European Parliament and of the Council.

The Security Strategy for Society is a government resolution that harmonises the set of national principles regarding preparedness and guides the preparedness actions taken by the entire society by describing a cooperation model for comprehensive security. The Security Strategy for Society defines and describes the vital functions of society, which are safeguarded with strategic tasks. The vital functions are essential for the functioning of society and their maintenance must be ensured under all circumstances. Consequently, they are also the starting point of preparedness planning at all operational levels. Safeguarding the vital functions of society extends into the statutory tasks of several parties and partially to areas for which it is not possible to specify a single responsible party. The vital functions of society are also strongly interdependent. The threshold of influencing Finnish society from outside is raised by the preparedness of different administrative branches in accordance with the comprehensive security model.

Figure 1. Vital functions of society (Security Strategy for Society 2017)



Preparedness is based on the assessment of risks. Safeguarding the vital functions of society and the related strategic tasks under all circumstances requires risk assessment and an understanding of the potential impacts of various disruptions on risks. The national risk assessment assesses risks that may, if they materialise, influence the maintenance of the vital functions. In the previous Security Strategy for Society (2017), the national risk assessment was extended to serve also the risk analysis of the Security Strategy for Society. The aim is to publish the updated Security Strategy for Society in 2024.

The goal is that the regularly prepared, comprehensive risk assessment is used in preparedness planning at all operational levels. However, the national risk assessment is not intended to be an all-encompassing risk list as each party assesses risks in more detail in relation to their tasks and operations and in accordance with the legislation applicable to their administrative branch and sector. Consequently, the national risk assessment does not necessarily include all significant risks specific to each administrative branch and party, which highlights each party's responsibility in risk assessment.

In addition to the national risk assessment, regional risk assessments will be drafted at the same time, as a separate process and on assignment by the Ministry of the Interior. Regional risk assessments, prepared mainly according to the regional division of the wellbeing services counties, take better account of the threats or disruptions characteristic of the regions, the management of which requires activities deviating from the norm and which will cause significant impacts at the regional level if they materialise. Disruptions and accidents, such as floods, storms and forest fires, are often regional, but several simultaneous large-scale events may lead to a national disruption.

1.2 Grounds and process of preparing the national risk assessment

The Union Civil Protection Mechanism underlying the preparation of the national risk assessment covers people, the environment and property against all kinds of natural and man-made disasters, both within and outside the area of the Union (civil protection).

The national risk assessment looks at disruptions and threat scenarios that develop relatively suddenly and require crisis resilience and preparedness. The national risk assessment aims to identify risks that have a wider national significance. This means risks that have to be managed through resource coordination between several parties – regionally or nationally at the very least, or even by requesting assistance from other countries. The occurrence of such incidents may cause significant impacts on the lives or health of people, economy, environment and society.

The national risk assessment focuses on assessing the impact of the materialisation of the identified risks on the vital functions of society and on the strategic tasks that aim at safeguarding the vital functions. However, it should be noted that impact assessment is always indicative and that in reality, the impacts of disruptions are always partly unpredictable. The description of preparedness measures and risk management required by the identified risks is not included in the national risk assessment.

The changing operating environment and its change phenomena, which may influence the likelihood of the materialisation of disruptions and threat scenarios as well as their impacts, are described as concisely as possible in chapter 2 of the risk assessment. Due to its scope determination, the risk assessment does not discuss extensively topics such as slowly developing risks that are related to demographic changes or climate change and require adaptation.

The revision of the national risk assessment was started on 2 November 2021 in a cross-sectoral preparatory group set up and chaired by the Ministry of the Interior. Representatives of the following parties have taken part in the working group: Ministry of the Interior, Ministry of Justice, Secretariat of the Security Committee, Prime Minister's Office, Ministry of Transport and Communications, Ministry of Education and Culture, Ministry of the Environment, Ministry of Social Affairs and Health, Ministry for Foreign Affairs, Ministry of Economic Affairs and Employment, Ministry of Defence, Ministry of Agriculture and Forestry, Ministry of Finance, National Emergency Supply Agency and the Finnish Meteorological Institute. In addition, the Regional State Administrative Agency for Western and Inland Finland appointed a joint representative of all Regional State Administrative Agencies in the working group. The Finnish Red Cross represented NGOs in the work.

Preparatory work was carried out on the basis of the previous national risk assessment from 2018; in other words, the working group's task was to ensure that the previous risk assessment (2018) is up to date. The process of drafting the national risk assessment tapped into different parties' existing risk assessments or similar products as processes as much as possible. In practice, the national risk assessment is an amalgamation of the different parties' individual risk assessments. Different branches of administration identified threat scenarios and disruptions that impact the vital functions of society at the national level. When compared to the risk assessment prepared in 2018, the revised risk assessment includes two new risks and one risk has been left out.

In the previous risk assessment prepared in 2018, the competent ministry for each threat scenario or disruption was responsible for writing the verbal description of the threat scenario or the disruption. In this assessment revision, these threat scenarios and disruptions were checked, also in cross-sectoral cooperation, to ensure they are up to date. The competent ministry or the representative of the administrative branch was responsible for writing new threat scenarios and disruptions. The expert opinions in the ministries' respective branch of administration were also used in the revision. The outputs of different administrative branches were combined and edited into their final form in the national risk assessment working group.

The revised national risk assessment was prepared during a period when Finland's NATO accession process was still underway and the war of aggression against Ukraine started by Russia was ongoing.

1.3 General information about threat scenarios and disruptions and their assessment

The security of society faces new uncertainties due to changes in the operating environment. The advance warning period of security threats has shortened, which also poses challenges for advance preparedness measures, decision-making and the operational capability of authorities as well as fluent cooperation between authorities. As security threats are becoming more diverse, it has become increasingly difficult to determine who is the competent authority in charge, especially at the early stages of the incident.

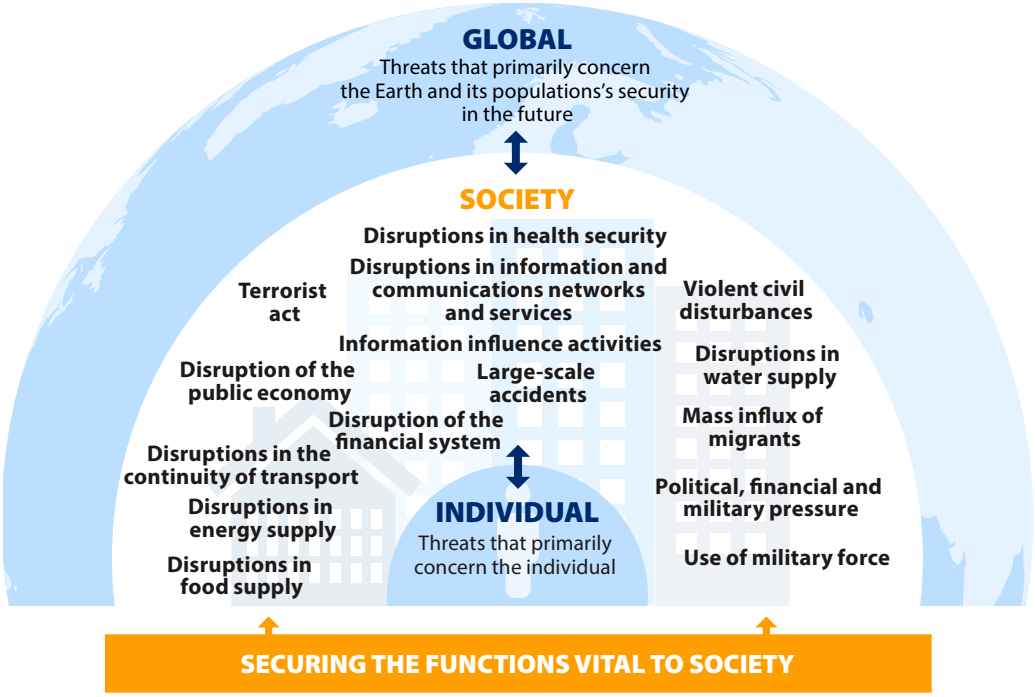
The threats to the security of society may appear on their own, simultaneously or as continuums; threats and changes associated with them may be unexpected, cross-border, rapid and of varied duration. Threats may emerge as a result of circumstances, technical reasons or people's unintentional or intentional actions.

In the national risk assessment, threat scenario refers to a description of potential threats in the security environment. A disruption means a threat or event that compromises vital functions or strategic tasks of society and the management of which requires more extensive or close collaboration and communication between authorities and other parties.

More than one of the national threat scenarios and disruptions analysed in the risk assessment may materialise simultaneously, due to networked society, interdependencies between different functions or other simultaneous unintentional and intentional actions, for example. The prolongation of large-scale disruptions may also, for its part, increase society's susceptibility to other simultaneous disruptions. With the concatenation of disruptions and the cascading of impacts, a single disruption may have extensive impacts on different functions in the interdependent operating environment. To support risk management, the assessment of threat scenarios and disruptions conducted in the national risk assessment aims to identify the potential concatenation and cascading of impacts.

The assessment of threat scenarios and disruptions entails uncertainty as it is difficult to predict the reasons, specific targets, scope, likelihood and repercussions of the threats in any detail. The increasingly complicated assessment and anticipation of threat scenario and disruption impacts poses challenges to preparedness planning and disruption management. Threat scenarios and disruptions that influence the security of society and their mutual relations must be reviewed more comprehensively across sectoral boundaries. Monitoring and analysing changes in the operating environment and maintaining advance preparedness must in fact be a continuous and active effort of all parties responsible for society's preparedness and management of disruptions.

Figure 2. Threat scenarios and disruptions 2023



Threats and disruptions may have their origin outside Finland or have impacts extending from the Finnish territory beyond its borders to a varying extent. There should be ability to assess this international dimension and its various impacts in both the anticipation of threats and disruptions and the planning of prevention measures.

The threat scenarios and disruptions that are identified and assessed in the national risk assessment are described verbally using the following structure: the underlying threat or threats, the target of the threat, the method of implementation and the concatenation and cascading of impacts and disruptions.

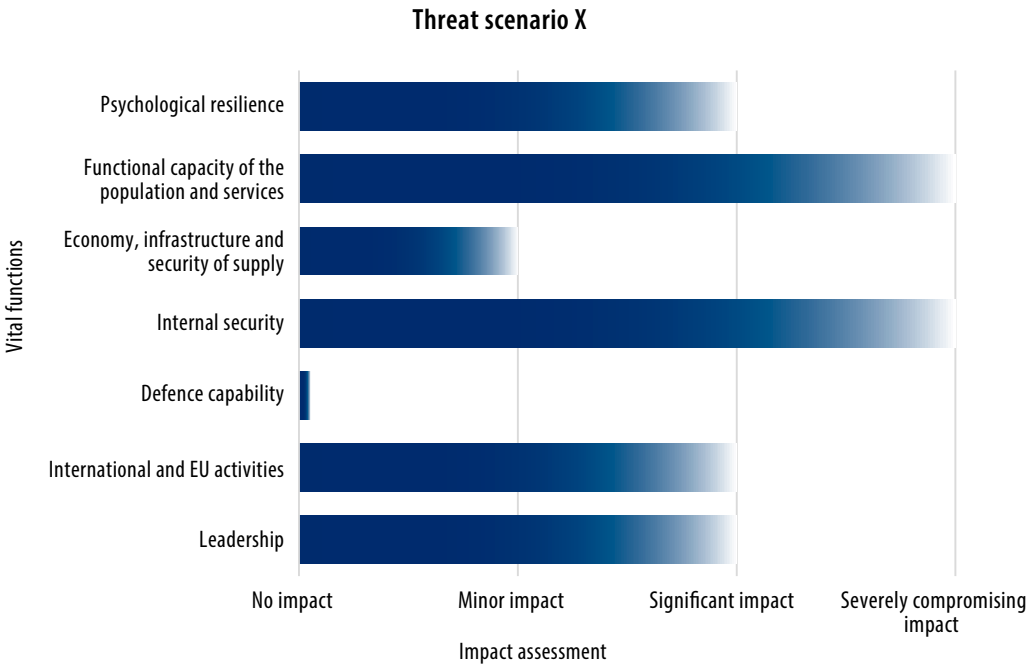
In the national risk assessment, the impacts of threats and disruptions are assessed in relation to the vital functions of society and the strategic tasks that safeguard them, as defined in the Security Strategy for Society 2017. In Table 1, the impact assessment of threats and disruptions is described on the following scale: minor (*), significant (**), severely compromising (***), no impact (-). The impact assessment is also described briefly in the verbal descriptions of threat scenarios and disruptions.

Another factor to be taken into account with regard to the impact assessment is that the vital functions of society and the related strategic tasks are not separate entities but are linked to each other. Should it materialise, a threat to one of the vital functions of society may also influence other functions.

Table 1. Impact assessment of threat scenarios and disruptions

Impact on vital functions	Assessment description
No impact	No impact
Minor impact	The materialisation of the threat scenario/disruption has minor/mild/limited/indirect impacts on the functioning and maintenance of (a) single strategic task(s) (minor disruptions). The impact may be regional or short-term, for example.
Significant impact	The materialisation of the threat scenario/disruption has significant impacts on the maintenance of strategic tasks. The impacts of the threat scenario/disruption on the maintenance of strategic tasks have national significance and may call for measures deviating from the norm.
Severely compromising impact	The materialisation of the threat scenario/disruption has extremely significant, large-scale and compromising impacts on the maintenance of strategic tasks. The maintenance of strategic tasks and the management and containment of the impacts of the threat scenario/disruption may call for major measures deviating from the norm. The management of the situation may require, for example, additional powers to safeguard strategic tasks.

An example of the impact assessment of a threat scenario or a disruption:



1.4 Regional risk assessments as part of the overall risk assessment system

Risks assessed at the national and regional levels lay a solid foundation that defines what kinds of risks different administrative branches and other parties must be prepared for. In addition to the national risk assessment, regional risk assessments are prepared as a separate process at the regional level, mainly according to the regional division of the wellbeing services counties, on assignment by the Ministry of the Interior. The targeted schedule for completing the regional risk assessments on by the end of March 2023.

Regional risk assessments focus on regionally significant risks whose management requires activities deviating from the norm and which will cause significant regional impacts if they materialise. The aim is not to identify and list all possible scenarios in the region, but to choose the most significant threats and disruptions shared by the operators of the region.

The goal is to draft the regional risk assessments cross-sectorally so that the region's municipalities, wellbeing services counties, authorities, businesses and organisations are represented in the working groups. The results of the regional risk assessment and a description of the drafting of the assessment are compiled into a written report distributed to the operators in the region for use and, if necessary, to other stakeholders. The aim is to use the regional risk assessment as one of the guiding principles in the preparedness of regional operators alongside the national risk assessment.

The nationwide risk assessment system, common to different operators, consists of the national risk assessment and the regional risk assessments, in which the most significant risks have been identified and assessed cross-sectorally. In addition, each party and sector drafts and uses their own risk assessments in their preparedness measures and assesses risks in more detail in relation to their tasks and operations and in accordance with the legislation applicable to their administrative branch and sector.

2 Transformation of the security environment

In the constantly changing and interdependent operating environment, international and national developments and changes, such as global phenomena, regional development in Europe and its neighbouring areas as well as the rapid and intensive change in the security policy environment, are reflected directly not only in Finland's international position but also in the wellbeing, safety and security of the population. In addition to opportunities, changes in the operating environment may also involve threats and identified risks for Finland.

The national risk assessment's chapter focusing on the operating environment aims to describe certain key developments and broad, overarching change phenomena in the security environment, which may influence the identification of the threat scenarios and disruptions covered by the risk assessment, their materialisation and the concatenation and cascading of impacts. The risk assessment's chapter on the operating environment is not intended to be an all-encompassing description of the security environment; instead, its aim is to describe the essential characteristics of the operating environment related to the threat scenarios and disruptions covered by the risk assessment and also take slowly developing phenomena into account.

As sources, the chapter uses recent materials describing the operating environment and its change, such as the following:

- Government report on the National Climate Change Adaptation Plan by 2030 (2022) (in Finnish),
- Futures review of the ministries 2022 (in Finnish),
- Government report on security of supply (2022) (in Finnish),
- Government report on changes in the security environment (2022),
- Government Report on Internal Security (2021),
- Government's Defence Report (2021) and
- Government Report on Finnish Foreign and Security Policy (2020).

2.1 Transformation of Finland's foreign and security policy environment

The intensifying competition between the superpowers and the weakening of the rules-based international system increase instability in the operating environment. The security situation in Europe and in Finland is more serious and more difficult to predict than at any time since the Cold War. Increased tensions also undermine the security situation and its predictability in the Baltic Sea region. A possible pan-European military conflict or a military conflict in the Baltic Sea region would affect Finland and it would be difficult for Finland to remain outside such a conflict.

Russia's military attack against Ukraine in February 2022 has destabilised Finland's foreign and security policy operating environment significantly for a long term. With its attack, Russia has shown it is ready to use its military force as an instrument of its power politics against its neighbouring states. Russia has supported its military operations with intensive hybrid influence activities targeted especially at Ukraine but also on states that support Ukraine. This has shown that Russia is increasingly ready to violate the sovereignty of other states and promote its own security policy interests more ruthlessly. Russia has violated the UN Charter and breached the European treaty-based security order. The return to rules- and cooperation-based relations with Russia seems unlikely in the coming years. Russia's war of aggression in Ukraine destabilises the situation both in Europe and globally through the energy and food crisis and increasing inflation.

The military situation in Finland's neighbouring areas is currently calm and Finland is not facing an immediate military threat. However, Finland must be prepared for the use or the threat of use of military force against it as well as political pressure. Finland is also preparing for the contingency that military force might be used solely against Finland. The military actions against Ukraine show that a high level of readiness, the ability to counter sustained military pressure, the ability to repel large-scale offensive operations on several simultaneous fronts as well as the ability to protect the population, critical infrastructure and functions are important.

As a result of the major change in Finland's security policy environment, Finland applied for membership of the North Atlantic Treaty Organization (NATO) in summer 2022. Upon realisation, Finland's NATO membership will increase both Finland's security and the stability and security of the Baltic Sea region and Northern Europe. Membership in the defence alliance NATO will also make Finland part of NATO's collective defence and thus covered by the security guarantees enshrined in Article 5 of the North Atlantic Treaty. The deterrent effect of Finland's defence will increase considerably. If Finland, as a NATO member, became a target of military force, it would defend itself with the support of its allies according to plans prepared and rehearsed in advance. Similarly, NATO membership

means that Finland prepares for supporting its allies. All members, including Finland, share the risks, responsibilities and benefits associated with collective defence. As a NATO member, Finland will also be involved in decision-making on security policy questions that are essential for Finland.

In NATO, Finland also shares the same risks and threats as the other member countries. NATO's Strategic Concept identifies Russia as the alliance members' most significant direct threat. Terrorism is NATO's most direct asymmetric threat. China is considered to challenge, through its actions, the values, security and interests of the alliance members. The accession to NATO means that Finland must, as part of the alliance, bear its responsibility if an armed conflict, for example, arises between NATO and the parties mentioned above.

Globally identified challenges, such as climate change, conflicts, the availability of food and water, migration and pandemics, constantly affect our operating environment both on their own and as interlinked phenomena, further intensifying the impacts of other challenges in the operating environment. Global challenges can cause inequality, bring on a lack of prospects, deepen dividing lines and increase the attractiveness of populist movements.

Alarming intra-EU development in areas such as compliance with the principle of the rule of law, differing economic outlooks in different Member States, increasing indebtedness and the intensifying competition between the superpowers may also pose challenges to the EU's unity and its decision-making and operating capacity. One way of trying the influence the EU's operating capacity is exercise politics that undermine it, which is why unity and decision-making play especially significant roles. On the other hand, responding to threats also intensifies cooperation within the EU. In external relations, the European Union is Finland's most important frame of reference and channel of influence. Finland influences the EU's joint policies and commits to them. As an active operator, the EU seeks to strengthen its role in preparedness for disruptions and responding to various types of crises. As Finland is part of the EU's external border, border security questions are especially prominent in Finland.

In addition to the identified change phenomena, the operating environment may also be subject to sudden changes that are more difficult to predict – such as the war of aggression started by Russia – and that have impacts that spread and cascade. Changes that have happened and are happening in the world and their cascading effects and repercussions are often visible in Finnish society fast and require preparedness and immediate responsiveness. The ability to anticipate and react as well as to adapt to the changes in the security environment strengthens society's crisis resilience. The key to strengthening crisis resilience is the maintenance of strong national defence capability and internal security. Internal security and national defence capability are also enhanced by means of foreign and security policy.

2.2 Global value and supply chains

The prioritisation of national interests and traditional power politics have returned to international relations and now manifest themselves also in trade, technology and the energy sector in addition to traditional foreign and security policy aspects. The unilateral promotion of national interests, in disregard of common interests, weakens the rules-based international system which maintains the stability of global markets and the reliability of value and supply chains.

The changed geopolitical situation and competition between the superpowers increase uncertainty in international markets and also the operations of Finnish companies, too. Finland is an open economy that is dependent on global value chains and the free movement of goods and people is a key element of Finnish society. Finnish businesses and the critical services of Finnish society are integrated with global value and supply chains, through which both critical raw materials and components and final products flow. Disruptions in these value and supply chains can be seen also in Finland and often generate cascading effects, which may have large-scale impact on society, especially through the deterioration of companies' operating conditions. In addition, energy market disruptions are reflected in Finland. Various data flows have also become an integral element of global value and supply chains as society and functions are becoming increasingly digital.

Finland's location in the north at the external border of the EU's single market and dependence on transport flows via the Baltic Sea are notable risk factors in maintaining the operational reliability of society and the national security of supply. The COVID-19 pandemic and the crisis resulting from its cascading effects both highlighted the significance of global markets and value chains and demonstrated the impacts of protectionist measures on their reliability. Russia's war of aggression has had a major impact also on the energy system. The security of energy infrastructure, energy prices, price stability and the availability of energy entails significant factors that increase the risk level of comprehensive security. For Finland, especially the operational reliability of the EU's single market has a significant stabilising impact on the continuity of the critical functions of society and general crisis resilience.

The relation between market functionality and security of supply should be highlighted when assessing societal disruptions of various degrees. The purpose of security of supply is, in case of emergency conditions and comparable severe disruptions, to safeguard economic functions that are necessary for the population's livelihood, the country's economy and national defence as well as the related technical systems. The building blocks of the national security of supply are functional international markets, diverse industrial and other production operations, stable public economy and competitive national economy.

Market operators' ability to adapt to disruptions and safeguard the continuity of their operations determines the crisis resilience of critical production and services. Security of supply is largely built on the ability of companies operating in the critical sectors to react to emergency conditions, tolerate crises and disruptions and recover quickly. Even in crises in society, the starting point is to carry out operations on market terms. If markets cannot maintain society's basic economic and technical functions during disruptions and emergency conditions, society must complement market operations with necessary measures.

In Finland, work to safeguard security of supply is based on cooperation of the public, private and third sectors. The major part of critical infrastructures, services and production is produced and maintained by private companies. The sectors crucial for security of supply are food supply, energy supply, the financial sector, logistics, industry and healthcare. It is difficult to prepare for all risks in advance and not all disruptions, even severe ones, are such that they could be managed with measures related to security of supply. When it comes to security of supply, the field of operations must be kept clear.

2.3 Changes in society

Polarisation is a global phenomenon that is also found in Finland. Although for the majority of people in Finland, everyday life is safer and more secure than ever before, the significance of societal inequality and polarisation for safety and security is considerable. The experienced and measured safety and security of various vulnerable population groups is lower than that of the population on average. In Finland, there are major regional differences both in the wellbeing of the entire population and in the wellbeing of young people. The majority of the population are doing well but not all are included in this positive development. Inequality of Finnish society can be seen in the unequal distribution of health, wellbeing, income, wealth, competence, employment and residential area development, differences in societal participation of various population groups and the segregation and polarisation of values and attitudes. Increasing inequality is linked with social exclusion and an increase in crime and violent radicalisation. For example, if there is more digital inequality in the increasingly digital society, polarisation may become more pronounced. This development has adverse effects on the state of the rule of law and democracy. At the level of the population, wellbeing-related phenomena, such as the downward trend in people's physical functional capacity and marginalisation development, may also have spillover effects on the performance of military national defence.

The unequal distribution of wellbeing and participation and the diversification of values and attitudes may create tensions in society and increase people's mistrust towards institutions and each other. Hostile information influence activities may also be used to create and accelerate antagonism and general uncertainty. From the individual's point of view, distinguishing information with valid content and reliable information sources, on the one hand, from opinion-based or unreliable information and information sources, on the other hand, has become more difficult. This is significant for access to information by everyone but especially by vulnerable persons. In the increasingly digital society, particular attention must be paid to groups at risk of digital marginalisation, such as the elderly, and the participation of speakers of different languages.

By producing and sharing biased information on social media platforms, large groups of people can be mobilised and general unrest and antagonism in society can be intensified. The opposition faced by security authorities and the related violence and online targeting and shaming are expected to continue to increase.

According to predictions, crime will evolve and become more varied. Prominent features in the evolution of crime include the increase of violence, firearms and drugs as well as the increase of fully or partly online cross-border crime and its becoming more serious and more varied. Younger people will be involved in serious violent crime and drug crime. Furthermore, according to predictions, organised crime will increase and become more international and serious, mirroring the general development seen in other EU Member States. Curbing this development in Finland calls for international cooperation between authorities, adequate measures and resources in crime prevention and later in criminal proceedings, as well as a better ability of other authorities and communities to identify organised crime and protect themselves from it.

In international comparison, Finnish people's trust in each other and various operators of society is high. Although the major part of Finnish population trusts in public administration, there are differences between population groups and regions in this regard.[2] From the perspective of responding to disruptions, the population's trust in the actions of authorities and the significance of the population's crisis resilience are emphasised especially in prolonged crises. The population's trust in the actions of authorities is an essential element in maintaining psychological crisis resilience. Population groups in a weaker position must also be better taken into consideration when preparing for disruptions.

2 OECD (2021) Drivers of Trust in Public Institutions in Finland

The ageing of the population and urbanisation influence the security environment in Finland and pose challenges to the service system, especially in sparsely populated areas. Finland has the lowest population density in the EU, the population is ageing faster than in most other European countries and the number of residents in sparsely populated areas continues to decrease. Segregation caused by an unequal distribution of income, housing costs and wellbeing has become more salient in the largest Finnish cities, although it is still quite moderate from an international perspective[3]. Also during disruptions, the availability of labour and sector-specific appeal are important for the maintenance of the vital functions of society and for preparedness.

Cooperation between different sectors and operators of society maintains crisis resilience, strengthens capabilities and creates a preventive threshold against external influence activities targeted against Finnish society. The population's and communities' crisis resilience and independent preparedness play a significant role in the entire society's crisis resilience. Psychological crisis resilience plays a key role in maintaining people's functional capacity during disruptions and also promotes recovery from crises. According to the Citizens' Pulse survey conducted in December 2022, approximately half of the Finnish population feels that they are currently very or fairly well prepared for various security threats or severe disruptions while one in four respondents considered their own state of preparedness very or fairly poor[4]. The survey referred to authorities' and organisations' recommendation for households to have emergency supplies at home for at least 72 hours.

2.4 Increasingly digital society

The impacts of digitalisation apply extensively to the entire society: organisations, companies and individuals. Digitalisation has made information and communications services and networks a part of people's everyday activities in all areas of life. Digital transformation has also introduced new technologies and operating methods. In the future, the technological environment will become even more complex.

In the Vocabulary of Comprehensive Security, cyber security has been defined as a state in which the threats and risks posed by the cyber environment to the vital functions of society or other functions dependent on the cyber environment are under control.

3 Finnish Institute for Health and Welfare (2018) Sosiaalinen kestävyys: asuminen, segregaatio ja tuloerot kolmella kaupunkiseudulla.

4 Finnish Government and Statistics Finland (2022) Citizens' Pulse 15 December 2022

Cyber environment consists of one or more information systems that are meant for processing data or information in electronic form and the related telecommunications arrangements. Telecommunications connections and physical premises are also a part of this whole.

The need to improve the overall state of cyber security results from the significant changes that have taken place in society's operating environment, the constantly evolving cyber security threats, the increasing complexity of ICT environments, the convergence of embedded and traditional ICT systems and the development areas observed in national activities.

Cyber security must be integrated into all activities, processes and systems subject to threat factors.

Cyber security must be seen a natural part of each organisation's and individual's social responsibility. Cyber security is a key element in the disruption-free functioning of society.

Examples of cyber environments of critical infrastructure include electric or nuclear power plant automation and control systems, food transport and logistics systems, healthcare information systems, traffic control systems, banking and payment systems as well as information systems that enable communications services.

There may be major interdependencies between digital systems and organisations providing and using them. The cascading effects of individual system disruptions can be significant due to the concatenation of faults and disruptions.

Failures, disruptions or vulnerabilities of jointly used electronic platforms can simultaneously affect the availability of the services and confidentiality or integrity of data of several organisations. Disruption in the functionality or security of a single information system or telecommunications connection may affect one or more services that are crucial for the functioning of society.

International telecommunications connections are the foundation of the production of digital services. Both international and domestic telecommunications connections are part of the critical infrastructure of society. Without functional telecommunications connections, the functioning of society is disrupted.

Within the EU, cross-border digital services have become more common and the Member States' mutual dependence on each other's digital infrastructure has increased. Cyber disruption in one Member State may have significant impacts on other Member States.

The increase of the volume of publicly available information that is significant for the functioning of society may make it possible to use it for malicious purposes. The increasing volume of information that global service providers accumulate may also entail risks. The availability, integrity and confidentiality of information that is critical for the functioning of society must be safeguarded.

Cybercrime, such as data breaches or large-scale violations of data protection, threaten the population's fundamental rights and unauthorised activities by state operators, either online or within information systems, create threats to national security. In addition, they may contribute to a lack of trust among the users of services. This can lead to a general erosion of trust in the services of society and the actions of authorities.

The digitalised society also increases the risk of cyber spying targeted at central government and companies and, to a small extent, also at our critical infrastructure. Both criminal groups and authoritarian states use unauthorised information collection to steal companies' immaterial assets and to create competitive advantage.

Central government is also subject to attempted intelligence collection in information networks. Attempted intelligence collection is targeted at the formulation of the state's political opinion, the operations of various central government organisations and information related to defence capability. Supply chains and device manufacturers are also subject to threats.

Technological development has also influence the national defence operating environments, especially cyber, space and information defence. Authorities' cooperation and powers as well as national and international cyber defence cooperation must be developed further.

2.5 Hybrid influence activities

In hybrid influence activities, a state or other external party systematically employs a variety of methods, concurrently or sequently, with an aim to influence the target's vulnerabilities to reach its own goals. Its wide range of means may include, for example, political, diplomatic, economic and military methods as well as information and cyber influence activities. Influence activities are injurious and the aim is to implement them in such a manner that the operators' involvement in the actions can be denied. Activities may involve both illegal and legal methods. Influence activities can be carried out over a long period of time, even years.

External and internal security are strongly intertwined in hybrid threats. Influence activities can be targeted at Finland directly or as part of a larger whole that seeks to influence the Western countries' or the EU's unity or the EU's internal decision-making and operations, for example. Activities may have apparently positive impacts but the underlying motives and objectives are harmful or unacceptable to the targets.

Some of the threat scenarios and disruptions described in the national risk assessment may emerge as a result of hybrid influence activities or attempts may be made to use hybrid influence activities during disruptions or when preparing for future hybrid influence activities by mapping society's vulnerabilities, for example.

Hybrid influence activities may be targeted at all vital functions of society. Influence activities may be targeted directly or indirectly at, for example, political decision-making, the functioning of society's vital services or critical infrastructure, the opinions of the population, trust in authorities or Finland's opinion statements on international forums. It is typical for hybrid influence activities that they try to influence different parts of society surreptitiously and simultaneously so that the country or community being influenced would voluntarily end up making decisions that are harmful to them and support the goals of the influencing party. As a rule, economic cooperation and investments entail benefits and, consequently, it may be challenging to draw the line between harmful influence activities and acceptable operations.

Influence activities taking place in the information environment are targeted at the bonds that hold society together, such as people's trust in each other, democracy, decision-making and the rule of law. The goal is to impair the decision-making ability and functionality of society and erode the national value base. Another goal may also be to attempt to influence Finland's international position, alliances or reputation.

Hybrid influence activities can take place under the protection of the freedom of speech and assembly, which makes it difficult for authorities to both maintain the cornerstones of the democratic state and prevent harmful influence activities. Hybrid influence activities may also take advantage of a democratic society's normal means of influencing by misusing them. Such means include, for example, complaints made on false grounds and information requests made solely with the intention to burden the system. Election interference, in its various forms, is also an example of how the vulnerabilities of the democratic systems can be exploited.

Election interference may take place as attempts to influence the election results or people's impression of their trustworthiness. It may be targeted at election systems and campaigns. Questioning the integrity of the election can threaten the credibility of entire Western democracy. Election interference may seek to destabilise civil peace and sow mistrust towards politicians, public officials, population groups and the entire society, for example.

As part of hybrid influence activities, several European countries have in recent years been the target of third countries' attempts to instrumentalise migration for political purposes. Attempts to influence a single Member State may also have sought to destabilise the EU's unity and operating capacity and consume the target country's resources.

Hybrid influence activities may also be targeted at so-called soft targets that still are crucially important for people's everyday lives and wellbeing. For example, there may be attempts to exploit sensitive personal data. Cyber environment influence activities are capable of influencing a very large group with reasonably small input.

A key instrument for long-term influence activities is economy and, within it, critical commodities and related supply chains and dependencies. As a category of economic means of influencing, dependencies create opportunities to exert influence or pressure. The creation of dependencies with the aid of supply and maintenance chains or ownership relations is among potential means of influencing. Finland is an open economy that is dependent on exports and must be involved in global value chains and networks. This also exposes different sectors of society to hybrid influence activities.

When foreign investments increase, immovable property and companies may transfer into the ownership of operators in whose interests it is to act against Finland's national interests. The control of property also makes it possible to use it against the vital functions of society. Political and diplomatic pressure outside ordinary political and diplomatic activities or attempts to influence local decision-makers are also potential means of influencing.

Changes in the operating environment also influence how corruption manifests itself. Attempts may be made to exercise influence on public officials and decision-makers both in Finland and abroad.

Hybrid influence activities may also comprise physical influence activities. This may include, for example, sabotage, attacks against critical infrastructure or demonstrations of military force. Forms of physical influence activities can be regarded as harder means of influencing, which may be used, for example, if the other means used have not yielded the desired effect. Influence activities in the physical dimension often also seek psychological influence.

It is characteristic of hybrid influence activities that by combining legal and illegal means as well as means from different authorities' responsibility areas, it may remain beyond the reach of ordinary security measures by authorities or completely unrecognised. Responding to hybrid influence activities requires a comprehensive, nationally unified approach that also involves the EU.

2.6 Climate change

In the last few decades, northern regions have warmed up many times faster than the average rate of global warming. For example, the Arctic region has warmed up at four times that rate. Finland's average annual temperature has risen by approximately 2°C from the mid-19th century. This is approximately two times the global average. The impacts of the rapidly changing climate can be seen in several threat scenarios in the risk assessment.

Climate change has three different kinds of impacts on society and its vital functions. First, within the borders of Finland, typical regional risks related to extreme weather phenomena change. Moreover, climate change creates new risks for Finland's ecosystems, people's health and wellbeing, businesses and critical infrastructure. Biodiversity loss may also undermine the foundations of economy and wellbeing in the long term. Climate change accelerates biodiversity loss, which in turn intensifies climate change. Second, climate change increases the likelihood of risks which are reflected from other parts of the world to Finland through cross-border impacts. Third, risks related to climate change mitigation policy, or so-called transition risks, have recently become increasingly significant.

Within the borders of Finland, climate change causes regional and national risks. In Finland, the majority of weather-related disruptions have so far been regional. Blackouts associated with storms and snowfall and their consequences, forest fires and rescue services required by them as well as floods have cause significant regional disruptions and economic impacts. In addition to blackouts, long droughts have interfered with water utilities and the water supply of communities and industry. Climate change may influence these risks by changing the intensity and frequency of extreme weather phenomena and their typical time of occurrence, which changes the societal risks related to them. Weather-related disruptions threaten both people's health and the operational reliability of healthcare. For example, heatwaves cause significant health hazards for the chronically ill and may also congest healthcare services in the future. The management of weather and climate risks is covered especially in the regional risk assessments, as the risks and conditions vary between different parts of Finland.

Increasing droughts results in a higher risk of extensive forest fires. Very extensive forest fires generate significant rescue service needs and may require international assistance. In addition, smoke from forest fires causes health hazards. Human activity in forests is a significant factor behind the risk of forest fires. Long drought in the summer impairs the hydroelectric power generation in Finland and the other Nordic countries and possibilities of power control in the national grid.

The forest sector has significant effects on national and regional economy, so large-scale damage and changes in Finnish forests may have economic impacts and, as a consequence, increase social challenges. Disease and insect damage becoming more common due to the decreased immunity of trees is a significant risk to the forest industry. Most fungal diseases also benefit from climate change. The single largest risk for forests is the significant increase of damage caused by the European spruce bark beetle when climate change strengthen their population. International plant trade also increases the risk of new pests. In addition, many infectious diseases dangerous to humans, such as tick-borne encephalitis, may spread to larger areas due to climate change.

Climate change also causes risks that are reflected to Finland from outside the country's borders. Risks that originate from outside the borders of Finland and reflect to Finland are associated with industrial supply chains, increase the likelihood of large-scale immigration and influence the financial market, economy and the national security of supply.

Agricultural climate risks are significant at both the national and the international level. Especially increasing long spells of high temperatures and drought, on one hand, and rainstorms, on the other, cause additional problems to agriculture and have effects on food security. New plant diseases, pest and weed species are expected to spread in Finland with climate change. Local self-sufficiency of agriculture is linked with risks reflecting from outside the country's borders as climate change may have global impacts on food production and, consequently, on the availability and price of food. Higher food prices and lower availability may lead to social problems and unrest also in Finland.

The most vulnerable sectors of industry and businesses are those with purchasing and supply chains exposed significantly to extreme weather phenomena and climate change outside the borders of Finland. Industry-related risks may increase impacts on the national economy, especially in the long term.

Climate change increases migration in the coming decades. Tens or possibly hundreds of millions of people need to leave their home regions due to reasons related to climate change. The majority of them migrate within their home country but some migrants travel farther. Push factors may include sudden catastrophes, such as floods or storms, but also more slowly advancing deterioration of living conditions, which may be reflected in the political stability of the region. The increase and intensification of migration push factors result in a higher risk of large-scale migration flows and increase their effects related to the population's health.

Transition risks refer to risks arising from the transition towards a low-carbon society. These risks are likely to increase as climate policy becomes stricter unless they are reduced and managed. They comprise both the potential adverse effects of individual actions and the consequences of the broader transition that takes place at the systemic level of the entire society. Transition effects may be associated with, for example, the securing of raw materials required for the energy transition, geopolitical changes resulting from the phase-out of fossil production, the use of energy policy as an instrument of power, or societal antagonism and experiences of inequality that increase within the state as a consequence of climate policy. Quickly tightening mitigation policy may influence logistics systems and the operational prerequisites of military national defence, for example. In connection with transition effects, attention should always be paid also to effects on people's health, wellbeing and equality.

The global overall economic impacts of climate change are estimated to be negative in the long term. The impacts depend on the period of time, temperature increase estimates and the climate-related changes of humidity, rainfall, winds and extreme weather phenomena. The speed of change also influences costs and the scope of negative impacts and adaptation is easier when the speed is lower. In the international financial market, both policy actions to mitigate climate change and the physical impacts of climate change are felt in different sectors of economy. They are reflected in different asset categories, such as oil reserves or real estate. In fact, a major question faced by the financial sector is the extent of risk caused by climate change on investment portfolios and when and how it will potentially materialise.

Climate change also causes many risks and impacts that are not considered relevant to be discussed in the national risk assessment as the assessment focuses on nationally significant, partly sudden disruptions and threat scenarios. The National Climate Change Adaptation Plan was published in December 2022. As a basis for the Adaptation Plan, an extensive risk and vulnerability analysis was conducted, reviewing also sudden and regionally significant risks of climate change and risks associated with long-term changes.

3 Assessed threat scenarios and disruptions

3.1 Information influence activities

Underlying threat

Changes in the information environment and the more diverse and widespread use of information technologies have shaped our everyday life significantly in the last few years. This has also been a cultural change throughout society. While these technologies have increased the openness of society and enabled people's active participation in discussion in society, they have also brought along new kinds of threats. Hostile information influence activities, election interference, intentional spreading of disinformation, hate speech and online harassment have become factors threatening democracy, people's equality as well as freedom of speech, opinion and the press. At worst, information influence activities threaten the trust that holds society together and can also be used as part of hybrid influence activities.

Influence campaigns taking place in the information environment have become more effective and versatile. By exploiting the weaknesses and vulnerabilities of the target, its actions, thoughts and opinions can be influenced effectively. Information influence activities refer to systematic actions designed to influence public opinion, people's behaviour and decision-makers and, through that, the operating capacity of society. They are activities that aim at inducing the target to make decisions harmful to itself and act in violation of its own interests or directing the target to act to promote someone else's interests.

Information influence activities can also be part of influence activities carried out in the physical environment. For example, denial-of-service attacks, data breaches or interference targeted at the critical infrastructure may seek to influence not only the physical environment but also the information environment and, consequently, the vital functions of society and the operating capacity of society. Indeed, it is important to note that information and cyber threats described above are an essential element of hybrid influence activities.

Over the last few years, some social media companies have become global gatekeepers, with their activities partly characterised by nontransparency and the unpredictability of operations in connection with changes of ownership, for example. The concentration of data and, as a result, power to these companies has evoked a lot of discussion in recent years, on topics such as the corporate social responsibility of these companies. Their revenue model based on selling user data and targeting messages and advertisement efficiently as well as the algorithms at the core of their business influence the direction of discussions in society by controlling what kinds of information people get, consume and share, among other things. As a result, these companies have a significant power potential. Efforts have been made to guide the activities of social media companies in the prevention of information influence activities through EU-level regulation, for example.

Target of the threat

By exploiting the information environment, malevolent operators can try to influence decision-making and the functioning of society and weaken an individual state's international position and alliances. Information influence activities are targeted at the entire society, decision-making, institutions, democracy and people's fundamental rights, such freedom of speech and expression. Information influence activities may also be targeted at non-governmental organisations and at companies that are essential for infrastructure.

A hostile attempt to influence may be motivated by state or non-state operators. It may be difficult or even impossible to identify the perpetrator. A further challenge is that the activities may be designed so that they are as difficult to recognise as possible, which poses challenges for responding to them. Such influence activities are often carried out in the grey areas between legal and illegal activities exploiting loopholes in legislation or the difficulty of law enforcement, for example.

Method of implementation (possible)

Identified operating methods in Finland and targeted at Finland include spreading disinformation about the government's decisions, the conditions and treatment of the population and the actions of authorities. In addition, facts about Finnish history, for example, have been distorted and disinformation has been spread about events. Another method has been to use information that is correct as such in a manipulative way by removing it from its context.

The range of information influence activities can also include threatening and pressuring an individual or individuals, spreading their personal data, making unfounded complaints about them or instigating others to engage in such activities. Especially online targeting and shaming is a phenomenon, the increase of which has drawn a lot of attention in recent years. In cases of online targeting and shaming, it may be challenging to draw the line between information influence activities and harassment. The means mentioned above can be used to provoke, suppress discussion, silence people and instigate antagonism, for example. The goal is to erode the national value base, democracy and trust and suppress freedom of opinion, speech and the press.

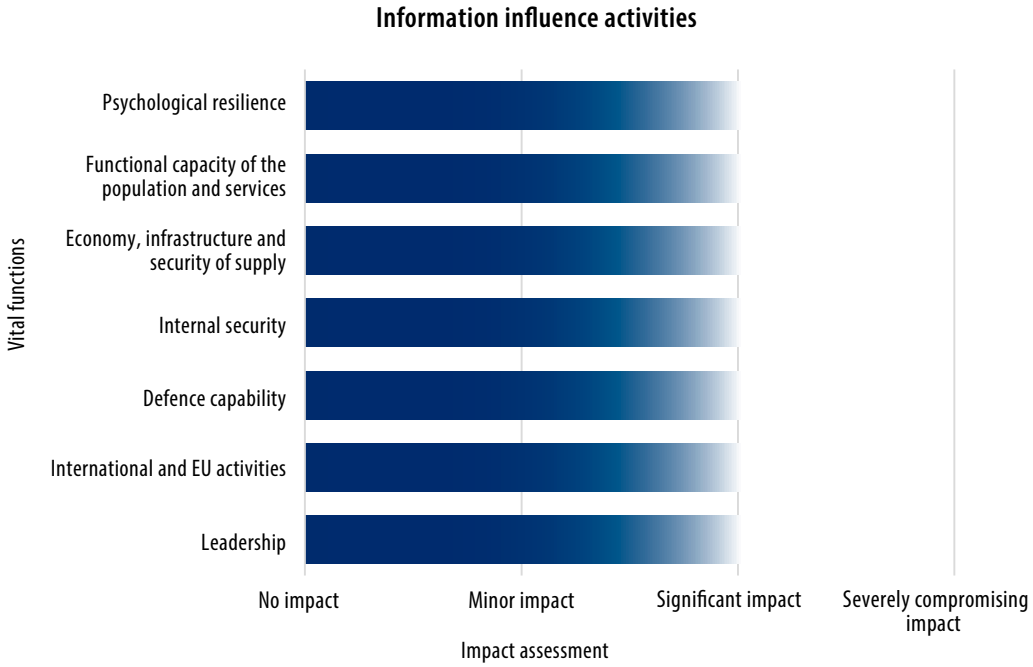
The narratives, or vehicles of storytelling, used in information influence activities are often built so that they arouse emotions and strengthen polarisation and the existing dividing lines of society. They are targeted at what reinforces or undermines people's identity and view of the world. It may be difficult to resist message that reinforce one's own view of the world and identity, especially if the same message is repeated through several channels and one's own social network believes and endorses the messages. These identity-targeting narratives are often global and not limited to the national information environment.

Cascading of impacts and disruption chains

Finland has been the target of foreign disinformation campaigns and the distortion of history and decision-makers' statements, for example. As part of information influence activities, attempts may be made to exploit and instrumentalise the dividing lines within society and dissatisfaction in society. For example, during the COVID-19 pandemic, the operating methods witnessed in Finland included spreading disinformation related to the coronavirus and vaccines as well as harassing and even threatening authorities, researchers, journalists and decision-makers both in and outside social media.

So far, information influence activities targeted at Finland have not had extensive or paralysing impacts on the operating capacity of society. The basic structures and characteristics of society, such as people's strong trust in institutions, each other, authorities, democracy, responsibly operating media and the rule of law, protect Finnish society from the impacts of information influence activities. However, increasing polarisation, marginalisation and antagonism threaten societal trust that underlies resilience and, as a result, the crisis resilience of society. Consequently, the impacts of information influence activities cannot always be observed in the short term. According to the trust survey published by the OECD in 2021, Finland has scored highly in international trust comparisons but there are significant differences in trust in different institutions between regions and population groups and there are signs of segregation.

Impact assessment



3.2 Political, financial and military pressure

Underlying threat or threats

Political, financial and military pressure (hereinafter referred to as "pressure") aims to influence the decision-making and operations of a state to achieve objectives which the targeted state would not otherwise consent to. Pressure can also promote on-going matters and events in the target state beneficial to the party exerting pressure. The purpose of pressure is to make the leadership of the targeted state act as desired, question the operating capacity and legitimacy of the political leadership of the targeted state, cause general uncertainty and weaken the population's sense of security and will to defend the country.

Pressure can also be exerted on media and in international politics and forums. Pressure can be comprised of individual measures, it can increase gradually, or it can take place at several levels at the same time. Information influence activities, disturbing information networks and denial-of-service attacks are examples of forms of pressure. The instigator of the pressure can be difficult to identify.

Target of the threat

The targets of pressure are political decision-making as a whole and the vital functions of society; pressure influences the state's leadership, civil peace and the population's opinions. Pressure can involve disturbing, preventing or interfering in the actions of authorities, functioning of business, services or payment traffic and border violations or concentration of troops in the vicinity of borders. Hybrid influence activities, which combine military and non-military means, including cyber influencing, use of special forces, political assassinations and staged accidents, are part of the means available in pressure.

Finland may be part of a larger group of countries targeted by pressure (such as EU Member States or NATO member or partner countries). Pressure can also aim to isolate Finland from a larger group of countries or partners.

Method of implementation (possible)

The means of pressure and use of military force are not clearly separated; on the other hand, the boundary between state and non-state action is increasingly difficult to identify, which is typical of hybrid influence activities. Regional crises which have also involved the use of military force in recent years have emerged through a surprising and fast development of the situation.

Instability can be caused in the targeted area with the means of information influence activities, also utilising social and traditional media and a foreign state's diplomatic network, for example. The media may be fed with distorted information that distorts the situation picture and makes decision-making more difficult for its own part. Cyber operations are also prepared in advance by e.g. hacking information systems.

In different situations (in normal conditions and crises), Finland can be subjected to economic and political countermeasures by e.g. parties hostile to the European Union or possibly unexpected offers of cooperation. The position of groups of people living in Finland may be reviewed critically and diverse grievances may be highlighted and their correction demanded. Any actions by authorities addressing foreigners living or arriving in Finland as well conflicts with the majority may be given a lot of media coverage.

The means used for pressure combine military and non-military operations, covert operations, information and cyber influence activities, use of CBRNE materials[5], financial pressure, instigating internal conflicts within the population and causing imbalance in society. The means are used and varied flexibly as warranted by the situation.

5 National CBRNE Strategy 2017: CBRNE threats refer to hazardous incidents caused by chemical substances (C), biological pathogens (B), radioactive material (R), nuclear weapons (N) and explosives (E) as well as by the misuse of expertise related to these.

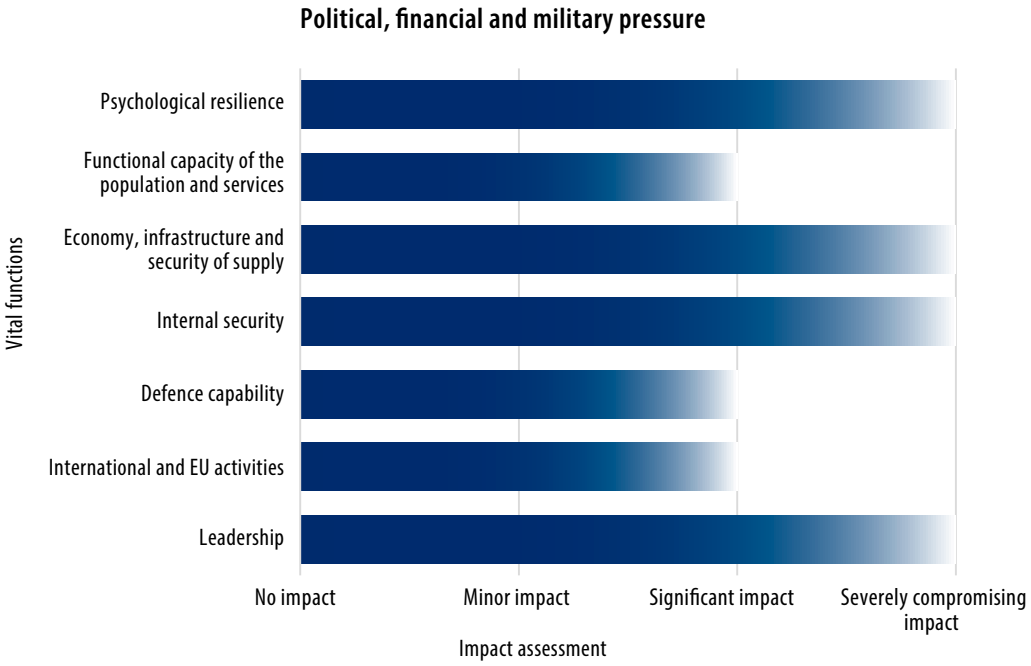
Military pressure consumes the resources of the defence system and simultaneously those of the entire society. Long-term pressure may have repercussions on internal security, international position, psychological crisis resilience, the population's will to defend the country and state leadership.

Pressure can be followed by the use of military force, if the pressure does not achieve the desired objectives. The use of military force will probably begin with the aim of a surprise momentum.

Concatenation and cascading of impacts and disruptions

In pressure situations, the impacts on people and the environment may remain low, but they can become severe from the point of view of the functions of society and the will to defend the country. The indirect economic impact of pressure that involves considerable restriction or interference of import and export are significant. Pressure affects all vital functions of society in different ways.

Impact assessment



3.3 Use of military forced

Underlying threat or threats

In the current, unpredictable operating environment, the advance warning period of crises has become shorter and the threshold of using military force has become lower.

The primary objective of sustaining Finland's defence capability is to create a preventive deterrent to the use and threatened use of military force and capability to safeguard territorial integrity and repel attacks. Prevention requires the capability to identify threats proactively and increase the defence readiness as well as military performance capabilities matching the threats.

Security threats are prevented and prepared for in accordance with the principles of comprehensive security and comprehensive defence. Comprehensive defence includes all the national and international military and civilian activities that secure the operational prerequisites of military national defence during emergencies.

It is estimated that military threats against Finland are likely connected to a Europe-wide crisis or that they arise as a result of a military conflict developing in areas close to Finland. Observations from contemporary crises or military conflicts suggest that broad-spectrum influence activities and the expansion of their range of means has become an established part of these crises and conflicts.

Defence readiness requirements extend to include the cyber, space and information operating environments. The state must be able to monitor all environments and, if necessary, activate necessary measures for defence.

Target of the threat

The open use of military force is part of the threat scenario of broad-spectrum influence activities. The use of force may be systematic or the situation may escalate into the use of force without a long planning and preparation period.

Military force is used to weaken Finland's international position and the operational prerequisites of military national defence as well as to hinder the maintenance of the vital functions of society and the operating capacity of the economy and infrastructure. Large-scale use of force aims to paralyse Finland's defence capability and prevent the independent decision-making ability of the state leadership.

In addition to national defence, use of force is aimed at disrupting, paralysing or destroying the leadership and vital functions of society. Targets are, for example, decision-makers, management systems and telecommunications networks. Other likely targets include power and energy distribution networks, food supply, water supply and healthcare, information resources, traffic nodes, communications systems, defence industry, logistics and all connections abroad. The war in Ukraine has demonstrated that the use of military force against the critical infrastructure of society is a key element in Russia's way to wage war.

Being subjected to military force requires allocating a significant proportion of society's resources to supporting military defence. Maintaining vital functions becomes more difficult, and significant strain is placed on employment and the economy.

Method of implementation (possible)

Military pressure, which is one of the means of broad-spectrum influence activities, consumes the resources of the defence system and simultaneously those of the entire society. Long-term pressure has repercussions on the target state's internal security, international position, psychological crisis resilience, the population's will to defend the country and state leadership. In broad-spectrum influence activities, the opponent may attempt to use military methods and the threat of using them while still below the threshold of open conflict. In such cases, declaring emergency conditions and naming the attacker becomes more difficult, forcing the defender to only operate with the powers and resources of normal conditions. The above-mentioned characteristics have been identified in recent conflicts. Broad-spectrum influence activities may lead to a military conflict either rapidly or as a result of a long influence operation.

If military, financial or political pressure does not reach the desired outcome, either limited or large-scale military operations can be commenced and the achievement of their goals is supported, either directly or indirectly, with other broad-spectrum influence activities in all operating environments.

A military operation may be carried out in a swift and surprising manner using troops that are constantly in a high state of readiness and long-range weapon systems. A limited operation may strive to gain control of specific targets or physical areas to improve military operating conditions and to influence the target state's leadership and its decision-making, the implementation of defence measures and the functioning of infrastructure vital to society.

In a military crisis, exerting pressure on the target country and on the readiness of its defence system may take place over a period of many months. During this time, the attacker can concentrate military force in the neighbouring area and thus enable the execution of a large-scale military operation. The concentration of military force in the neighbouring area may also increase the risk of unintentional escalation. The objective of large-scale operations may be to break through to strategically important areas, gain control of them or occupy them and paralyse the defence capability of the target state to achieve the strategic objectives.

Cyber attacks made in combination with the use of military force are a threat to comprehensive defence and they can be comparable to an armed attack in terms of effect and severity. Cyber strikes associated with other use of military force may disrupt and paralyse the vital functions of national defence and society, such as the management connectivity of authorities, general communications networks and services or industrial systems. For example, Russia has very extensively used cyber strikes as part of other use of force in the war in Ukraine.

The use of military force is very likely to entail also information warfare. Hostile information influence activities are used as part of a military operation, involving related carefully prepared information operations. The likely elements of information operations potentially targeted at Finland include at least sharing harmful and distorted information for malicious purposes, modifying the availability of information or destroying information that is critical to Finland as well as its processing and transfer systems. Information operations seek to influence people's thinking and actions in a manner that is beneficial to the attacker and promotes the achievement of the attacker's military and political objectives.

In a military operation targeted at Finland, there are also space-related threats. The attacker can threaten Finland from space, using means such as intelligence collection and space technology to support its operations. As Finnish society and authorities are increasingly dependent on space-based systems, the attacker will probably also try to influence space systems that are critical to Finnish society, such as communications and navigation systems. Another likely target is Finland's ability to create and maintain space situational awareness.

In the scenario of use of military force, use of a nuclear weapon or merely threatening to use one in Finland's neighbouring area has effects on society, especially psychologically. It has effects on society even in a scenario in which the radiation hazard does not ultimately become severe or only part of the fallout lands in Finland. A nuclear weapon will cause a considerable risk to the area near its target area also in a possible accident.

Probably, some protective measures will be necessary in at least part of the country in that case and the disruption caused to society can be significant. People's need for mental support will also impose a challenge on authorities. Depending on the affected area, Finland's international connections may be partially or completely severed temporarily. The use of a nuclear weapon far away from Finland would mainly have diverse spillover effects on Finland.

In addition to nuclear weapons, the use of force may also involve other CBRNE[6] means. CBRNE can be used in many ways as a part of broad-spectrum influence activities or direct use of military force. Finland's National CBRNE Strategy describes the threat as an attack that may be targeted not only at national defence but also at an individual, building, public transport vehicle or an extensive area. Targets may also include food and drinking water and related infrastructure. Another potential threat is the intentional use of plant and animal diseases to damage plant or grain farming and production animals. Depending on the intended impact, the target is affected by contamination with or exposure to a selected substance or pathogen, release of a substance that is similar to the actual substance but non-hazardous or a threat of CBRNE substance and weapon use issued at the target. Depending on the substance used and the intended impact, there may be major variation in the equipment and methods employed to release the substance and deliver it to its target.[7]

Concatenation and cascading of impacts and disruptions

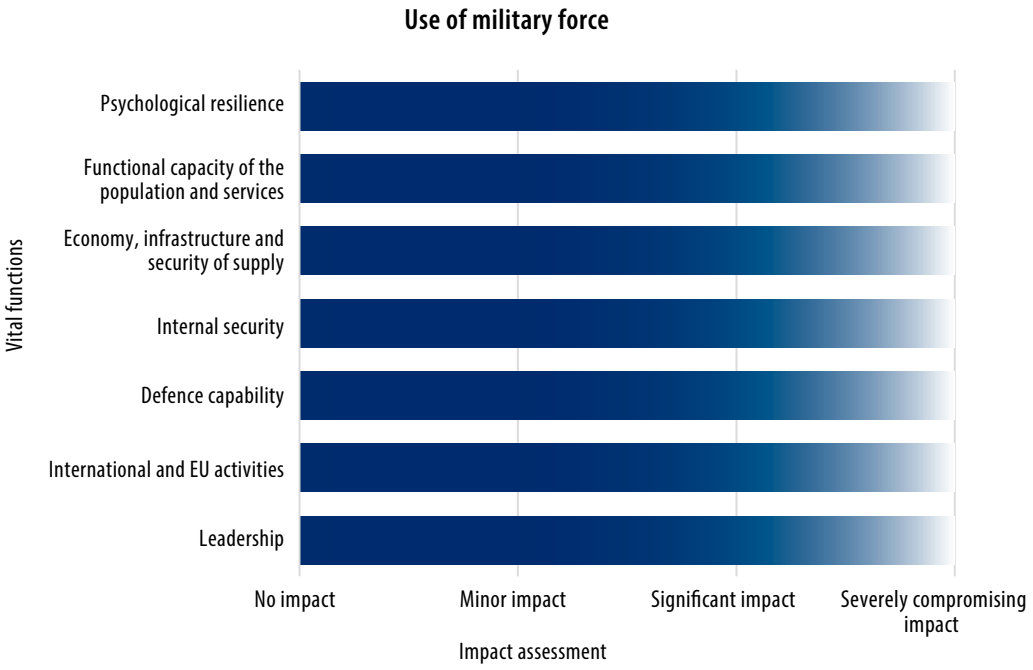
Military force can be used in attempts to impair the state's decision-making by influencing leadership and to interfere with other vital functions of society. The goal is to weaken the state's decision-making ability, disrupt vital functions and compromise civil peace and the state's independence. Even small-scale use of military force or takeover of a limited area – tying Finland to the conflict – may be used to attempt to make Finland's foreign political position more difficult and decrease Finland's political leeway.

In addition to the extent of the adversary's actions, the impacts of the scenario of use of military force depend on Finland's own countermeasures and society's crisis resilience. The total impacts on society can become very severe and extensive. Comprehensive defence is based on the population's will to defend the country, which lays the foundation for comprehensive security and strengthens the crisis resilience of our society.

6 National CBRNE Strategy 2017: CBRNE threats refer to hazardous incidents caused by chemical substances (C), biological pathogens (B), radioactive material (R), nuclear weapons (N) and explosives (E) as well as by the misuse of expertise related to these.

7 Ministry of the Interior (2017), National CBRNE Strategy 2017

Impact assessment



3.4 Mass influx of migrants and instrumentalisation of migration

Underlying threat or threats

Mass influx of migrants refers to a situation in which a large number of foreign nationals enter Finland in a short period of time and they apply for international protection or do not meet the preconditions for entry defined in the Aliens Act and the Schengen Borders Code. There is no exact definition of the number of migrants considered to constitute mass influx of migrants as the situation may proceed in a variety of ways. In addition to the total number of migrants, another essential aspect is how quickly the situation evolves: there may be a very large number of migrants in a very short period of time or gradually increasing pressure may result in a disruption if it continues for a long time.

Mass influx of migrants is caused by wars and conflicts, environmental and climate change, the unequal distribution of wealth and other resources and also hope for a better life. Technological disasters and major accidents can also cause major migration. Factors that influence the direction of migration flows include opportunities for travel and also traffickers' routes, which may change quickly. Destination countries also have factors that have impacts on the direction of migration flows, such as diasporas or migration policy.

In mid-2022, there were approximately 103 million people in the world who had been forced to leave their homes due to conflicts, violence or another security-threatening situation, persecution or human rights violations. Of them, roughly 53 million were internally displaced in their home country. According to the UNHCR, the number of displaced people has more than doubled in the last ten years. The number of displaced people is estimated to increase further in the coming years for reasons such as the progress of climate change.

The intentional direction of migrant flows to Finland may be used as an instrument of political pressure. This is called the instrumentalisation of migration. The direction of migrant flows may be part of hybrid influence activities, which can also be combined with other means of pressure, such as information influence activities. Among migrants, there can also be criminals or intelligence personnel.

Target of the threat

The scenario of mass influx of migrants or instrumentalised migration involves the risk of not being able to organise the registration and reception of migrants in a controlled manner and carrying out the residence permit procedure quickly and efficiently.

The situation ties up a lot of the resources of internal security authorities, which may impair these authorities' ability to take care of their other duties. An exceptionally high number of migrants may weaken border security and create a situation, in which not all migrants arriving in Finland can be registered. The number of people residing illegally in the country may increase, which may impair public order and security.

The situation may also threaten the psychological crisis resilience of society. The key factor strengthening crisis resilience is the population's faith in authorities being in control of the situation. If migration is a result of hybrid influence activities targeted at Finland, the operation can also involve information influence activities trying to make public discussion polarised and, consequently, create and strengthen antagonism. This kind of situation may compromise public order and security and also have significant political effects.

Method of implementation (possible)

Mass influx of migrants may happen gradually or as a sudden situation resulting from an accident or a conflict, for example, when people try to leave the area in question. Land routes facilitate the biggest border-crossing volumes: with regard to internal borders, mainly the land border with Sweden, and with regard to external borders, the eastern border (border crossing points and/or land border). The mobility can be influenced by the actions of the authorities of the country of origin or transit country as well as their desire to guide migrant flows in their country's territory.

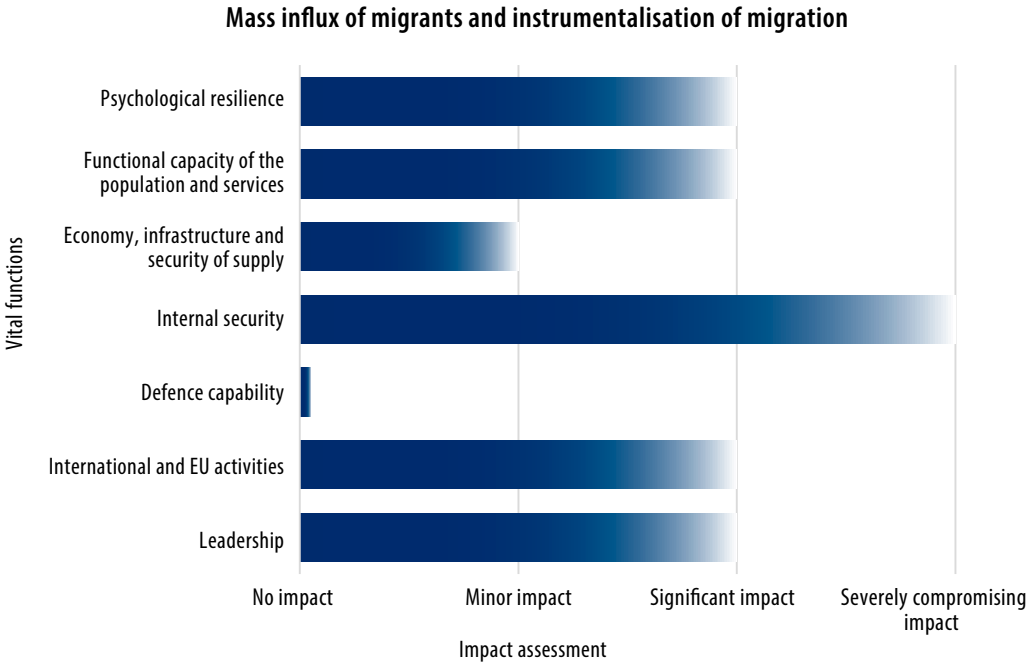
On Finland's eastern border, instrumentalised migration may take the form of the exertion of migration pressure that serves Russia's political objectives. The extent and duration of the potential influence operation may vary. The influence operation may also be carried out on the EU's other external border sections. In this case, Finland may experience migration as secondary migration flows via internal borders. Migration flows to Finland are mitigated by measures restricting movement that are valid or will be adopted in the Schengen Area, such as the introduction of internal border controls.

Concatenation and cascading of impacts and disruptions

An exceptionally high number of migrants is a challenge to leadership. The management of a versatile and quickly developing disruption requires an up-to-date situation picture, timely reactions and good crisis communications. Signals of the situation not being under control may give rise to mistrust towards authorities. It impairs the population's psychological crisis resilience, increases instability in society and can deepen different dividing lines.

A high number of asylum applications creates a backlog in different application processing stages and also requires the allocation of significant additional resources to various authorities. Long waiting periods in reception centres reduce the wellbeing of applicants, can indirectly cause various disruptions and postpone the start of integration for those who are granted residence permits. Furthermore, prolonged waiting periods increase the costs of reception operations significantly. If applicants receiving a negative decision are not returned, the number of people residing illegally in the country increases.

Impact assessment



3.5 Terrorist act or another violent act targeting the structures of society or large crowds

Underlying threat or threats

The aim of terrorist violence is to instil fear among the population and to pressure a party to change its actions. There is no single specific profile for person involved in terrorist activities; instead, there are typically personal exposing factors behind violent radicalisation or other violent action.

According to the Finnish Security and Intelligence Service's threat assessment, the threat of an act of terrorism act has risen in Finland. The most likely threat of an act of terrorism in Finland comes from individuals or small groups who support extreme right ideology or radical Islamist ideology. Acts of terrorism in other European or Western countries can serve as inspiration for terrorist acts in Finland. Persons of interest in counter-terrorism activities are networked both in Finland and internationally. The online environment, such as encrypted messaging applications and discussion groups, are a key platform for violent radicalisation. Some of the persons of interest have received armed training, taken part in an armed conflict or expressed the will to military action.

In addition to persons of interest in counter-terrorism activities, the police has identified concern-raising persons with the ability and will to carry out attacks on large crowds or the structures of society.

Target of the threat

An act of terrorism or another serious violent act can target the leadership of society, critical functions, critical infrastructure, public places, large crowds or people carrying out tasks that are critical to society.

Method of implementation (possible)

The majority of acts of terrorism carried out in Western countries in recent years have made use of edged weapons, vehicles and firearms. Attacks carried out using simple methods are quickly realised and do not require special expertise or long preparations or planning, unlike attacks using explosives. The use of relatively new technology, such as 3D-printed guns and gun parts or unmanned aerial vehicles, is possible in the near future.

An act of terrorism carried out with CBRNE materials is highly unlikely as it requires special expertise.

Concatenation and cascading of impacts and disruptions

An act of terrorism can cause limited or significant immediate and also long-term effects. It can also have impacts beyond the actual act. It can increase fear among the population and the need for security measures. Security measures, on the other hand, may have effects on the people's day-to-day lives and also on work carried out by authorities as resources need to be allocated to responding to a specific threat.

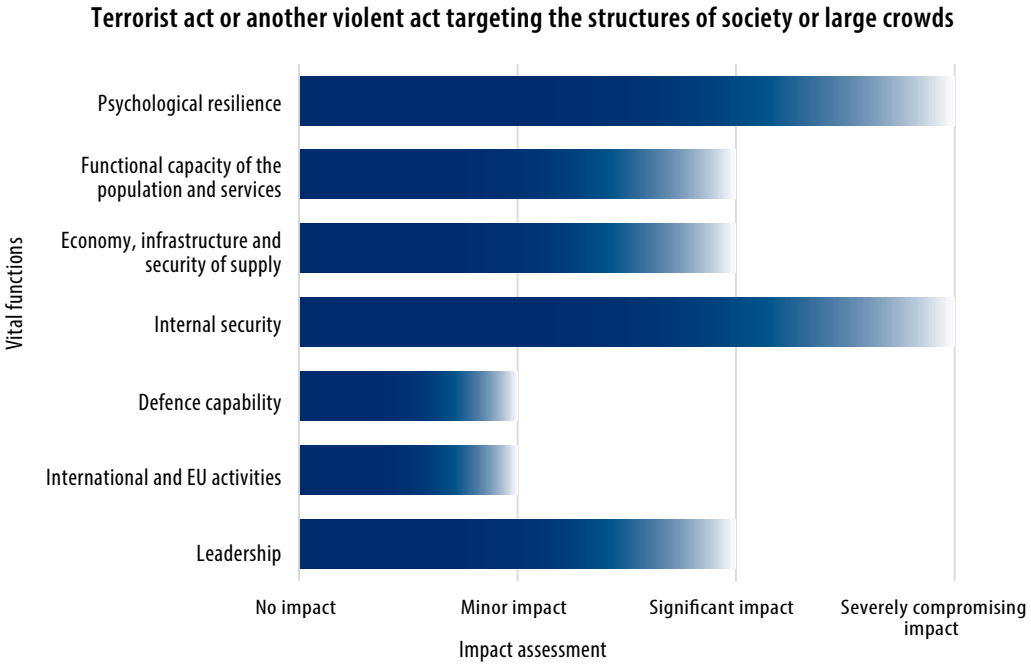
An attack on the key vital functions of society, such as an act targeting telecommunications network and power grid nodes, or an act targeting key persons or the deterioration of social order can cause significant repercussions on the functions of society.

The attack may deteriorate social order, the operating capacity of authorities and the population's crisis resilience. When threats, visible or hidden, are combined with a social media campaign that contains exaggeration and threats, panic and chaos among the population may turn into forms that can shake society.

An attack in a central public space, traffic node or means of transport cause significant harmful effects, both immediately and over a longer term, on the functions of society in the affected area. Direct economic impacts may be considerable and there are costs associated with restoring the attack site. Furthermore, the general public may start avoiding the attack site, which aggravates harmful economic effects. In addition to the immediate impacts, the functionality of society is impaired by the restoration of contaminated areas and the repair of damage, for example. An act of terrorism on the sea (passenger or cargo vessel) would be very likely to involve a sea rescue mission and/or environmental disaster management.

The impacts of a CBRNE attack would be considerable but the threat of such attack is more unlikely than that of attacks executed with easily available instruments. A severe CBRNE situation would cause extensive and/or severe health threats. The situation would have significant effects on people's living conditions and environment. There could also be negative effects on business life. An attack with CBRN materials would likely have a significant psychological impact on the population and, as a result, it would be possible that people who were not actually exposed to the materials in question would seek help in healthcare services.

Impact assessment



3.6 Violent civil disturbances involving large crowds, groups or communities or actions compromising social order

Underlying threat or threats

Different European countries have experienced violent, large-scale civil disturbances, which may have gone on for days. Also people and groups whose aim is to turn the situation into a violent riot have taken part in such disturbances. The aim of the disturbances may be to deteriorate social order, the operating capacity of authorities and the population's crisis resilience. They may also be part of broader-spectrum hybrid influence activities.

In Finland, violent, large-scale civil disturbances and prolonged violent unrest taking place in several places or in different towns and cities at the same time may result in a situation that the police do not have sufficient resources to keep under control.

The factors that increase the risk of unrest include the types of social problems and experiences of inequality that affect people's everyday life, disturbance or complete interruption of the functions of society due to e.g. failure in power supply or the cyber environment, increasing marginalisation, actions of extremist movements, the effect of the social media and the increasingly tense international situation. Over a longer term, stricter climate policy and climate change mitigation measures may also stir unrest.

The deterioration of social order has extensive impacts on the functioning of and trust in society. Organised crime may compromise social order if it gains enough foothold and infiltrates the structures of society.

Target of the threat

Unrest can compromise social order, degrade people's security and sense of security and cause financial damage. Unrest an also affect the functions of society and decrease trust in political decision-making and the actions of authorities.

Method of implementation

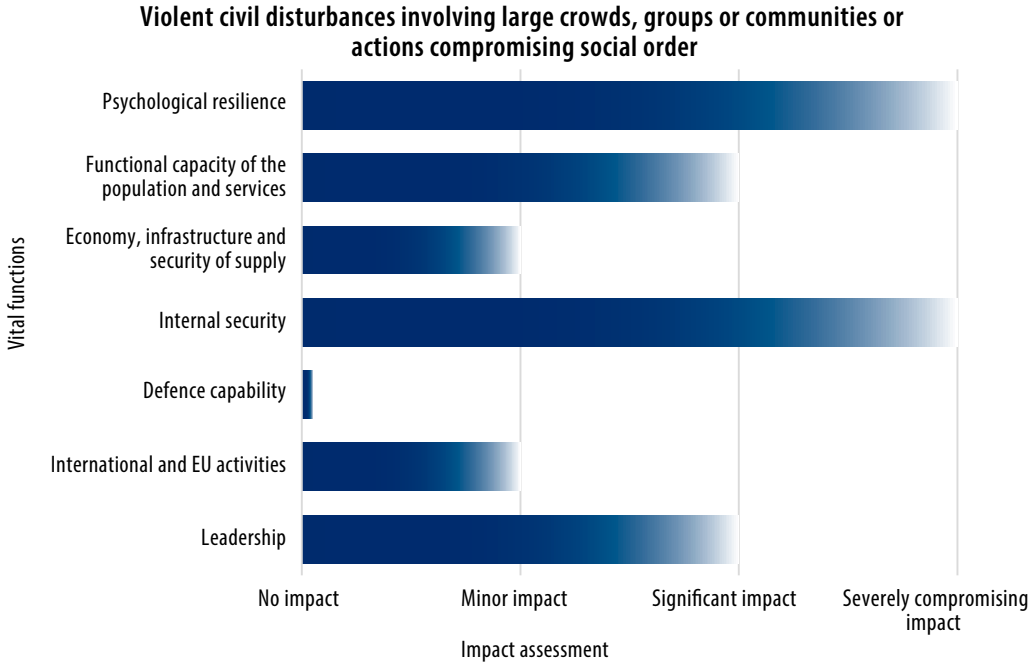
People's dissatisfaction and aggressive release of tensions can be provoked consciously and systematically. Action on social media, hate speech and fake news feed the sense of dissatisfaction among people and may lower the threshold of taking part in violent disturbances. Also peaceful demonstrations can be attended by those agitating violence and unrest on purpose, aiming to turn the event into a violent riot. Disturbances can also involve attempts to invade symbolic premises and locations.

Concatenation and cascading of impacts and disruptions

Unrest has effects on the functions of society, and should unrest expand, on the possibilities of the police to maintain public order and security. If the situation escalates and prolongs, the possibilities of other authorities to provide official assistance may be impaired as their resources are tied to taking care of their own duties.

The events may deteriorate social order, the operating capacity of authorities and the population's crisis resilience.

Impact assessment



3.7 Disruption of the public economy

Underlying threat or threats

The availability of funding for the public sector is a precondition for safeguarding the vital functions of society. Public-sector expenditure is funded primarily through taxes, social security contributions and property income. The deficit between expenditure and income is covered through lending in the international financial market.

Target of the threat

At worst, a disruption of the public economy threatens the state's funding ability. Loss of funding ability may be the result of the state losing its creditworthiness or prevention from using the infrastructure required for obtaining funding.

Method of implementation

The financial risks of the public economy are associated with unforeseen macroeconomic development and the materialisation of diverse contingent liabilities. A negative disruption of macroeconomy may lead to an economic recession and further to an increase in the state's indebtedness and decrease in financial assets through lower asset values. A soft economic situation can cause the state's indirect liabilities to be triggered, thereby further straining the already weakened public economy and national economy on the whole.

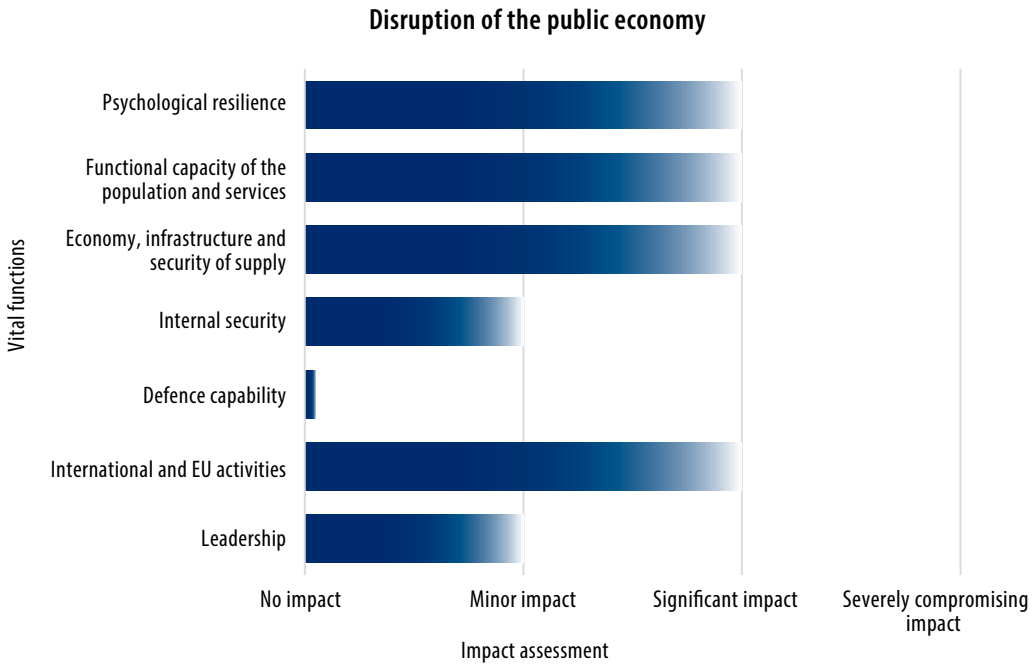
The materialisation of direct, indirect and hidden liabilities depends on economic development. However, the development involves risks. With the increase in indebtedness and indirect liabilities, the state's freedom of action and ability to face negative shocks has weakened in recent years. A severe disruption of economic development may be caused not only by various economic phenomena but also a culmination of international political juxtaposition. The interference of international production chains due to military conflicts or economic sanctions, for example, can, with its cascading effects, impair the operating conditions of economic operators very quickly and substantially. All crises leading to reduced economic activity should they prolong may lead to compromising the availability of funding for the public economy.

Should they materialise, almost all threat scenarios or disruptions described in this national risk assessment would have a negative impact on the public economy as well. In crises, the financial position of the public economy and the state economy in particular is typically at risk of being weakened as the preconditions for economic activity are disturbed. At worst, tax income may reduce strongly while there is significant increasing pressure on public expenditure as unemployment increases, for example. In addition, reacting to disruptions compromising society's functioning usually increases needs for expenditure when aiming to prevent and mitigate the consequences of the crisis. Disruptions of the financial market in particular have typically had strong spillover effects on the public economy as well.

Concatenation and cascading of impacts and disruptions

Safeguarding the state's liquidity and creditworthiness in severe disruptions of the public economy requires exceptional measures relating to financial and monetary policy. The required short-term measures include preparing for prioritising critical payments, for example. In the longer term, it is necessary to make significant spending cuts and increase diverse taxes and levies. These measures may have negative repercussions on the national economy, the livelihood of the population, various public services, the health and wellbeing of the population, and infrastructure.

Impact assessment



3.8 Disruption of the financial system

Underlying threat or threats

Stable and disruption-free operation of the financial market is a precondition for the functioning of society. Disruptions of the financial market compromise the payment traffic, financial and investment services that are absolutely necessary for both the operations of private and public organisations as well as services related to individuals' daily transactions, finances and investments.

Financial market crises can, if not controlled, become economic crisis threatening the entire national economy. They can also lead to a collapse of the creditworthiness of businesses and the state, thereby destabilising the entire society.

Disruptions of the infrastructure of the financial market and prevention of the use of critical systems can compromise the continuity of the vital functions of society. Functioning of the economy and infrastructure, securing the population's minimum subsistence and carrying out security-related duties require the availability and permanence of asset-related information and the ability to make, transmit and receive payments.

Target of the threat

From the point of view of the financial market, threat scenarios have conventionally been divided into the materialisation of financial market risks on the one hand and on severe disruptions of the infrastructure used for providing financial services on the other. The first category includes the materialisation of financial risks relating to the financial market, such as solvency, liquidity, market and credit risks. The second category, severe disruptions of the infrastructure required for providing financial services, is part of operational risks. Examples of these include severe disruptions of information systems and telecommunications and severe issues relating to energy supply.

The distinction between these risks is, however, becoming more vague. Providing financial services has, for the key part, become a digital business. The real-time nature of operations emphasises the importance of the continuous fault-free functioning of information systems. The materialisation of operational risks may lead to such significant financial losses or loss of trust in the market as to compromise the financial continuity of operations.

Method of implementation

From the point of view of the financial market, the threat scenarios can materialise in two ways: either "from outside" the financial market so that they have a negative effect on the financial market, or so that the financial market itself causes a disruption that spreads elsewhere to the economy and society.

International crises of the financial market are a key trend threatening the functioning of the financial system. Excessive risk-taking combined with poor disruption resilience often underlies financial market crises. This means that even an unforeseen individual event can trigger a crisis. The impacts of such a crisis can concern Finland either directly or indirectly.

The development of the world economy involves several uncertainties that can also contribute to triggering disruptions of the financial market. Geopolitical confrontations, disturbances in international trade (due to a pandemic, for example) or political instability can also cause disruptions in the financial market. The exceptionally stimulative monetary policy that has been continuing for a long time supports growth but also exposes the financial market to disruptions. The stability of the euro area is still subject to uncertainties as the result of the previous decade's economic and debt crisis and, more recently, the COVID-19 pandemic and the culmination of these uncertainties due to political developments, for example, cannot be excluded.

With the digitalisation of the financial sector and the changes in the cyber environment, also operational systemic risks, cyber risks in particular, have become more prominent causes for concern. The operating capacity of an individual operator in the financial sector can be compromised due to the materialisation of a cyber risk in addition to business-related reasons. The disruption can then spread to other parts of the financial system and compromise the functioning of the entire market and potentially also paralyse the functions of society to a larger extent.

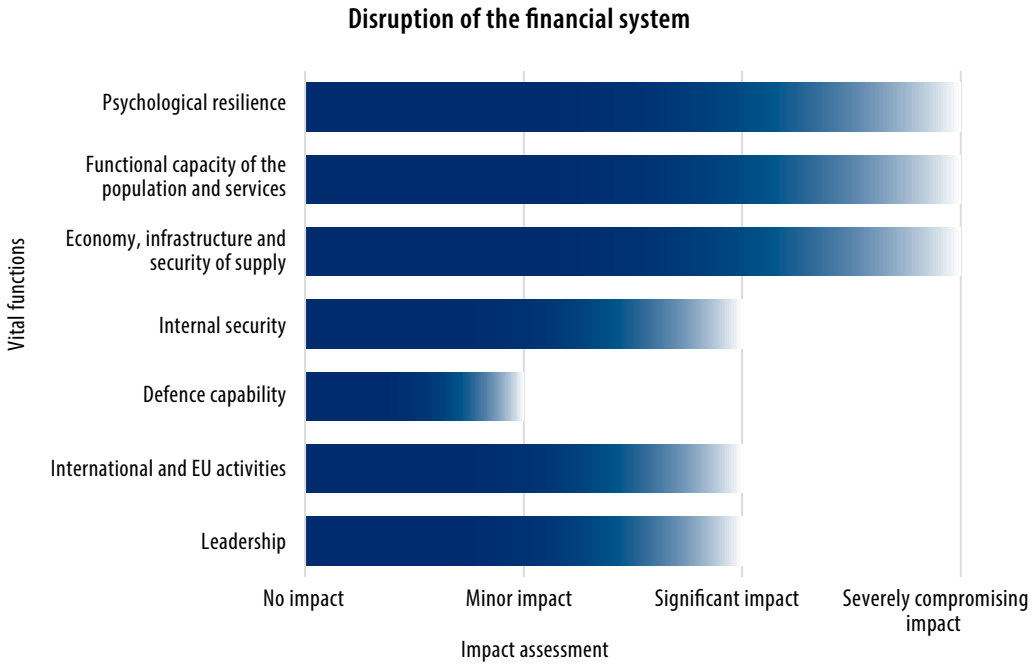
The functioning of the financial market is very bank-driven in Finland. The Finnish banking sector in itself is very centralised and large compared to the GDP. The structural characteristics of the financial system weaken its resilience and strengthen the passing of disruptions between parties. As a result of the structural changes in the banking sector, Finland is still tied to the other Nordic countries and at the same time to disruptions of the world economy as well. Increasing indebtedness of households weakens the ability of households and, at the same time, also the entire national economy to adjust to negative surprises in the economy. High indebtedness may also intensify the effects of economic disruptions.

Should they materialise, almost all of the threat scenarios and disruptions described in this national risk assessment would cause some degree of shock in the financial market as well. In addition, the materialisation of many of the threat scenarios or disruptions could lead to the inability to use the infrastructure required in providing financial market services. The functioning of the financial system as such can also be chosen as the target of hostile influence activities. The information systems and information resources required for providing financial market services are located abroad in key respects. Prevention of the use of these systems can interrupt payment traffic, card payments and securities trading in Finland as well.

Concatenation and cascading of impacts and disruptions

Very strong interdependence is characteristic of the functioning of the financial market, exposing it to rapid spreading of disruptions. A strong negative impact on the rest of the national economy is typical of disruptions in the financial market. Disruptions of the infrastructure of the financial market and prevention of the use of critical systems can compromise the continuity of the vital functions of society.

Impact assessment



3.9 Disruptions in energy supply

3.9.1 Major disruption in power supply

Underlying threat or threats

Power supply may be interrupted or disrupted due to a variety of reasons. Compared to previous years, the threat level of energy system disruptions has changed and increased especially due to the war of aggression started by Russia. Impacts on energy flows have increased the price of energy and impaired energy availability. The threat level of hybrid and cyber operations targeted at the energy infrastructure has risen. The geopolitical situation, increasing demand and climate targets influence the prices of energy products. It is possible that the high price of energy may cause social problems.

In addition to the new threats arising due to Russia's war of aggression, disruptions in power supply in recent years have been caused mainly by trees fallen on power lines due to storms and packed snow. However, these events have been regional. Very extensive and violent storms occur in Finland approximately once or twice per decade but as more and more of the power grid is being converted into underground cabling, the impacts of strong winds on power supply are constantly decreasing. Other possible threats include extensive technical or human-caused disruptions in power generation, transmission or distribution. There may also be disruptions in the availability of power plant fuels or power import connections.

Energy infrastructure may deteriorate over a longer term as investment decisions have become more complicated due to unpredictable energy and climate policy, for example. In addition, power plant usage rules may also influence the existing infrastructure's capability of responding to disruptions. A threat to power generation also lies in the closing down of unprofitable power plants, which particularly concerns condensing power station operating on market terms. The availability of power via international connections can also be exposed to influence activities due to political reasons, both in emergencies and normal conditions.

The progress of climate change can increase the risk of major disruptions in power supply, especially due to the reduction of ground frost and the increase in the exposure of trees to wind damage and packing of snow. Freezing rains are also likely to become more common. They increase the exposure of the power distribution infrastructure to damage.

Target of the threat

Disruption-free availability of power is particularly critical to companies, the functions of society and security of supply. Should it materialise, a major disruption in the power system may cause impacts on many different sectors of society. Impacts become worse in line with the duration of the blackout. Returning operations to normal may take a long time even after a short blackout.

From the general public's point of view, a major disruption in the power system would influence the smooth running of everyday activities, the heating of buildings, the availability of services and food supply. From a business perspective, many industrial processes would probably stop due to the inoperativeness of information networks and traffic disruptions. The actions of authorities would also become significantly more difficult at the same time when the need for services in various public sector branches would increase.

Method of implementation (possible)

The reasons of power supply disruptions include exceptional weather phenomena, several simultaneous, concatenated, severe combinations of technical faults and damage, major accidents, shortage of electricity (shortage of power), market disruptions (materials, fuels, industrial action), human errors, hacking of information networks, sabotage or terrorism. The situation becomes serious if the disruption affects tens of thousands of customers in a region simultaneously, the stability of the power system is compromised or the power system breaks down partially or entirely (a major disruption in the power system).

Even in normal conditions, blackouts lasting for hours may occur unexpectedly for various reasons, such as storms. Due to Russia's war of aggression, the threat level has increased regarding the availability of energy, price stability and the security of energy infrastructure.

A disruption in the availability of electric energy due to insufficient power generation or import is not easy to rectify in all cases. If there is no adequate backup production capacity or possibilities of importing electric power, the only way to react to the situation is to limit the overall consumption of electricity, possibly using circulated power interruptions. During the winter peak consumption, approximately one-fourth of the need for power is covered through imports.

With regard to the national grid, two simultaneous major disruptions during peak consumption is a major risk. Simultaneous failure of a major nuclear power plant and import connection could be an example of such a situation. This may lead to a situation in which the joint use of the entire power system collapses, thereby making the entire national grid fall down. It can take days to get the grid up and running again.

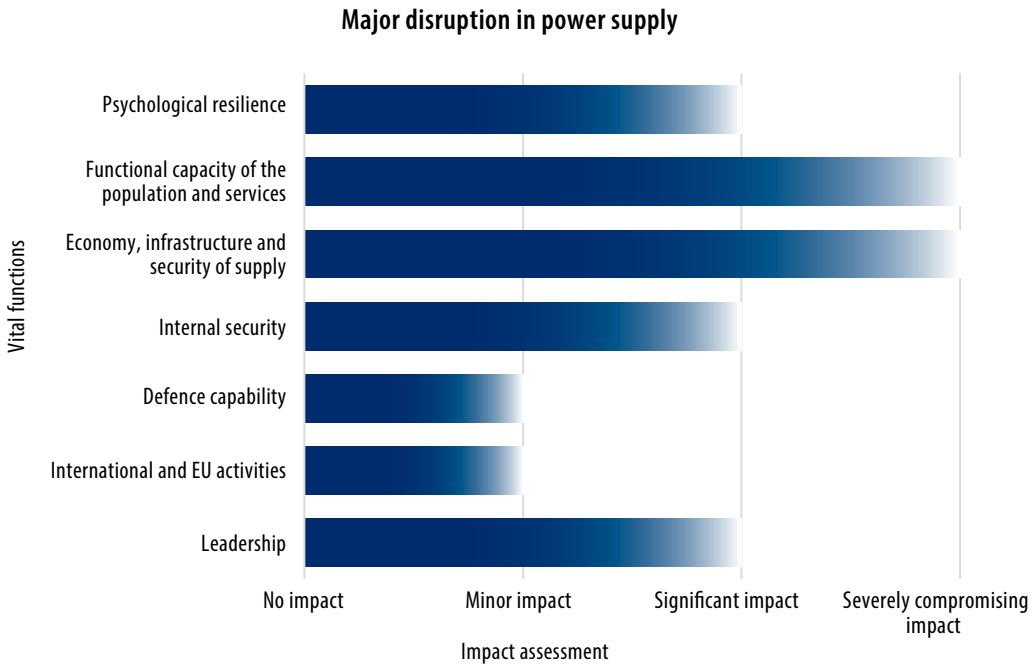
The worst weather-related scenario is an exceptionally strong storm when there is no ground frost, with the fiercest impacts affecting the southern and central parts of the country. In this case, especially the power grid that is not installed as underground cables would be damaged and there would generally be long blackouts outside densely populated areas. However, even in the worst case, the impacts would likely remain regional.

Concatenation and cascading of impacts and disruptions

Society is very dependent on electric power. Even short (even under 10 seconds) disruptions in power supply may cause problems to some industrial processes. If the interruption in power supply is prolonged, in practice most functions of society are greatly disrupted or cease to function altogether. As a short-term risk scenario, it should be noted that the increasing price of energy may cause, in addition to company- and sector-specific challenges, the concatenation of risks from one sector to another and, as a worst-case result, a wave of lay-offs and dismissals. This may happen if the negative economic impacts resulting from higher costs start spreading from one sector to another.

Power supply problems may also influence households and the functional capacity of the population.

Impact assessment



3.9.2 Severe disruption in the availability of fuels

Underlying threat or threats

Procurement of oil, coal, gas and nuclear fuel depends entirely on imports. Energy policy aims to reduce the dependence on imports, but a significant share of the procurement of fuels will be based on imports also during the next few decades. In energy policy, preparations should also be made for hybrid influence activities aiming to undermine energy security by manipulating prices or restricting availability, for example.

The availability of fuels has a major effect on e.g. primary production, food and fuel supply transports, public transport, logistics in general, and energy production.

The use of domestic fuels is based on an extensive production and logistics chain. With regard to biomass, for example, the chain includes harvesting, storage (drying), transport and chipping. Disruptions in any part of this chain can cause the entire delivery to be interrupted, thereby disrupting energy production.

New and alternative sources of energy becoming more common sets major challenges also for the system based on conventional emergency stockpiling and regulation mechanism. Stockpiling capacity for the new energy sources might be non-existent, and stockpiling them can be difficult.

The reliability of distribution also has significant impacts on the availability of fuels to the end users. Distribution being exposed to disruptions may be an even bigger risk than the risk of running out of the actual fuel.

The geopolitical situation, increasing demand and climate targets influence the prices of energy products. It is possible that the high price of energy may cause social problems.

Target of the threat

The risk for the availability of oil, coal and natural gas is the prevention of transport. A disruption in the supply of imported fuels lasting several months would significantly hamper the generation of heat and electricity, industry and, with regard to oil, the operation of vehicles and machinery.

The risk facing the availability of domestic fuels is challenges in logistics and in particular stockpiling.

A severe disruption in the availability of fuels may have extensive impacts on other vital functions of society, such as the actions of authorities.

Method of implementation (possible)

Prolonged prevention of maritime transport to Finnish ports is possible during exceptionally harsh winters. An exceptionally harsh winter would impose increasing requirements for the adequacy of ice-breaking fleet as vessels meeting new environmental regulations may have poorer ice performance.

Long-term economic or labour market disruptions affecting Finnish shipping or ports would also have significant impacts on Finnish shipping. More limited impacts on Finnish shipping or the functioning of ports could be caused by individual threats relating to international crime or terrorism, telecommunications or cyber security problems affecting the logistics system or major accidents associated with shipping or ports.

The majority of Finland's internal logistics is based on road transport; without fuel distribution and related fuel deliveries, logistics transports will practically cease until traffic fuels are available again.

The availability of fuels is particularly emphasised with regard to the availability of Finnish fuels. The production of domestic fuels is very decentralised, and its logistics is comprised of very many parts. The related risk level has increased as the only remaining alternative to solid fuels is different forms of wood-based fuels. A ban on the use of coal will enter into force on 1 May 2029. The use of fuel peat is again increasing as it replaces imported fossil fuels and wood imports from Russia.

For decades, Finland's natural gas supply relied solely on the pipeline from Russia and the main threat related to natural gas was considered to be the scenario that deliveries from Russia to Finland would be interrupted for several months. Imports of natural gas to Finland were discontinued in summer 2022.

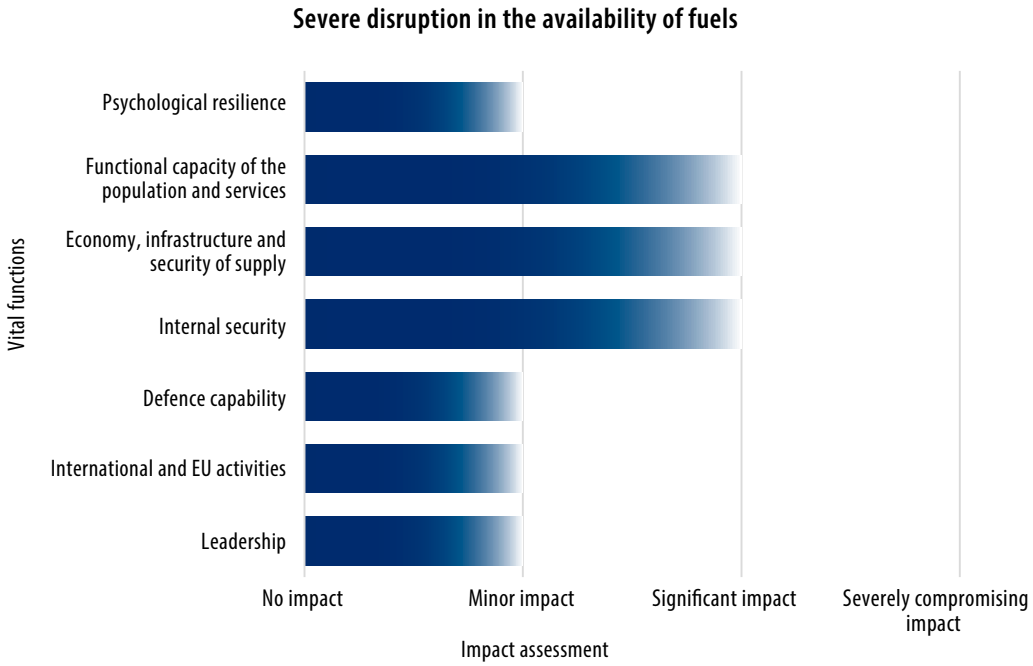
A liquefied natural gas (LNG) import terminal network has been built in Finland. A natural gas transfer pipeline between Finland and Estonia was commissioned in 2021. Together, these two cover Finland's need for natural gas. In addition, Finland's security of supply of natural gas is based on the use of substitute fuels.

Concatenation and cascading of impacts and disruptions

Disruptions in fuel deliveries can be reflected in power and heat production, business, transports and housing. Extensive disruptions can have significant cascading effects. Problems with the availability of traffic fuels would also affect the deliveries of Finnish fuels.

Even now, it is not possible to distribute fuel adequately from the distribution points if the points have no power and telecommunications connections required for payment traffic. Energy supply will not be a straightforward purchase transaction in future, either, but a service event requiring more extensive information systems. These information systems are decentralised and their production can be located abroad or in cloud services.

Impact assessment



3.10 Disruptions in information and communications networks and services

Underlying threat or threats

In order to function, the digital services of society need secure and reliable connections and information systems. This dependence entails risks, such as cyber threats.

A cyber threat refers to a potential situation, incident or activity, which may damage or interfere with network and information systems, the users of these systems and other people or otherwise have a harmful impact on them. The increasingly tense international situation has raised the threat level in the cyber environment. Supply chain disruptions and the availability of components influence system maintenance.

Possible other causes of disruptions in communications services and networks could include, for example, data security incidents, communications service malfunctions affecting a limited group of users or geographical area, breakdowns and invalid settings of network devices, extreme weather conditions, intentional disturbing of communications, vulnerabilities of network devices and communications services and their exploitation, crime and terrorism, and major accidents. Intentional disturbing or the activities of international criminal organisations may also be part of hybrid influence activities by a state or other operator.

Without functional communications services and networks, many services of trade and society are not available or their use is at least hindered significantly. Many of the people's day-to-day services and routines also depend on the reliable functioning of communications services and networks.

From the point of view of managing society and the psychological crisis resilience of the population, it is important that communications between people, emergency calls, authorities' communication channels, public administration's digital services and mass media also function in society's severe disruptions and emergency conditions. Disruption-free functioning of radio frequencies is also important for the functioning of society.

Target of the threat

Several services vital to society, such as payment traffic and power networks, depend on the functioning of communications services and networks.

For example, IT services and production control systems of businesses, and partly those of public administration, too, may depend on telecommunications connections to foreign data centres. Therefore, severe, extensive or prolonged disruptions in the functioning of communications services and networks constitute a significant threat to the functioning of society.

A significant share of things, devices and means of transport are connected to the internet and their operation is controlled through the processing of digital data. More attention must be paid to their security.

Communications services particularly critical to society include emergency calls and the transmission of authorities' emergency warnings and targeted official announcements to the population.

Communication networks and services that enable authorities' communications are also critical. Similarly, international telecommunications connections and core networks belong to the most critical communications network infrastructure.

In radio frequency disruptions, it is particularly important that there are no disruptions in the frequencies used for emergency and security traffic and authorities' networks, mobile networks, mass media transmission connections and energy supply and civil engineering remote control networks.

Time and geospatial data received via satellites may also be targeted with unintentional or intentional disturbance. This time and geospatial data is used in many functions critical to society, such as transport, power distribution, actions of authorities and the financial sector.

Military national defence is also partly dependent on the infrastructure of society.

Social media services play a significant role in people's interaction and recreation and organisations' communications.

Method of implementation (possible)

Telecommunications or information systems, applications or related technical components may become damaged. The disruption may be caused by a device, software or application failure or intentional external action. Such disruptions are usually unpredictable. They have an immediate impact on the quality of the service offered. They can also be security threats.

Hardware and software failures are also common causes of malfunctions.

Underlying reasons for disruptions also include, for example, accidents related to natural phenomena or human activity.

Approximately 10–20% of severe incidents in the functioning of communications networks and services result from power supply disruptions. These disruptions also usually last longer than other faults.

Under normal conditions, radio frequency disruptions are usually caused by a system malfunction or other technical fault. The disruptions can be caused by an unintentional technical failure or intentional influence activities.

Activities disturbing network and information systems may be carried out by criminals, terrorists or state operators. In the background, there may also be political reasons or individual instigators' will to show off.

Data breaches, intelligence collection in information networks, denial-of-service attacks, other attempts to damage information networks and network infrastructure and other disturbance, targeted at the State of Finland or society, are examples of such activities.

At worst, targeting health and social services, energy production or industrial control systems with a cyber attack may cause material losses and loss of human lives.

The disruption-free functioning of both communications networks and services and the basic internet infrastructure, such as domain name service systems, plays a key role in disruption-free and functional electronic services.

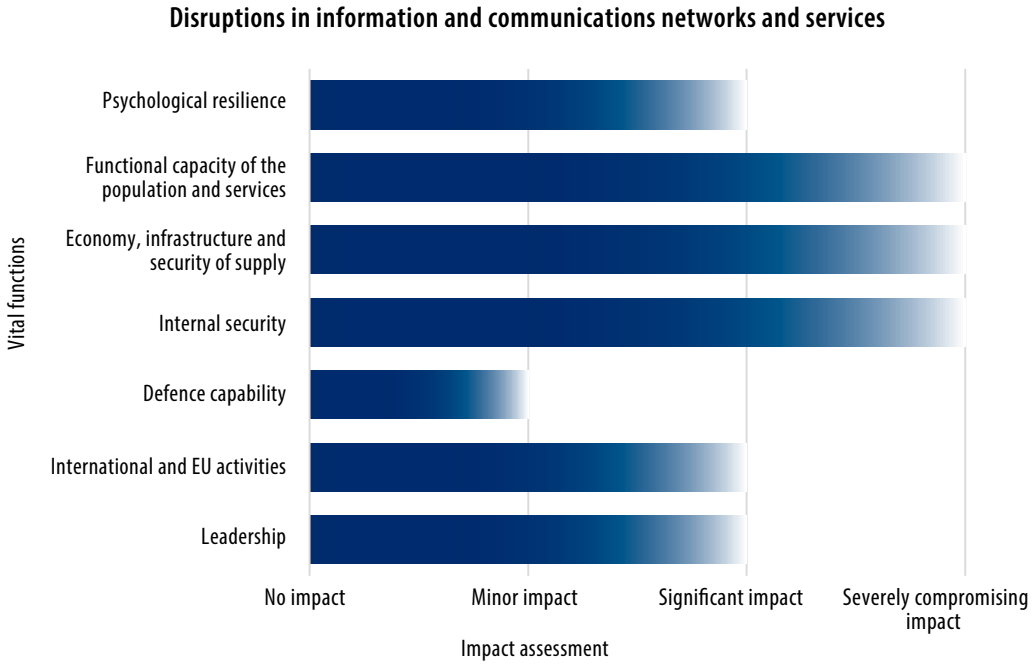
Concatenation and cascading of impacts and disruptions

The interdependence of various electronic systems and services may cause the concatenation and cascading of faults and disruptions. A disruption in the functioning of communications networks or services affecting power generation, for example, would have extensive impacts on society.

Disruptions in individual network services could be a risk to the availability of services if a considerable number of other services depend on the functioning of a single service, such as authentication services.

An extensive or long-lasting disruption in the functioning of communications services, networks, the .fi domain name services or radio frequencies would deteriorate public trust in the electronic services of different sectors, for example, and cause disruptions in the maintenance or security of services in society.

Impact assessment



3.11 Disruptions in the continuity of transport

Underlying threat or threats

Changes in the European security political situation have caused disruptions in the transport system. Not all of the normal transport routes used in Finland's foreign trade have been available as the security situation in Europe has changed. Nevertheless, transports have been directed to new routes on market terms.

Finland's security of supply is based on the functioning of transport chains. The reliability of transport chains is a cornerstone of security of supply. Measured in tonnes, maritime transport accounts for approximately 90% of the exports and nearly 80% of imports in Finnish foreign trade.

In recent disruptions, the resilience of Finnish export and import companies has proved to be good. The situation is similar in most of other developed countries.

The transport volumes of Finnish shipping are so high that replacing them with road, rail or air transport would be extremely difficult.

Severe disruptions related to maritime transport are immediately reflected in Finland's economy and security of supply. Key product groups for security of supply and the functioning of society include, for example, fuels, food, chemicals, component, spare parts and pharmaceuticals.

The reliability of transport within the country is important especially with regard to food and pharmaceuticals.

The COVID-19 pandemic caused disruptions in the global container transport system, among other things. These disruptions have been reflected in industry and trade, too.

Transport infrastructure and its condition and traffic capacity also influence security of supply.

Target of the threat

Disruptions in maritime traffic in the Baltic Sea have significant impacts on transports related to Finland's security of supply and foreign trade. Disruptions in the international transport system or the availability of Finland's nearby air space affect security of supply, the smooth and disruption-free running of foreign trade and Finland's international accessibility.

Distribution issues with power or fuels or telecommunications disruptions affecting Finnish shipping or ports would have severe impacts.

In addition, long-term labour market disruptions affecting Finnish shipping or ports would also cause severe impacts.

If a critical railway section were out of use for a long time, it would be difficult to find replacement solutions for rail transport. When it comes to transport structures, it is important that critical bridges can be used.

More limited impacts would be caused by individual threats associated with international crime or terrorism or major traffic accidents.

The transport system can also be influenced through cyber attacks, data breaches, sabotage and malware.

Method of implementation (possible)

Russia's attack against Ukraine in February 2022 has shown that the security situation can change quickly. However, the likelihood of disruptions affecting maritime traffic in the Baltic Sea or availability of Finland's nearby air space due to changes in the international or European security situation is difficult to estimate.

Long-term economic or labour market disruptions would also have impacts on the transport system.

Extensive freezing of the Baltic Sea or otherwise difficult ice conditions, should they continue for a long period, would cause problems to Finland's foreign trade and security of supply. The insufficient renewal of Finland's ice-strengthened tonnage in traffic and the ice-breaking fleet constitutes a threat to the functioning of the transport system and transports that are important for security of supply.

There is also the risk of the ice-breaking fleet being reduced due to milder winters being common and therefore a shortage of fleet during a winter with harsh ice conditions. It is estimated that extreme weather phenomena will increase. That is why particular attention must be paid to exceptional circumstances. As a result of rapid climate warming, there will be less ice cover in the Baltic Sea, but difficult ice conditions will continue to occur.

Significant but limited impacts could be caused by individual threats relating to international crime or terrorism affecting Finnish shipping or the functioning of ports, telecommunications or cyber security problems affecting the logistics system and major accidents associated with shipping or ports.

Global disruptions outside the transport sector may also cause disruptions in transports.

Russia's overflight restrictions have affected Finland's international aviation. Finland's international accessibility has reduced compared to the time before the coronavirus pandemic and Russia's attack against Ukraine.

Significant restrictions to the use of air space can be caused as a result of an ash cloud caused by a volcano, for example. Long-term economic or labour market disruptions affecting airports or national airlines would also have significant impacts on Finnish aviation.

Significant but limited impacts on aviation would be caused by an act of terrorism, telecommunications and cyber security issues in flight control systems, power supply or aviation fuel distribution issues and major aviation accidents.

Concatenation and cascading of impacts and disruptions

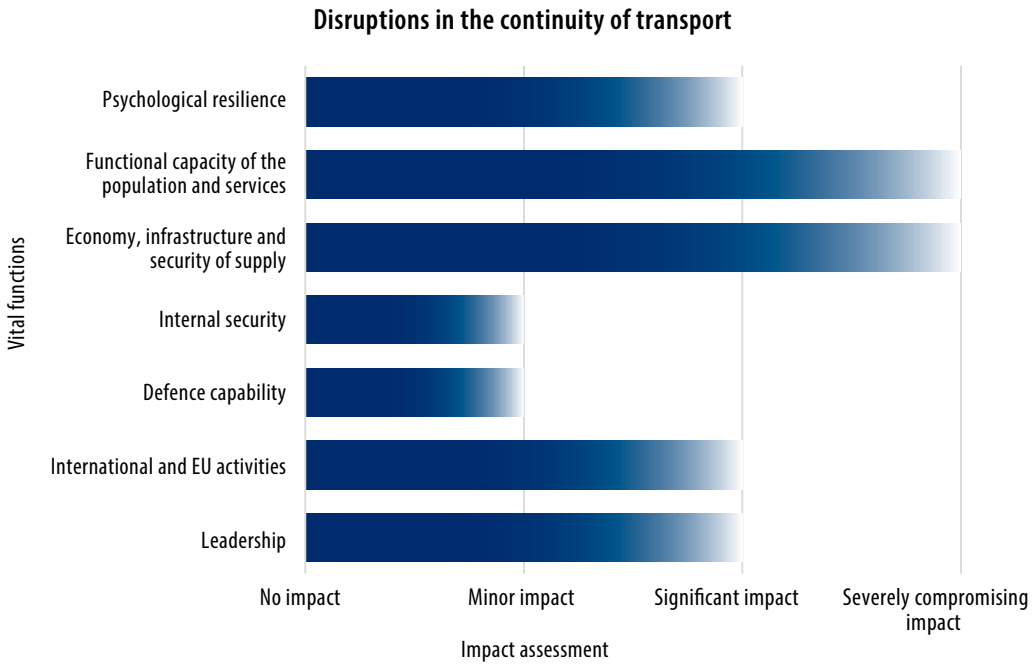
Power and fuels, information systems and telecommunications networks and services are basic prerequisites for the transport system. Disruptions in infrastructure require cross-sectoral preparedness.

A power failure in the national grid would have significant impacts on rail traffic. Power supply disruptions would also interfere with the distribution of traffic fuels. As the share of electric vehicles increases, disruptions in power supply would directly affect the supply of vehicle motive power.

Severe maritime shipping disruptions would cause problems in fuel supply, which, in turn, would be reflected in traffic fuel distribution and other road transports. This would affect daily consumer goods trading. Disruptions in the availability of goods would reduce the functional capacity of the population and the operating capacity of society. Disruptions in transport chains would also quickly have impacts on medicine supply and health and medical care. Disruptions in export transports would be quickly reflected in the economy.

Severe disruptions in maritime transport would influence supply of daily consumer goods and food, the availability of industrial spare parts and components and the operating conditions of industry.

Impact assessment



3.12 Disruptions in health security

Disruptions in health security refer to all disruptions that have a direct or indirect impact on people's health. The World Health Organization's (WHO) International Health Regulations (IHR) have been created to prevent global health threats. Finland approved the IHR in 2005. In Finland, the National IHR Focal Point is the Finnish Institute for Health and Welfare. The IHR focuses on the prevention of contagious diseases but also covers all cross-border threats that influence people's health. As a result, chemical threats and radiation hazards are also considered health threats. In health security disruptions, attention must be paid to the health of people, animals and the environment, as there is a strong interdependence between them.

The key aspect of the management of health security disruptions is to prevent them. The underlying factors contributing to the emergence of new contagious diseases are changes in the ecosystem and land use, agriculture, urbanisation, international travel and trade. As a part of this whole, attention must also be paid to the safety and security of food and tap water. Chemical threats and radiation hazards also require national capabilities and special expertise and affect people's health, animals, the living environment, food and household water. The COVID-19 pandemic that broke out in 2020 has been a practical demonstration of the extensive impacts of health security disruptions on society. In 2022, WHO also initiated negotiations on a new international accord on pandemic preparedness and response.

Health and social services are very dependent on competent personnel. In all health security disruptions, the healthcare capacity becomes overburdened easily as its operations are very streamlined even in normal conditions. Prolonged disruptions also usually cause care and service backlog. Furthermore, healthcare and social welfare are dependent on functioning infrastructure, support services, healthcare equipment and pharmaceuticals. Disruptions in these functions can also be critical. An example of this is a large-scale disruption in medicine supply. The highly centralised global production of pharmaceuticals especially in China and India and the related logistics are susceptible to disruptions.

In healthcare and social welfare, critical activities built on individual operators can be identified, the vulnerabilities of which may become risks for society. It should be noted that currently, Finland does not have such production of pharmaceuticals or availability of raw and packaging materials that domestic production could meet all needs of healthcare and social welfare. The production of various devices, such as medical devices, or other critical products requires components and any disruptions related to the production of these components may have significant impacts. The availability of products may decrease significantly or the critical maintenance or repair of devices may become impossible.

3.12.1 Antimicrobial drug resistance

Underlying threat or threats

Antimicrobial drug resistance refers to microbes becoming resistant to pharmaceuticals used in the treatment of infections in people and animals (antimicrobial drugs, or antibiotics). Antimicrobial drug resistance is not a new phenomenon, but large-scale use of antimicrobial drugs in people and animals, rapidly increased tourism, movement of foodstuffs and animals between countries and continents and the environmental problems related to the production of antimicrobial drugs, especially in developing countries, have deteriorated the problem with resistance. Currently, there are microbes resistant to all antimicrobial drugs in use in the world, meaning that there are no more effective drugs for treating infections caused by microbes of this type.

Although antimicrobial drug resistance in Finland and other Nordic countries is very good in global comparison, the most recent threat estimates regarding the global antimicrobial drug resistance of bacteria paint a gloomier picture of the development. As this is a cross-border health threat, more attention must be paid to there being, now and in the future, effective treatment available for controlling bacterial infections because uncontrolled, their destructive power is a significant factor jeopardising wellbeing – and, as a result, the stability of society.

If the antibiotics resistance of pathogenic bacteria isolated from production animals increases, it may increase production costs and losses, which have effects on the price of food and, at its worst, even its availability. Household pets live in close contact with people, and bacteria and resistance factors easily pass between people and pets.

Finland's extremely small pharmaceutical market is vulnerable to disruptions. Compulsory stockpiling regulations require inventories corresponding to the consumption of 6 months (public healthcare) or 10 months (pharmaceutical companies) for human antimicrobial drugs. Only critically important drugs for production animals are subject to compulsory stockpiling, but the required inventory level only equals the average consumption for three months. The aim of this stockpiling is to reduce problems caused by disruptions in the international availability of antimicrobial drugs.

In global crises, the demand for ordinary antimicrobial drugs increases while their availability globally decreases due to increased demand. The production of old but efficacious antimicrobial drugs is centralised and they are manufactured by few pharmaceutical producers. In addition, even if there are several products with the same active ingredient in the market, it is possible that the active ingredient of all of these products is a single factory outside the EU.

Target of the threat

The impacts of antimicrobial drug resistance can be seen especially in the Finnish healthcare system as well as care institutions and the patients treated in them. However, the threat affects everyone. Antimicrobial drug resistance may influence travel and travellers, too, as well as production animals and people working with them. As a result, the threat also affects food production and thus consumers. When it comes to animals, also pets and their owners should be taken into account. According to Statistics Finland, in 2016 approximately one in three households had a pet. Consequently, antimicrobial drug resistance has a myriad of impacts on the Finnish population.

Method of implementation (possible)

There are several potential methods of implementation to be taken into account.

The first scenario is that a microbe that is fully or almost fully resistant to all antimicrobial drugs spreads in acute hospitals and long-term care institutions. In acute hospitals, the microbe causes infections in immunocompromised patients, the treatment times become longer and some patients die from the infections. The microbe is of such nature that it is difficult to eradicate it from the care institutions. The microbe survives in the long-term care institutions and then returns to the acute hospitals with patients from them.

The second scenario is that a microbe that is fully or almost fully resistant to all antimicrobial drugs with increased virulence spreads around the world. Finns catch it abroad or in Finland. Due to antimicrobial drugs being inefficacious and the microbe's virulence, otherwise healthy patients succumb to infections. A microbe that is very resistant to antimicrobial drugs causes infections in outpatients that can no longer be treated with drugs used in ambulatory care. This burdens hospitals.

The third scenario is that for some reason, there is a long interruption in the production of the antimicrobial drug. There are no replacement producers or due to it being slow to scale up the production process, it takes six to twelve months for the new producers to commence operations. This makes treating infections in people or animals more difficult or prevents it.

The fourth scenario is that resistant pathogens becoming more common in production animals or pets may lead to a situation in which there are no longer any potent antimicrobial drugs for treating infections in animals. If the infection cannot be treated without antimicrobial drugs, the remaining alternative is to put the animal down. This causes losses to animal production and also has effects on food production. In this case, there may be political pressure to amend the legislation restricting the use of antimicrobial drugs.

Concatenation and cascading of impacts and disruptions

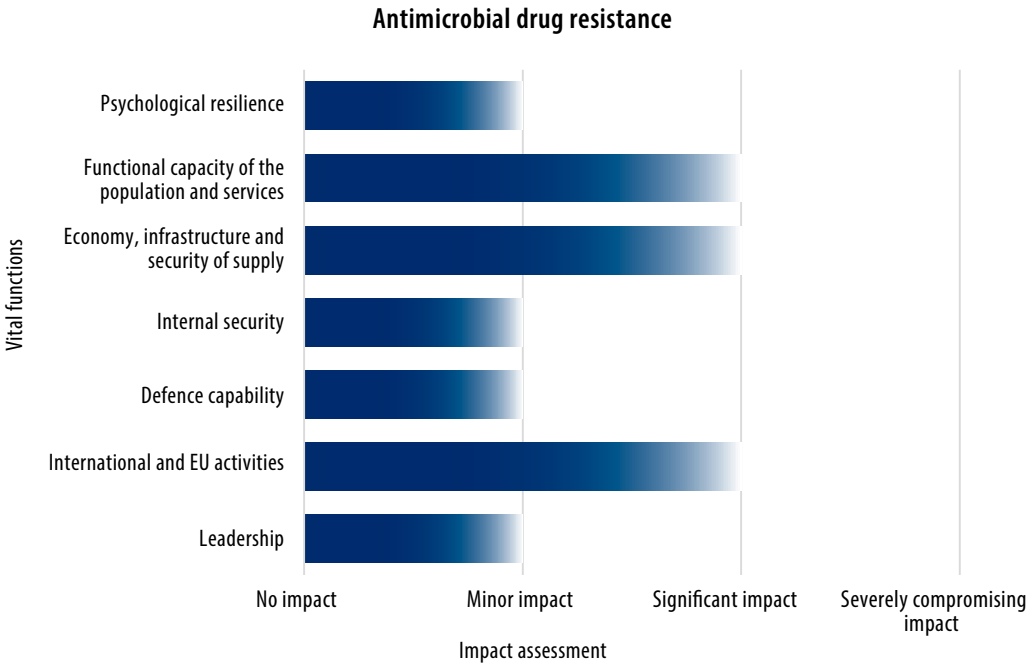
In Finland, there is currently relatively good and comprehensive monitoring of antimicrobial drug resistance in place. However, problem-causing microbes usually originate abroad, and not all countries are capable of monitoring the development of resistance. However, it is possible for a microbe that is fully or almost fully resistant to antimicrobial drugs to spread unnoticed, especially among potential symptomless carriers. Detecting and combatting an epidemic that takes place in the area of several different care institutions is difficult in Finland as well.

The development of antimicrobial drug resistance and problems with the availability of antimicrobial drugs may separately or jointly lead to a situation in which efficacious antimicrobial drugs are not available for treating infections in people and/or animals.

During a virus pandemic, antimicrobial drugs are needed to treat the sequela. Antimicrobial drug resistance and/or problems with the availability of antimicrobial drugs increase the mortality of the pandemic.

A security political crisis affecting Finland directly or indirectly would probably significantly interfere with merchant shipping in the Baltic Sea and aviation to Finland, which would hinder the availability of antimicrobial drugs. An armed conflict in Finland can significantly increase the need for antimicrobial drugs.

Impact assessment



3.12.2 Pandemic or similar widespread epidemic

Underlying threat or threats

Current knowledge indicates that, of respiratory tract viruses, especially influenza and coronaviruses can cause pandemics. One of the starting points of the World Health Organization's (WHO) health security strategy is that there must be preparedness also for the threat of pandemic caused by unknown or re-emerging (e.g. ebolavirus) pathogens. A pandemic refers to an epidemic that spreads fast across the world. An influenza pandemic refers to a widespread epidemic caused by a new subtype of the influenza A virus. In a pandemic, morbidity can be higher than in a normal seasonal influenza.

According to international estimates, 25–35% of the population may fall ill, while morbidity in seasonal influenza is 5–15%. In addition, the clinical picture can be more difficult in a pandemic than in seasonal influenza. Influenza pandemics have broken out every 10–40 years and the most recent pandemic is the one caused by the novel coronavirus (SARS-CoV-2). Coronavirus pandemics may be caused by new, previously unknown coronaviruses transferring either directly or via an intermediate host to people. During a pandemic, also completely healthy adolescents and adults suffer from severe forms, not only those in risk groups based on a disease or age. Continuous monitoring, prevention and preparedness for health threats is absolutely necessary for being prepared for various pandemic-related threats.

Target of the threat

Pandemics are a significant risk from society's point of view as a large group of people will fall ill and many will succumb, in addition to which there will be significant economic and social impacts on society and its operational reliability. A pandemic may also affect security and the stability of society. The infection spreads easily between people, the population has no resistance against the new virus and there is no preventive vaccine if the pandemic breaks out.

A pandemic lays a significant burden on health and social services. Nevertheless, a large number of people falling ill, extensive quarantines and potential restrictions on the entry into the country affect all sectors of society and their operational reliability. A pandemic challenges people's crisis resilience and, should it be prolonged, causes both psychological and social problems. In a pandemic, it may be necessary to restrict people's fundamental rights if high morbidity threatens to exceed the carrying capacity of healthcare and the operating capacity of society. Adopted restrictions also have impacts on the functioning of society, people's wellbeing and economy. The likelihood of a new pandemic outbreak is high.

Method of implementation (possible)

The pandemic outbreak method may vary and the detection of a new virus may happen with a delay depending on its symptoms. The magnitude of the risk and severity of the pandemic are impossible to estimate in advance. Groups at risk of the severe forms of the disease may also vary. It always takes time to get research data. The symptoms of pandemic influenza and pandemic coronavirus disease are usually similar to those of seasonal influenza and seasonal coronavirus disease but the symptoms and sequela can be far more severe. Preventing the spreading of the influenza virus and coronavirus is successful only to a very limited extent. However, in practice the spreading can be slowed down with various restrictions.

With currently available means, it is not possible to prevent influenza infections but antiviral pharmaceuticals developed against influenza can shorten the duration of illness and the possibility of sequela. As a result of the ongoing pandemic, pharmaceutical development is carried out very actively. The appropriate use of respirators can also provide protection against infections, especially in close contact.

Of the avian influenza viruses, viruses of subtypes A/H5, H7 and H9 have caused infections among people. The majority of the infections have been caused by the H5N1 and H7N9 viruses. Cases of avian influenza occur continuously around the world, but significant transmission of the virus from one human to another has not yet been found. An influenza virus originating from birds or pigs may mutate so that it transmits from one human to another and causes a pandemic. The most recent influenza pandemic was caused by a new subtype of the influenza A (H1N1) virus with structures of influenza A strains typical of pigs, birds and humans, emerging in 2009.

The production of new kinds of vaccines based on genomic data (mRNA vaccines) can be started immediately when the genomic data of the virus causing the pandemic has been determined. The production of genome-based vaccines is faster than that of vaccines based on earlier vaccine technologies. New genome-based vaccines can also be modified easily when new virus variants emerge. The quick production of vaccines decreases the disease burden caused by the pandemic, especially by reducing the severe forms of the disease. This requires efficient international cooperation.

Concatenation and cascading of impacts and disruptions

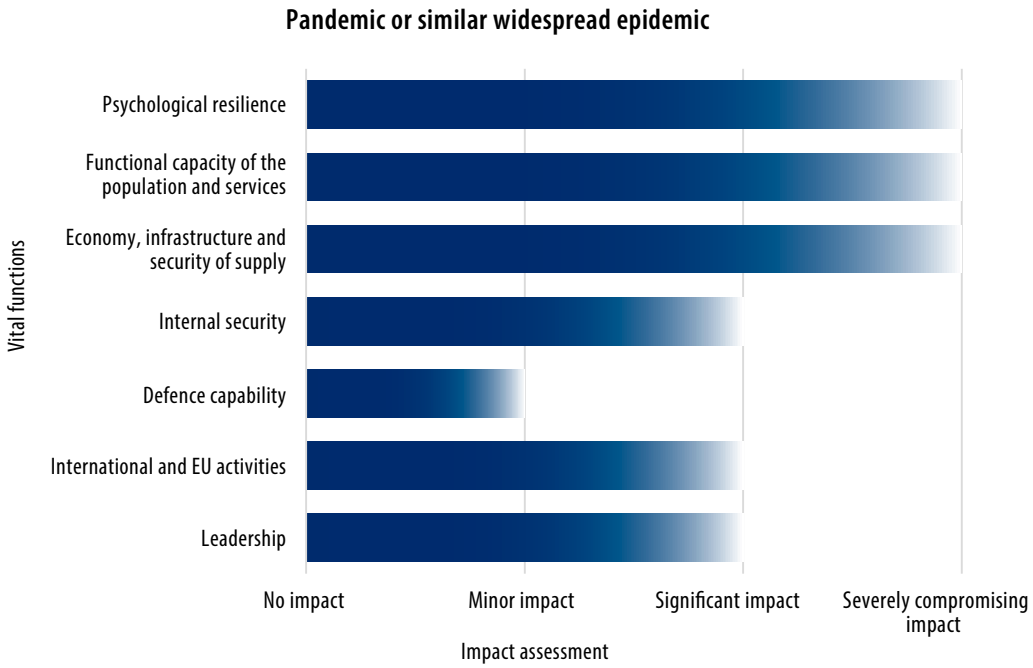
A pandemic can threaten almost all vital functions of society, not merely the healthcare system and its functioning. Critical situations occur when large groups of people fall ill at the same time. Potential quarantines and restriction measures also affect operations in all sectors. Society's crisis resilience and ability to respond to other simultaneous disruptions decrease. A pandemic poses challenges to leadership, defence, internal security, energy supply, transports and food supply, among other areas. The social, productional and economic impacts of a pandemic are significant. Personnel falling ill and personnel shortage increase the burden and risk of errors of those working. Deaths have direct impacts on individuals, families and communities.

During a pandemic, also indirect impacts become very significant. People's crisis resilience and ways to react to crises vary. A pandemic and the related threat of illness and potentially death causes fear and in some people even panic and loss of functional capacity. A pandemic causes prolonged stress and psychological burden to everyone. The number of social and psychological problems increases. The situation of population groups in a weaker position may deteriorate further. Both the population and authorities have a considerable need for information, which must be produced in new ways. Consistent and up-to-date communications is of utmost importance and must reach all population groups.

The aim is to prevent the virus from spreading in society, ensure the carrying capacity of healthcare, protect the risk groups, restrict the harmful effects on the health of the population, safeguard the functioning of society, reduce the number of deaths and protect the population groups in a weaker position. The most important measure in preparedness and civil protection is vaccination against the virus causing the pandemic. Vaccination is the most effective way of combatting pandemic and its spreading and harmful effects, but the development of a vaccine and the ramp-up of large-scale production takes time so vaccines usually cannot influence the first wave of a pandemic.

Antiviral treatment of influenza, started as quickly as possible once the symptoms appear, can shorten the duration of illness and reduce the number of sequela. In Finland, the state's emergency stockpiling of pharmaceuticals is developed and carried out under the leadership of the Ministry of Social Affairs and Health, through cooperation among several parties, and the state also has emergency stockpiles for pandemics. Other antimicrobial drugs are needed in the treatment of the sequela caused by the influenza, and in addition to the public sector, also the private sector is required to stockpile them. Disruptions and problems in the availability of both vaccines and pharmaceuticals increase the magnitude of the impacts of a pandemic. At the early stages of the pandemic, there are no pharmaceuticals or vaccines available against new pathogens.

Impact assessment



3.12.3 Animal disease epidemics

Underlying threat or threats

Animal disease epidemics are caused by severe animal diseases that spread easily. African swine fever and highly pathogenic avian influenza are highly infectious animal diseases, among others. African swine fever causes a fatal haemorrhagic fever in pigs, and there is no cure or vaccine for it. Highly pathogenic avian influenza spreads easily among wild birds and from them to poultry, where the rate of mortality is high. Avian influenza may also spread through animal trade and, indirectly, human activity.

Target of the threat

The primary target of the threat is animal farms and a widely spread epidemic may also affect food production and the food industry.

There are also avian influenza strains that can infect humans and, at worst, the threat may apply to a large group of people.

Method of implementation (possible)

African swine fever is transmitted via live pigs, pork and other pig products and virus-infected goods and materials. African swine fever has spread from Africa to Caucasus in 2007 and continued to spread outside Africa. The disease occurs in wild boars and at animal farms in Russia, Belorussia, Ukraine, Moldova, the easternmost parts of the EU, including the eastern parts of Germany, Far East and Middle America. In Estonia, other Baltic countries and Russia, there are lots of cases of African swine fever in wild boars and to some extent also in domesticated pigs. The risk of infection in Finland is through pork products and contaminated goods and via a wild boar carrying the virus.

A bigger risk of avian influenza emerged in 2005. Each year, there are cases of avian influenza at production farms in the EU. In winter 2016–2017, there were lots of avian influenza cases among both wild birds and poultry. Since autumn 2020, there have been a high number of cases of highly pathogenic avian influenza among wild birds in the EU area, including Finland. In the EU area, there have also been many cases among poultry. In Finland, the most recent case was a single case in February 2021. Transmission to poultry farms is possible if poultry get in contact with wild birds or their faeces. Avian influenza strains are monitored because it is possible that the virus mutates so that it also infects humans. The virus strains detected in the current epidemic do not infect people.

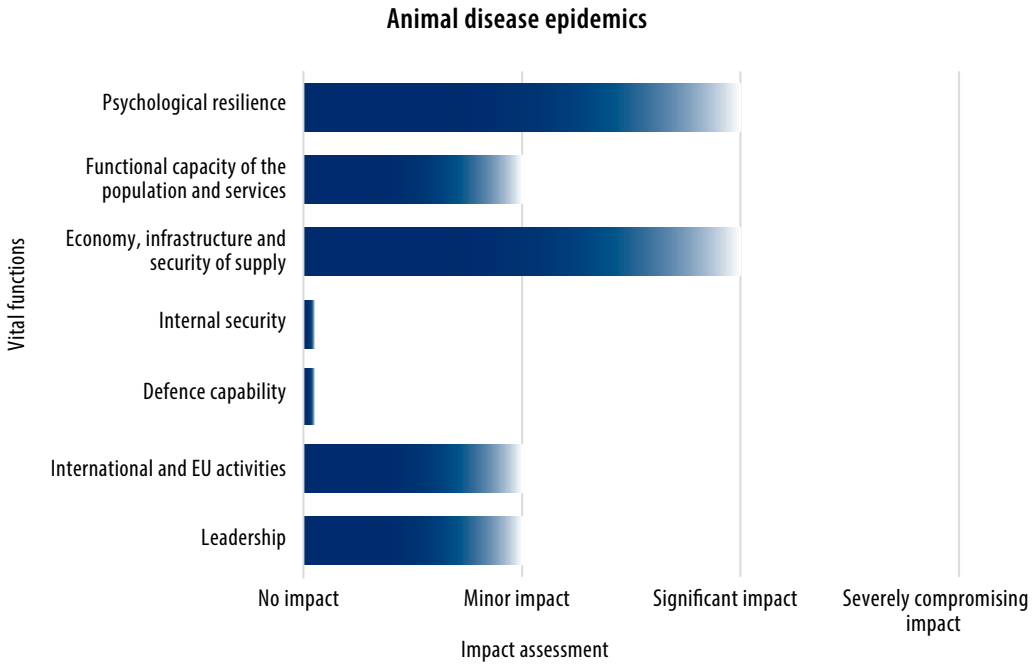
Concatenation and cascading of impacts and disruptions

Highly infectious severe viral animal diseases and animal disease epidemics can impair the operating conditions of animal production, damage natural animal populations, prevent or significantly interfere with exports or trade of animals or products of animal origin and in some cases transmit from animals to people, causing people to fall severely ill. At worst, an animal virus may mutate so that it transmits from one human to another.

Animal disease epidemics cause interference to food production and the export and trade of animals and products of animal origin.

The financial impacts on animal production are considerable due to interference of production chains, disposal of animals, any loss of breeding animals, interference caused by slaughter and transport, regional transfer restrictions and consumer confidence. The disruptions in export alone very quickly amount to tens of millions of euros. Disruptions in food production may impair the availability of certain food products.

Impact assessment



3.13 Disruptions in water supply

Underlying threat or threats

Severe, potentially national water supply disruptions or health hazards due to water quality may be caused by disruptions in the availability of critical chemicals or components, interruptions in power supply and telecommunications caused by various reasons, or radiation accidents. Another threat is the ageing infrastructure, vulnerable to quality defects. Water supply is a sector that is administered with few personnel resources.

Severe regional water supply disruptions may be caused by accidents at water source areas and water intake plant, faults in water intake and treatment equipment and the pipeline, accidents due to human factors and malicious acts. Climate change is estimated to increase the drought risk of water utilities. Natural phenomena that cause regional disruptions include, for example, rainstorms and floods, the risk of which is increasing due to climate change.

Target of the threat

Reliable water supply, clear water and well-functioning wastewater treatment are vital to both people and nearly all production and society's services. All water utilities regardless of size are vulnerable to disruptions. The water utilities of large densely populated areas, towns and cities are especially significant targets.

Method of implementation (possible)

The most significant threat underlying an acute disruption in water supply is disruptions in power supply. The biggest need for power in water supply is associated with the transfer of water. Pumping is required throughout the production process from water intake to water purification and distribution and to safe removal of wastewater. During a blackout, the network also cannot be kept under pressure, which allows harmful substances to enter the household water network. Wastewater leaks may compromise the safety and security of household water production and irrigation water used in primary production. A pandemic or another reason jeopardising the availability of personnel may put the daily operations of water utilities at risk due to few personnel resources.

Floods and rainstorms may cause significant health hazards as large volumes of water carry solids and impurities and may cause uncontrolled wastewater leaks. Long drought may complicate water supply especially in small and medium-sized water utilities and lead to a disruption in water supply. Supply disruptions as such can also cause qualitative hazards to water supply. Vulnerability increases if the utility does not have an alternative source of water that can be taken into use quickly or if other preparedness arrangements have not been made.

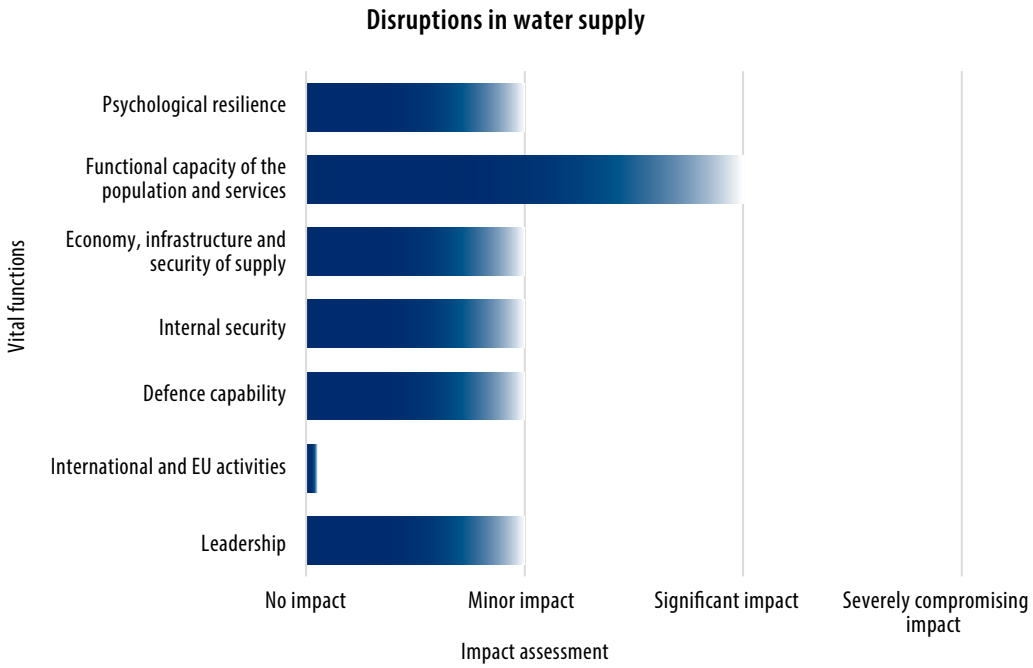
An extensive water supply disruption lasting even more than twelve hours can be considered severe.

Concatenation and cascading of impacts and disruptions

Water supply disruptions are always severe but water supply and/or household water quality defects in major urban centres or services key to the functioning of society may have significant negative effects on the functioning of society.

The interruption of water supply easily paralyses other services and production. The food industry, healthcare and social welfare units and other critical services are particularly vulnerable. Defects in water quality may cause a risk of illness among the population and, at worst, threaten people's lives.

Impact assessment



3.14 Disruptions in food supply and deterioration of food and nutrition security

Underlying threat or threats

Food supply refers to the whole consisting of primary production, the food industry and the trade and supply of daily consumer goods. Disruption-free food supply is exposed to diverse threats that can be unintended or intentional. As the food supply system consists of many different elements and is dependent on several sectors, a disruption in another sector of economy may also cause disruptions in food supply.

Food security refers to the state in which people have a sufficient amount of safe and nutritious food, corresponding to their food-related habits and enabling an active, healthy life. The aim of the term "food and nutrition security" is to highlight the importance of nutritious food in addition to the amount of food.

Extensive primary production threat scenarios both in Finland and globally are factors related to weather variation and climate change. Threats to primary production include drought during the growing season and, on the other hand, excessive rainfall or rainfall at the wrong time, which cause crop losses and deteriorate the harvest quality. In Finland, warmer winters and increasing rainfall due to climate change increase the risks caused to primary production especially by new plant diseases and pests. Another threat is animal diseases.

Climate change may also affect other areas of food supply but the greatest threat is targeted at primary production. Globally, primary production and the preconditions of food production are also affected by the increase of the world's population and the uncontrolled use of groundwater reserves, impairing the continuity of primary production.

Food production may also be affected by ultimate threats, in other words: the eruption of a supervolcano and nuclear war, which reduce the amount of sunlight reaching the surface of the Earth. Should they take place, they would have significant impacts on global food production.

In the long term, the scarcity and overuse of natural resources and biodiversity loss threaten the preconditions of the world's food production.

The price variation of agricultural production inputs and the potential price increases in the long term have indirect impacts on food security by causing upwards pressure in food prices.

All areas of food supply may also be subject to unintended or intentional threats caused by humans, affecting power supply and digital systems. A significant threat is an extensive cyber attack and its impacts on the functionality of production and logistics systems.

The COVID-19 pandemic also showed that the deterioration of the availability of labour is a significant threat to Finland's food supply. Furthermore, dependence on fertilisers, chemicals and components produced outside the EU increases food supply's susceptibility to disruptions. Geopolitical changes, major accidents (including nuclear accidents) and other threats affecting global supply chains, such as trade wars, a serious shortage of logistics containers, extreme and exceptional natural phenomena, jeopardise food supply and food security.

Foodstuffs may be contaminated and spoil due to different reasons in different phases of the process. Intentional sabotage is also a possibility. There can be a technical fault in the production process that is not noticed early enough. The raw material could include pathogens or contaminants, such as foreign matter appearing in food due to the production process or environmental contamination, already when entering the process. The financial losses can be significant and result in major restructuring. Most commonly, foodstuffs are contaminated when a microbiological, chemical or physical hazard enters the process (e.g. salmonella, EHEC and listeria bacteria). However, in Finland, this is very rare.

Target of the threat

The target of the threat can be any part of the food supply system. Threats affect the conditions and production inputs of primary production in Finland and globally. In addition, they are targeted at different phases of the food industry's production process, storage, transport of raw materials and food products, supply of daily consumer goods (including e.g. trade, sales and mass catering) and the population.

Method of implementation (possible)

Disruptions in food supply may be either acute and potentially short or changes in domestic food and nutrition security, created by long-term development and caused by the impaired availability of food and the resulting significant price increases.

Acute disruptions may be caused by disruptions in power supply, telecommunications and information and payment systems, which immediately prevent the population from obtaining food in the normal way and the functioning of food services. What makes a cyber attack difficult is that it can paralyse several production plants or shops almost simultaneously. In addition, such disruptions also prevent the operations of professional and large-scale kitchens and wholesale operations. A short-term stop does not severely compromise the functioning of food supply, but non-existent stockpiles in all parts of the chain will lead to disruptions in a few days. If the situation is prolonged, food supply is compromised and, at worst, completely prevented. The raw materials or finished products can also end up in the wrong places or the delivery and sale of the products are prevented.

Manipulating the production process, such as by altering the amounts of chemicals, can cause severe consequences for the health of people or animals. The difficulty or lack of detection can make the situation serious.

Long-term food and nutrition security threats are primarily associated with climate change and biodiversity loss. They are significant at both the national and especially the international level. They may lead to a global deterioration in the availability of food, which in turn lead to price increases and, in the long term, a price crisis. At worst, the availability of some important imported food items may collapse entirely as a result of climate change.

The COVID-19 pandemic has shown that an extensive pandemic may close down entire production facilities and affect global supply chains.

Concatenation and cascading of impacts and disruptions

Disruptions in food supply may lead to extensive social problems and unrest in Finland, too.

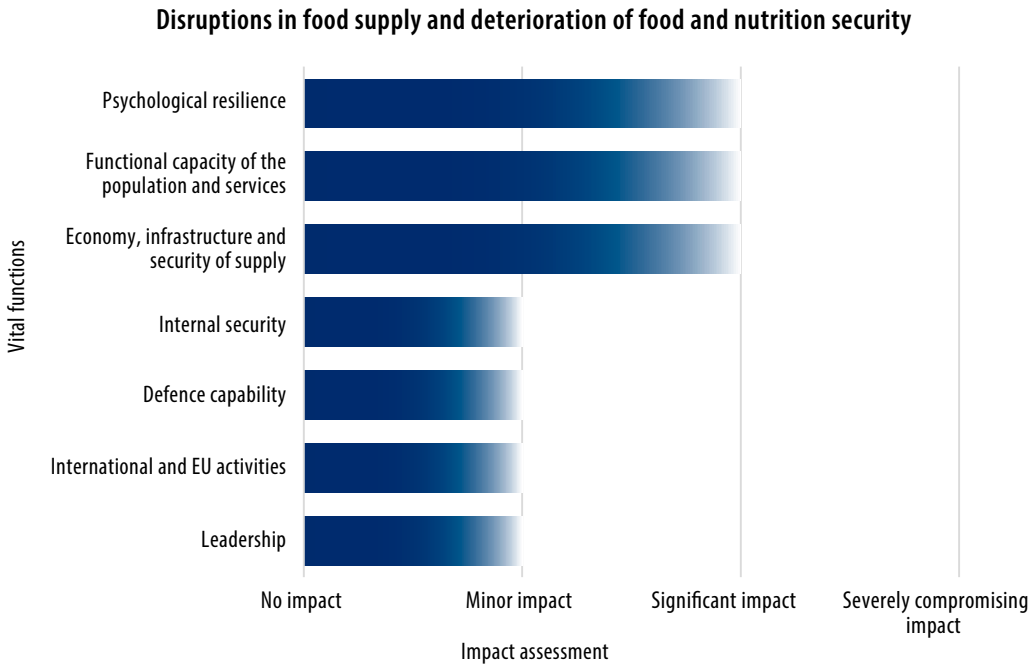
For producers, long disruptions may cause significant financial losses and recovery and return back to normal production may take time. In addition, the cyclical nature of agricultural production also plays a role: the impaired availability of production inputs at a critical time of the year may hamper the following year's production. The impacts may extend to the entire national economy.

An extensive epidemic caused by foodstuffs in a situation where there is no certainty of the cause burdens healthcare services and can test the population's psychological crisis resilience. Loss of consumer confidence in food safety and availability may, at worst, lead to unrest and disturbances if trust in authorities is deteriorated at the same time.

The deterioration of the population's food and nutrition security may generate mistrust towards authorities, for example, and reduce psychological crisis resilience.

Globally, the risk of crises and conflicts caused by food and water shortage increases, which may lead to mass influx of migrants where one destination country could be Finland.

Impact assessment



3.15 Large-scale or long-lasting accidents

3.15.1 Maritime multi-sector accident

Underlying threat or threats

The Baltic Sea is a demanding operating environment and one of the busiest sea areas in the world. It is constantly changing due to increasing traffic volumes, larger vessels and the more diverse range of substances transported. Each day, approximately 200 large vessels operate in Finland's territorial waters only. Accidents and near misses happen regularly in Finland's extensive sea areas. Channels that are difficult to navigate, dark and wintry conditions and intersecting traffic in the Gulf of Finland, for example, impose challenges on navigation and increase the threat of maritime accidents. Due to sanctions against Russia, a new threat has emerged in the form of vessels registered in non-EU countries, which replace the EU Member States' vessels especially in oil transports from Russian ports. The structures of these vessels are not necessarily suitable for the winter conditions of the Baltic Sea. Moreover, the crew might not be used to working in ice conditions.

A strong growth in the volume of oil and chemical transports in the Baltic Sea has increased the possibility of severe environmental accidents. As the result of a maritime shipping accident or ground-based oil or chemical spill, thousands or even tens of thousands of tonnes of oil, oil products or chemicals can end up in the sea.

The transport performance of the Baltic Sea maritime traffic increased by approximately 45–50 per cent in 2006–2020. On the basis of global maritime traffic development estimates, the transport performance is predicted to further increase in the Baltic Sea, too. Change factors related to the Baltic Sea region's economic development, climate policy and shipping characteristics may influence transport demand and the number of vessels. Increased traffic volumes increase the risk of maritime accidents in the area. The growth is estimated to focus particularly on container traffic.

In December 2022, the maritime import ban imposed by the EU on Russian oil will enter into force. Even before this deadline, many EU Member States have reduced their imports of Russian oil in 2022. In autumn 2022, crude oil imported to Finland comes mainly from Norway whereas, according to the IEA (International Energy Agency), previously approximately 80 per cent of our imported oil came from Russia. This change means that the approximately 10 million tonnes of crude oil shipped annually to Kilpilahti, Porvoo, take a considerably longer route in tankers across the Baltic Sea. At the same time, oil is transported from Russia's Gulf of Finland ports to markets outside Europe, which also means that oil tankers departing from these ports travel a longer route across the entire Baltic Sea and onwards to non-EU states. This increases the risks of environmental accidents in the Baltic Sea's open-sea areas.

It is estimated that the strongest growth in maritime traffic in the Baltic Sea will take place in the Gulf of Finland and northern and southern parts of the Baltic Sea. Rapid fluctuations in the global economic policy, oil price, international crises and terrorism can also change the situation rapidly.

Also, the increasing use of technology in shipping can have effects on the threat of maritime accidents. Technology associated with the management of vessels and navigation aids failing on narrow or heavily trafficked lanes can have severe consequences.

In addition, in the long term, the development of the automation of maritime traffic can bring about new kinds of vulnerabilities that cannot be yet properly estimated.

On the other hand, the automation of maritime traffic may reduce the threat of accidents caused by human errors.

In the changed global situation, an intentional shipping accident in the Baltic Sea cannot be excluded completely. For example, an intentional major accident would tie up a great deal of the resources of authorities, cause a significant environmental catastrophe and potentially prevent the use of maritime lanes in the accident area. Intentional attacks and sabotage against critical maritime infrastructure in the territorial waters and the exclusive economic zone may also restrict the use of sea areas and thus increase the risk of maritime accidents.

Target of the threat

The threat primarily concerns people and the environment. With regard to people, the most severe accident types taking place in the sea area are vessels capsizing or sinking due to a maritime accident and uncontrolled fire aboard a vessel. Onboard fires are a significant threat when loss of life or severe injury are concerned. The worst-case scenario is the collision between a large passenger vessel and an oil tanker/vessel carrying chemicals, in which saving lives is challenging due to a potential chemical spill, for example.

In an oil and chemical accident, the extent of damage to people, the environment and businesses depends on the location, amount and properties of the substance ending up in the sea as well as the weather, the time of the year and the effectiveness of damage prevention measures. A major accident involves the risk that a large amount of oil spilled in the sea reaches shores and causes extensive environmental and property damage.

An oil and chemical accident can cause diverse impacts on ecosystems and they are often difficult to detect, prevent and restore. The ecological impacts are both quick and direct as well as long-term and indirect. The ecological impacts of an oil accident on a population adapted to the Baltic Sea can be very severe, even permanent. Due to the poor condition of the Baltic Sea, even slight additional contamination can be fatal.

There are an estimated 20 high-risk shipwrecks in Finland's territorial waters, with probably more than 100 tonnes of oil, and an equivalent number of lower-risk shipwrecks, with potentially more than 100 tonnes of fuel oil.

Method of implementation (possible)

The worst-case scenario assessed involves two vessels, at least one of which is a large passenger ship. The other one can be a vessel carrying hazardous substances or another large passenger ship. The total number of people to be evacuated can be 6,000.

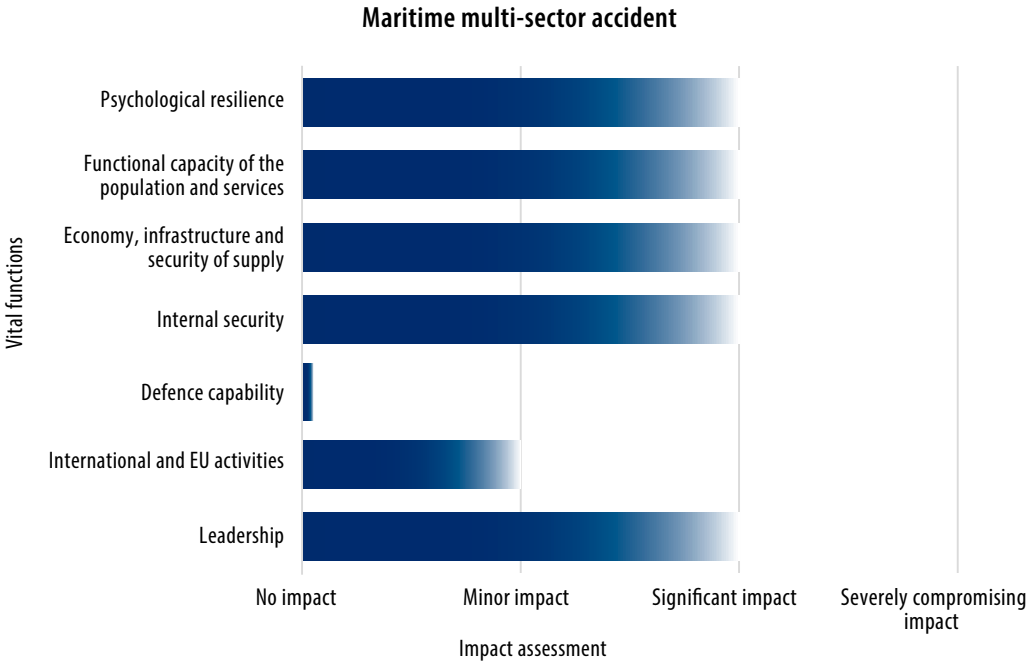
Human factors and technical failures play a significant role in peacetime accidents. The most significant oil and chemical spill threats caused by vessels are related to tankers' technical faults, running aground, colliding and fires. Technical faults aboard vessels include faults in the engine, propulsion, steering or navigation systems. Acute ground-based spills often originate in production plants and storage areas. Underlying the most significant ground-based spills there are often operating faults with equipment used for transferring oil or chemicals or leaks in pipelines or tanks.

Concatenation and cascading of impacts and disruptions

In a major accident, the evacuation of a large number of people and follow-up measures tie up a significant amount of the resources of various authorities. If there are many injured people in the accident, the healthcare treatment capacity is burdened. The after-treatment of a major environmental accident can take months or even years. Cleaning and restoring contaminated environment place a burden on the resources available. Waste treatment, for example, requires large interim storage and retention areas.

In addition to environmental contamination, the financial damage can be significant.

Impact assessment



3.15.2 Severe nuclear power plant accident in Finland or Finland's neighbouring areas

Underlying threat or threats

There are five nuclear power plant units in Finland: two in Loviisa and three in Olkiluoto.

Finland's neighbouring area includes the Russian Leningrad (Sosnovyi Bor) and Kola plants and the Swedish Forsmark plant. Severe accidents taking place in these plant locations may, depending on the weather conditions, also have radiation effects requiring extensive protective measures in Finland as well.

In addition to nuclear power plant accidents, different sources of radiation and so-called dirty bombs potentially built with them as well as nuclear-powered vessels and vessels carrying nuclear weapons in the Baltic Sea region must also be taken into account in nuclear and radiation safety.

Target of the threat

In a severe nuclear accident in Finland or Finland's neighbouring areas, large amounts of radioactive materials can be released to the environment. Managing the radiation hazard requires action at all administrative branches and levels. The measures can be considerable, requiring extensive investment by society in preventing and mitigating the harmful effects.

An emerging radiation hazard requires quickly protecting people and launching protective measures concerning food and other production. In addition, measures concerning agriculture and forestry, food and other industry, water supply, traffic (road, air, maritime and rail traffic), leisure activities, trade, transport, import and export, cleaning of buildings and the environment and waste treatment and disposal, among other things, may be required. Various measures may be necessary in distances of up to hundreds of kilometres from the accident site.

Managing the situation can also take a very long time. Cleaning the environment and restoring normal living conditions, ensuring the cleanliness of foodstuffs and tap water and managing waste containing radioactive materials can take years. The recovery of people and the environment may take decades.

Method of implementation (possible)

Generally speaking, nuclear power plants are sturdy constructions as they must withstand many extreme natural phenomena. However, they are not designed with military attacks in mind.

In addition to direct attacks against nuclear power plants, there may be indirect attacks. For example, the functioning of the power grid and its nodes as well as the power plant maintenance's and personnel's ability and possibility to look after the power plant are absolutely indispensable for safety.

In case of technical fault, the power plant reactor can be stopped with high certainty. After stopping, the reactor must be cooled to remove post-shut-down heat. A severe nuclear power plant accident can occur if the cooling of the reactor does not succeed and the tightness of the pressure-resistant structures surrounding the reactor is lost. Nuclear power plants have multiple independent safety systems operating through different means to prevent accidents.

Intentionally damaging a nuclear power plant by damaging the reactor or its cooling systems can lead to significant radioactive emissions. In this case, the systems of the nuclear power plant are made inoperable with an external attack and possibly an assistant with the required know-how. All nuclear power plants have effective security arrangements which have made such threats very improbable. Although nuclear power plants have redundant systems and arrangements for both accidents and intentional acts, the possibility of emissions that spread to a large area and have long-term impacts cannot be excluded completely. The mechanism of occurrence of an accident can be one that has not been identified before.

Concatenation and cascading of impacts and disruptions

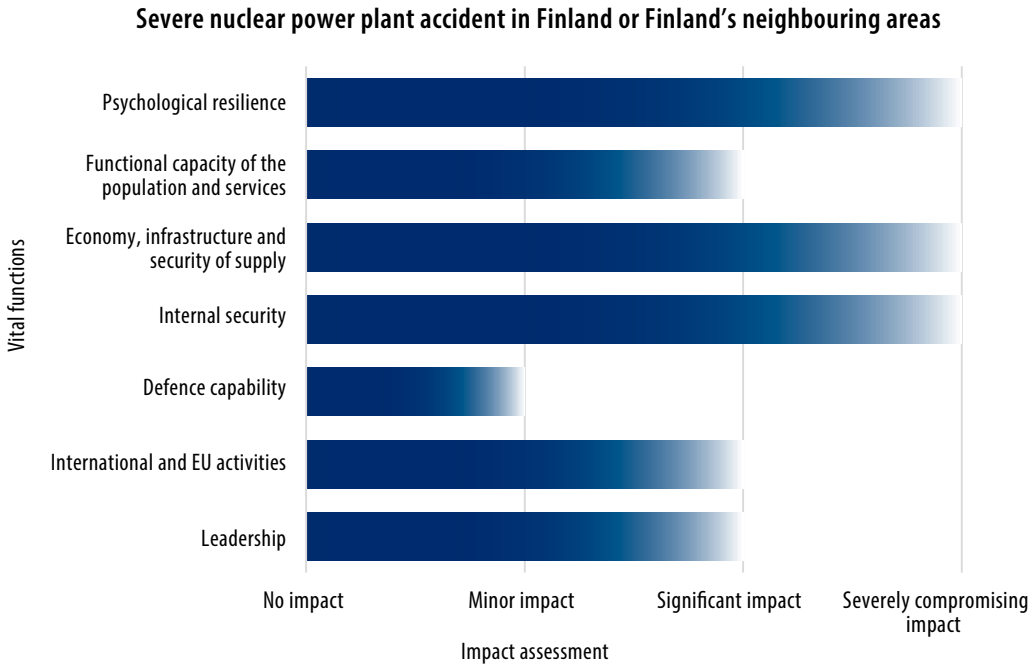
Attacks on nuclear power plants that have taken place in connection with Russia's war of aggression in Ukraine have made nuclear power and radiation safety prominent topics in the discussion about security of supply and preparedness.

A severe nuclear power plant accident can cause a significant long-term reduction in Finland's power production, especially if the other plant units of the plant location need to be shut down. In addition, the reassessment of the safety of nuclear energy can lead to a temporary shutdown of nuclear power plants. An accident would also give cause for assessing the justification or general approval of the use of nuclear energy and thereby influence Finland's future energy policy.

The direct health impacts of a radiation hazard will probably remain low, if there is success in the protection measures. However, the hazard would have significant effects on people's living conditions and environment as well as significant adverse psychological and social effects.

The economic impacts are extensive, particularly due to the long-term nature of the situation's after-care and recovery. A significant market disruption occurs in international trade. As all kinds of production would be suspended in the hazard area, society's support would be needed for restarting production once the area has been made safe again. Finnish exports would also suffer in case of a radiation hazard. Other countries would probably require cleanliness certificates or measurements of all goods exported from Finland.

Impact assessment



3.15.3 Several simultaneous extensive wildfires

Underlying threat or threats

As wildfires require favourable conditions, the threat of extensive wildfires in Finland is limited to the summer. As a concept, "wildfire" covers both forest fires and fires elsewhere in nature, such as grass fires.

With climate change, the threat of extensive forest fires is estimated to increase as conditions favourable to them, such as long spells of high temperatures and drought, will potentially increase. As the climate gets warmer, also periods during which simultaneous strong winds, high temperature and low humidity increase the risk of fires spreading will become more common. The situation becomes especially challenging if several simultaneous wildfires start near residential areas during favourable weather conditions. There is the threat that wildfires spread widely and, as a result, become difficult to control and suppress.

It is estimated that forest fire risk will increase not only in Finland but also in other parts of Fennoscandia[8]. Nevertheless, weather varies a great deal in Fennoscandia, which is further reflected in forest fire risk and its major annual fluctuations. There is also the threat that extensive forest fires spread across borders. In the Republic of Karelia in Russia, there are on average more than 500 forest fires a year, thousands in peak years. For example, in 2021, a state of emergency was declared in the Republic of Karelia due to wildfires and people were evacuated from their homes.

Examples of very extensive forest fires on the Finnish scale include the forest fire in Kalajoki in 2021 and the one in Muhos in 2020. Examples of forest fires of a considerably larger scale can be found in Sweden in recent years. For example, in 2018, lightnings started five separate fires in Ljusdal, with a total area of 9,500 hectares. As a result of requests for international help, firefighting personnel came from ten countries and suppression work continued for more than three weeks.

Target of the threat

In wildfires, the main threat to people is posed by toxic fire gases. Due to fire gases or uncontrollably spreading fire, people may need to be evacuated from a large area. Property damage may also end up being significant due to burnt forest, buildings and critical infrastructure.

The impacts of extensive wildfires are primarily regional but if there are several simultaneous wildfires, the impacts may affect the functioning of society more broadly. A fire may damage critical infrastructure or have harmful effects on industry. Suppression measures tie up a significant amount of resources, which means that they are not available for other daily rescue tasks. This kind of a situation may require national coordination of resources or even a request for international help to suppress the fires.

Forest fires also have impacts on climate and the environment. As a result of extensive forest fires, large amounts of carbon are released from vegetation into the atmosphere, which warms up climate and accelerates climate change.

8 Finnish Meteorological Institute (2021) Climate change and forest management affect forest fire risk in Fennoscandia

Method of implementation (possible)

Each year, approximately 1,000–6,000 wildfires start in Finland. The range is wide due to the major impact of weather on the risks of fires starting and spreading. Wildfires may start due to various reasons. Wildfires may start due to human activity, such as prescribed burning, other forms of open fire or a spark from forest machinery, and natural phenomena, or lightnings. A fire may also start due to intentional human activity, examples of which have been witnessed both in Finland and abroad. In addition to climate and weather conditions, the characteristics of the forest also influence how fires start and spread and how intensive they are.

In Finland, the majority of forest fires start as a consequence of human activity. Even if the share of forest fires that start from a lightning is smaller, they are often larger and more difficult to suppress than forest fires caused by human activity. Fires started by a lightning may be in a difficult terrain or far from the road network.

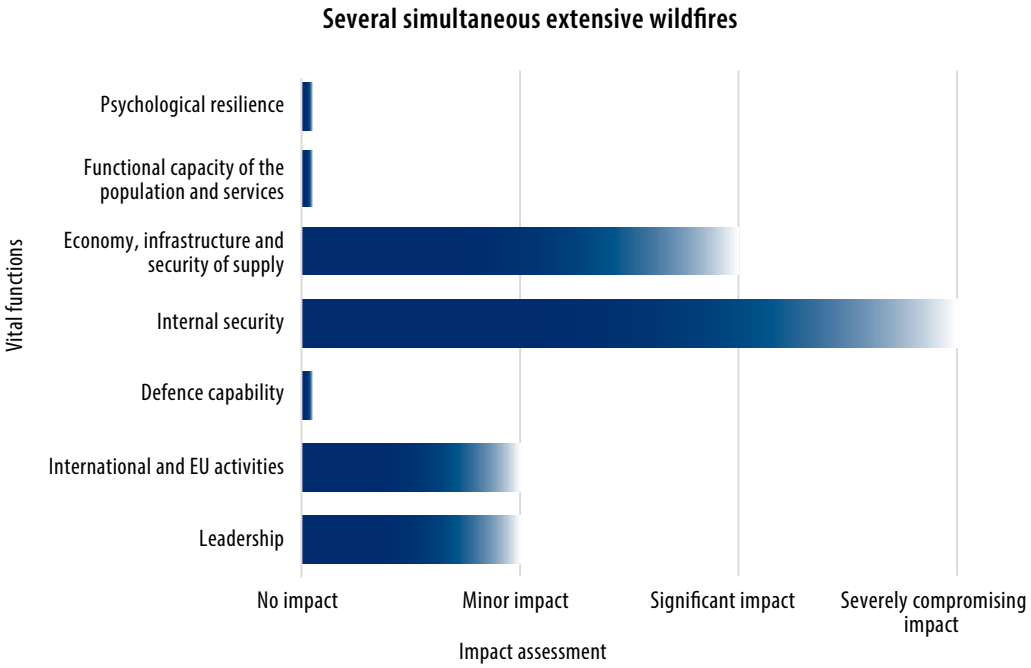
During a long period of rainless weather, lightnings or human activity may start a large number of wildfires, quickly spread by windy weather. Some fires become extensive and rapidly spreading crown fires before effective suppression measures are started. When an uncontrolled fire is near a residential area, it is necessary to evacuate the population of the area, potentially large groups of people.

Concatenation and cascading of impacts and disruptions

Taking control of and suppressing simultaneous extensive wildfires and carrying out post-fire tasks may take long, even weeks. At worst, the impacts of the situation can concatenate and cascade if, for example, the spread of the fire threatens critical infrastructure and its functionality or if the spread of the fire or the resulting harmful effects of smoke extend to populated areas and cause health hazards to people and a need to evacuate them. Extensive evacuation would also have severe social impacts.

Power grid and telecommunications devices may be located in the area affected by the wildfire and the fire or fire gases spread by it may cause significant harmful effects to the operations of industrial production facilities. Fires may have significant impacts on traffic: for example, it may be necessary to close railway sections and main roads, which may cause disruptions in national logistics chains.

Impact assessment



3.15.4 Extremely strong space weather storm

Underlying threat or threats

Space weather is a general term for a large group of physical phenomena caused by an eruption in the Sun, or a "solar storm". The frequency of solar eruptions varies in cycles of approximately 11 years according to sunspot cycles. The estimated frequency of exceptionally strong space weather storms that cause serious damage globally is once in hundred years.

Solar eruptions cannot actually be predicted but their risk can be estimated within a span of a few days. Once a strong eruption occurs, it takes roughly ten hours before the most significant impacts start.

Target of the threat

During strong space weather storms, geomagnetically induced power currents would cause voltage fluctuations in the national power supply grid and possibly transformer damage. Finland's national grid is relatively resilient against changes in space weather, but problems in the neighbouring countries can also be reflected in Finland via the joint Nordic power grid and our need for importing electric power.

A space weather storm interferes with the transmission of radio signals from satellites to the surface of the Earth and may also damage satellites. During a strong space weather storm, it would be possible that satellite positioning would be completely out of operation for approximately 24 hours, after which there would be disruptions in it for a few days. This would complicate traffic using satellite positioning. In addition to positioning, a space weather storm would interfere with satellite communications and also long-range HF radio connections between earth stations.

A space weather storm does not cause direct health hazards to people on the Earth's surface. The radiation dose during flights may increase but this does not constitute an acute health hazard either.

Method of implementation (possible)

The most recent storm causing significant impacts took place in October 2003, causing a blackout in Southern Sweden, lasting for tens of minutes. In addition, malfunctions were observed in numerous satellites and one satellite broke down.

In Sweden in 2015, a solar storm interfered with the radar system of the air traffic control, which lead to the country's air space being closed for a couple of hours.

Concatenation and cascading of impacts and disruptions

Interruption of power supply due to a space weather storm could last for the duration of the storm, a few days at the most. For some older transformer types, the ultimate risk is permanent damage to the transformers, which would considerably slow down the recovery of the functioning of the power grid, but this is not considered probable in Finland.

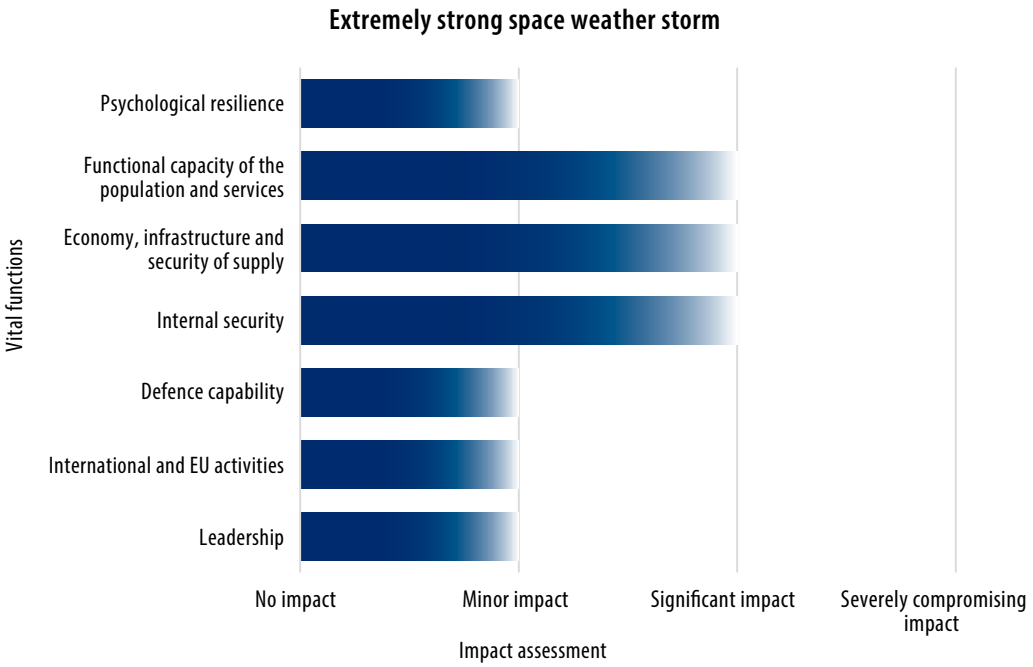
Satellite service problems would last for a couple of days. Communications and positioning problems could lead to flight cancellations due to safety reasons, for example. The temporary loss of the time signal of positioning satellites could affect the functioning of mobile phone base stations and other synchronised systems. The inoperativeness of satellite positioning would also have harmful effects on road traffic and rescue services.

The destruction of some satellites could lead to a long-term deterioration of services or even their discontinuation if a very specialised satellite were destroyed. However, long-term loss of satellite positioning is not likely as there are plenty of positioning satellites and even if a few of them were destroyed, the situation would not be critical.

It has been suggested that a space weather storm could also damage submarine telecommunications cables. Space weather does not influence optical fibre but the amplifiers of long cables could be damaged due to power current induced in their power cables. However, the assessment of the magnitude of this risk requires more research.

A space weather storm is a global event but the intensity of its impacts may vary from region to region. Although direct damage in Finland remained minor, problems in other parts of the world may be reflected here.

Impact assessment



Appendices

Table 1. Impact assessment in a summary table

Threat scenario/ disruption	Impacts of the threat scenario/disruption on vital functions and strategic tasks						
	Leadership	International and EU activities	Defence capability	Internal security	Economy, infrastructure and security of supply	Functional capacity of the population and services	Psychological resilience
Information influence activities	**	**	**	**	**	**	**
Political, financial and military pressure	***	**	**	***	***	**	***
Use of military force	***	***	***	***	***	***	***
Mass influx of migrants and instrumentalisation of migration	**	**	-	***	*	**	**
Terrorist act or another violent act targeting the structures of society or large crowds	**	*	*	***	**	**	***
Violent civil disturbances involving large crowds, groups or communities or actions compromising social order	**	*	-	***	*	**	***
Disruption of the public economy	*	**	-	*	**	**	**
Disruption of the financial system	**	**	*	**	***	***	***
Major disruption in power supply	**	*	*	**	***	***	**
Severe disruption in the availability of fuels	*	*	*	**	**	**	*
Disruptions in information and communications networks and services	**	**	*	***	***	***	**

Threat scenario/ disruption	Impacts of the threat scenario/disruption on vital functions and strategic tasks						
	Leadership	International and EU activities	Defence capability	Internal security	Economy, infrastructure and security of supply	Functional capacity of the population and services	Psychological resilience
Disruptions in the continuity of transport	**	**	*	*	***	***	**
Antimicrobial drug resistance	*	**	*	*	**	**	*
Pandemic or similar widespread epidemic	**	**	*	**	***	***	***
Animal disease epidemics	*	*	-	-	**	*	**
Disruptions in water supply	*	-	*	*	*	**	*
Disruptions in food supply and deterioration of food and nutrition security	*	*	*	*	**	**	**
Maritime multi-sector accident	**	*	-	**	**	**	**
Severe nuclear power plant accident in Finland or Finland's neighbouring areas	**	**	*	***	***	**	***
Several simultaneous extensive wildfires	*	*	-	***	**	-	-
Extremely strong space weather storm	*	*	*	**	**	**	*

Impact assessment: No impact (-), Minor impact (*), Significant impact (**), Severely compromising impact (***)

Ministry of the Interior
Finland

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