



# JRC CONFERENCE AND WORKSHOP REPORT

## Contingency plan for ensuring food supply and food security

*Workshop report*

Alan Matthews

2021

A photograph of a puzzle with one piece missing, replaced by a piece of corrugated cardboard with the text "Contingency Plan" written in red. The puzzle is set against a grey background.

**Contingency Plan**

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This report constitutes a compilation of the principal issues raised by the speakers at the online workshop organised by the Joint Research Centre (JRC) together with the three Directorates General – Agriculture and Rural Development (AGRI), Maritime Affairs and Fisheries (MARE) and Health and Food Safety (SANTE) – on the ‘Contingency plan for ensuring food supply and food security’ held on 20 May 2021.

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The agenda for the day’s workshop is attached as Annex I.

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## Executive summary

This report constitutes a compilation of the principal issues raised by speakers at an online workshop jointly organised by the Joint Research Centre (JRC) together with the Directorate General for Agriculture and Rural Development (AGRI), the Directorate General for Maritime Affairs and Fisheries (MARE) and the Directorate General for Health and Food Safety (SANTE) on the 'Contingency plan for ensuring food supply and food security' held on 20 May 2021. The objective of the workshop was to assist in the preparation of the EU contingency plan to ensure the future food supply and food security proposed by the European Commission in its Farm to Fork Strategy.

The workshop was organised around five topics:

- crisis preparedness and crisis management – modern conceptual framework,
- risks, threats, vulnerabilities to food security – how do you identify the key ones?
- businesses – how do (food supply chain) companies prepare and respond to crisis?
- government-level preparation for food crises,
- mechanisms of coordination between countries at EU and global level.

The context for the workshop was the experience of the COVID-19 pandemic, which raised awareness of the need to prepare for a possible food supply crisis in Europe. Several key lessons emerge from the management of the COVID-19 pandemic. Every crisis is different and has unpredictable elements. However, procedures can be put in place to ensure better coordination and better preparedness to manage future crises. Responses to a crisis should not make the crisis worse. In particular, when a crisis has global dimensions, trade embargoes are an example of counter-productive responses that were mostly avoided during the COVID-19 pandemic. There was a consensus that the EU food supply chain had proved resilient, and that the EU had avoided a food crisis as well as a health crisis, but that there is potential to improve preparedness and *ex ante* policy coordination.

The understanding of crisis management is greatly facilitated by distinguishing the different phases of the crisis management cycle: risk assessment, prevention and mitigation, preparedness, response, recovery and learning. Contingency planning is an important element of preparedness. This includes planning; organisation and procedures including communication; capacity-building, including training and exercises; redundancy; agreements and pre-arrangements; and early warning. Planning is the core of preparedness.

The vulnerability of a food system relates to both its likelihood of being exposed to hazards or shocks and its capacity to respond to them. Early warning is recognised as an essential element in reducing the risk of disasters and crises. Foresight studies are important to avoid linear thinking and to develop an imagination for thinking the unthinkable and preparing for it. The purpose of foresight is to allow organisations to stress-test contingency plans against a wide range of potential outcomes. Particular attention should be paid to the resilience of supply chains, which will require close collaboration with private sector actors. Business supply chains can be particularly vulnerable to logistical disruption. Private sector actors need to ensure visibility along the supply chain, including dependence on transport and logistics.

The COVID-19 experience revealed a pressing need for international cooperation and the need to develop effective policy action in a world that is so interconnected. The role that trade can play in food

security emphasises the importance of ensuring robust supply chains and building cooperative relationships along value chains and across borders. A toolkit of policy options is available to governments for this purpose. The key lessons for food security in an interconnected world are the need to strengthen cooperation and connection and to ensure consistency.

Workshop participants made several recommendations to improve the effectiveness of contingency planning. A proactive approach addresses threats and vulnerabilities to prevent emergencies from escalating into crises. All crises are different, and improvisation and creativity are key components in crisis situations. It is important to invest in risk assessment, including early warning systems and foresight exercises. Training crisis management team participants is vital. Resources need to be allocated to necessary exercises, simulations and other techniques to engage stakeholders and to help the relevant actors to get to know each other and to understand the differences between organisational settings before a crisis occurs. Planning should focus on coordination and coherence. Organisational structures should be designed to promote coordination and coherence, making use of flexible arrangements such as collaborative platforms, collegial bodies or networks of experts. The importance of good communication during a crisis cannot be over-emphasised, and this also requires training and planning. Evaluation is crucial. There is a need to learn from past experiences and mistakes so that systems can be improved to be better prepared for the next crisis. This should be integrated into contingency planning procedures and not just undertaken on an ad hoc basis.

In developing a contingency plan, the planning processes are just as important as the plan itself. The purpose of planning is to create a mutual understanding, common purpose and trust among participants who might not normally work together. The process of contingency planning allows skills to be developed and tested; interactions to be fostered and knowledge sharing between the team and with other stakeholders; networks to be established; and the building of flexible capabilities. Contingency planning should not only be limited to operational aspects but should also be used to support an overall awareness of risks and responses.

# 1 Introduction and context

This report constitutes a compilation of the principal issues raised by the speakers at the online workshop jointly organised by the Joint Research Centre (JRC) together with the Directorate General for Agriculture and Rural Development (AGRI), the Directorate General for Maritime Affairs and Fisheries (MARE) and the Directorate General for Health and Food Safety (SANTE) on the ‘Contingency plan for ensuring food supply and food security’ held on 20 May 2021.

The objective of the workshop was to assist in the preparation of the EU contingency plan to ensure the future food supply and food security proposed by the European Commission in its Farm to Fork Strategy. Its aim was to provide insights and technical advice from a scientific perspective as well as examples of good practices on how to prepare, coordinate and respond to unfavourable events that could threaten food security in the EU (Haniotis, 2021). The workshop discussions addressed the following topics, and this report summarises the presentations on them (for the detailed agenda of the workshop, see Annex 1):

- crisis preparedness and crisis management – modern conceptual framework. What are the links between crisis prevention, preparedness, response and resilience?
- risks, threats, vulnerabilities to food security – how do you identify the key ones? How do you assess these risks? How do you prepare for and manage them? What are suitable early warning indicators?
- businesses – how do (food supply chain) companies prepare and respond to crisis? What is effective/good practice?
- government-level preparation for food crises – how should countries prepare and respond to crises from a food security perspective? What is effective/good practice?
- mechanisms of coordination among countries at EU and global level and examples of good practice.

## 1.1 Context

The European Commission initiative to develop a set of procedures to be followed in times of crisis and to formulate a contingency plan to ensure food supply and food security will build upon the lessons learned from the COVID-19 pandemic and other recent events. The Commission has summarised the EU experience of the COVID-19 pandemic as follows (European Commission, 2020b):

The recent COVID-19 crisis showed that the EU’s food supply chain responded well: food supplies continued to be available throughout the crisis thanks to farmers, fishers, aquaculture producers and other actors of the food chain. However, in the initial stages of the COVID-19 crisis, there were some issues that affected the normal functioning of the EU’s food supply chain and threatened food security, such as border controls slowing down the free movement of people and goods and restricting the ability of the single market to operate fully to the benefit of consumers, or market disruptions due to the severe reduction of the demand for some products.

The Commission recognised that crises such as the COVID-19 pandemic, despite having no connection to food safety issues in the EU, could nonetheless put both food security and livelihoods at risk. According to the Farm to Fork Strategy Communication issued by the Commission in May 2020 (European Commission, 2020a):

Given the complexity and number of actors involved in the food value chain, crises affect it in different ways. While there has been sufficient food supply in general, this pandemic has presented many challenges, such as logistical disruptions of supply chains, labour shortages, loss of certain markets and change in consumer patterns, impacting on the functioning of food systems. This situation is unprecedented and the food chain faces increasing threats every year with recurring droughts, floods, forest fires, biodiversity loss and new pests. Increasing the sustainability of food producers will ultimately increase their resilience.

The Farm to Fork Strategy contained two concrete actions. One was that the Commission would assess the resilience of the food system and bring forward a proposal for a **legislative framework for sustainable food systems** by 2023. The other was that the Commission would develop a **contingency plan for ensuring food supply and food security** to be put in place in times of crisis. The Commission proposed to revamp the **agricultural reserve** so its full potential can be used upfront in the case of crisis in agricultural markets. The political agreement reached by the co-legislators in June 2021 on the future CAP regulations will improve the arrangements applicable to the reserve. In addition to the risk assessment and management measures to be activated during a crisis, the Commission proposed to set up a **food crisis response mechanism** coordinated by the Commission and involving Member States. It would be comprised of various sectors (agriculture, fisheries, food safety, workforce, health and transport) depending on the nature of the crisis. A Communication with a specific proposal is scheduled in Q4 2021 and will be accompanied by a Staff Working Paper that will summarise the discussions that have been held with experts, stakeholders and Member State representatives to date.

The Commission Roadmap for the contingency plan proposal published in November 2020 (European Commission, 2020b) gave further insights into the motivation for the food crisis response mechanism and how it might operate. It underlined that ‘the situation [arising from the COVID-19 pandemic] highlighted the need for better preparedness at EU level, and the potential for coordination, a common understanding of issues to be set up in advance of crises, as well as coherent response mechanisms, instead of when crises have already started. In addition, future crises may be significantly different in nature, and give rise to further issues beyond those caused by the COVID-19 pandemic.’

In particular, the weaknesses identified by the Commission included the following (European Commission, 2020b):

There is currently insufficient established coordination mechanism at EU level that cuts across all relevant policy areas and can organise the concerted response to crises affecting food supply and food security in the EU (including inputs to producers). This potentially affects the effectiveness, coherence and timeliness of the response to crises both at EU and at Member State level and amplifies their negative impact on EU citizens. It also puts at risk the livelihoods of people employed in the food supply chain and has consequences for food security. The trust of EU consumers in the EU food system may be jeopardised due to reduced effectiveness in food safety control mechanisms and guidelines (e.g. reduced official controls or ‘own checks’ as regards compliance with food and feed safety requirements).



Different types of political, economic, environmental or health crises have the potential to disrupt food systems. 'Go-it-alone' responses by Member States can worsen the problem of supply chain disruption at the EU level, can destabilise markets, and would not be in line with the single market and EU policies. A lack of timely and accurate information and expertise concerning markets can lead to suboptimal policy responses, in times where the need for quick and effective action is most pressing. With increasing international travelling and trade, global political uncertainty, climate change, deforestation, drought and desertification, and technological risks, the frequency and magnitude of crises is likely to increase in the future.

To achieve coordination at EU level, the mechanism envisaged by the Commission would take the form of a permanent forum, created by the Commission and in which Member States and, possibly, food supply chain stakeholders would be represented. It would build on existing coordination processes and, in the event of an actual crisis, would convene and serve as the main operational mechanism for coordinating a response.

The Commission has identified the following characteristics for an effective EU food crisis preparedness and response mechanism:

- have a focus on coordinated action and dialogue to support policy consistency across the Union;
- be a space for the exchange of best practices and lessons learned;
- use a solid and up-to-date evidence basis, including reference to existing EU and international monitoring bodies and instruments;
- continuously evaluate threats and risks to the EU's food system;
- engage with international partners and organisations; and
- offer transparent communication to stakeholders and the public.

Lastly, it proposed to develop a set of broad guidelines and recommendations to improve coordination at EU and Member State level on how to better monitor and respond to crises affecting the EU's food supply and food security, informed by the outcomes of the work of the forum. The forum would promote non-binding agreements on how to respond rapidly and in a coordinated manner in times of crisis affecting the food system.

Possible models for the permanent forum envisaged by the Commission may include AMIS at international level, and the food safety alert network run by DG SANTE. The US approach focusing on the resilience of the food supply chain announced by the Biden administration is another possible model (Meyer, 2021). Supply-side measures mentioned in other meetings organised by the European Commission in the context of developing the contingency plan for ensuring food supply and food security included the use of food reserves, food production diversification strategies and the diversification of import sources. On the demand side, affordability aspects in times of crisis and the particular case of isolated regions in times of crisis had been highlighted.

The contingency plan's focus is on creating a coordinated response mechanism and a procedure to prevent and tackle crises affecting food supply and food security in the EU. Crises affecting regions outside the EU are outside the scope of this initiative as they are addressed in other frameworks.

Further details on the public consultation process held in connection with the Roadmap, as well as details of the expert group meetings held to prepare the contingency plan Communication, are provided on the relevant Commission web page<sup>1</sup>. The academic workshop whose proceedings are summarised in this report was one of the expert group meetings organised for this purpose.

## **1.2 Lessons from COVID-19 and past crises**

The context for the workshop was the experience of the COVID-19 pandemic. The pandemic raised awareness of the need to prepare for a possible food supply crisis in Europe. Indeed, climate change and biodiversity loss, as well as future pandemics and possible geopolitical disruptions, make our food system more fragile. Its growing complexity – with increased dependency on transport, logistics and the internet – also makes it more vulnerable.

Recent examples of food crises experienced in recent decades include the food price peak in the mid-1990s that gave rise to fears that the world was running out of food and stimulated significant investment in increasing supply capacity; the food safety crises at the end of the 1990s and early 2000s, including the mad cow and foot-and-mouth disease outbreaks, that led to more stringent food safety rules at global level; the commodity crisis starting around 2008 that led to significant co-movement and integration between price developments on agricultural markets and other commodity markets and very adverse effects at farm level due to the much higher increase in the costs of production than in output prices; and the COVID-19 crisis in 2020 (Haniotis, 2021). The conclusion drawn by Haniotis was that every crisis is different. Every crisis has elements that are unpredictable and, thus, for which the Union and the sector were unprepared. What is important is to learn from the way in which these crises were addressed.

EU policies played an important role during the COVID-19 crisis, including the Common Agricultural Policy (CAP) and open trade rules on which the single market is based. EU agri-food sector logistics were disrupted by the initial measures taken by EU countries seeking to limit the spread of COVID-19 from nearby countries, including the reintroduction of border checks or closure of the national borders (with temporary suspension of the Schengen rules on free movement). Direct measures taken at EU level, such as opening 'green lane' border crossings; identifying workers in critical occupations, including health and food workers, for whom continued free movement was deemed essential; and facilitating the movement of seasonal workers avoided further disruption of agri-food supply chains. Agricultural policy measures included opening private storage aid for various dairy products as well as beef and sheep meat, permitting producer organisations to derogate from competition rules, providing greater flexibility in the implementation of market support measures for wine, fruits and vegetables, table olives and olive oil, apiculture and the EU's school scheme (covering milk, fruit and vegetables), as well as some simplification of administrative procedures. Temporary support measures were also introduced under the EAFRD and the EMFF (Matthews and Soldi, 2021; Montanari et al., 2021; Wieck et al., 2021).

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<sup>1</sup> [https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/market-measures/agri-food-supply-chain/contingency-plan\\_en](https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/market-measures/agri-food-supply-chain/contingency-plan_en).

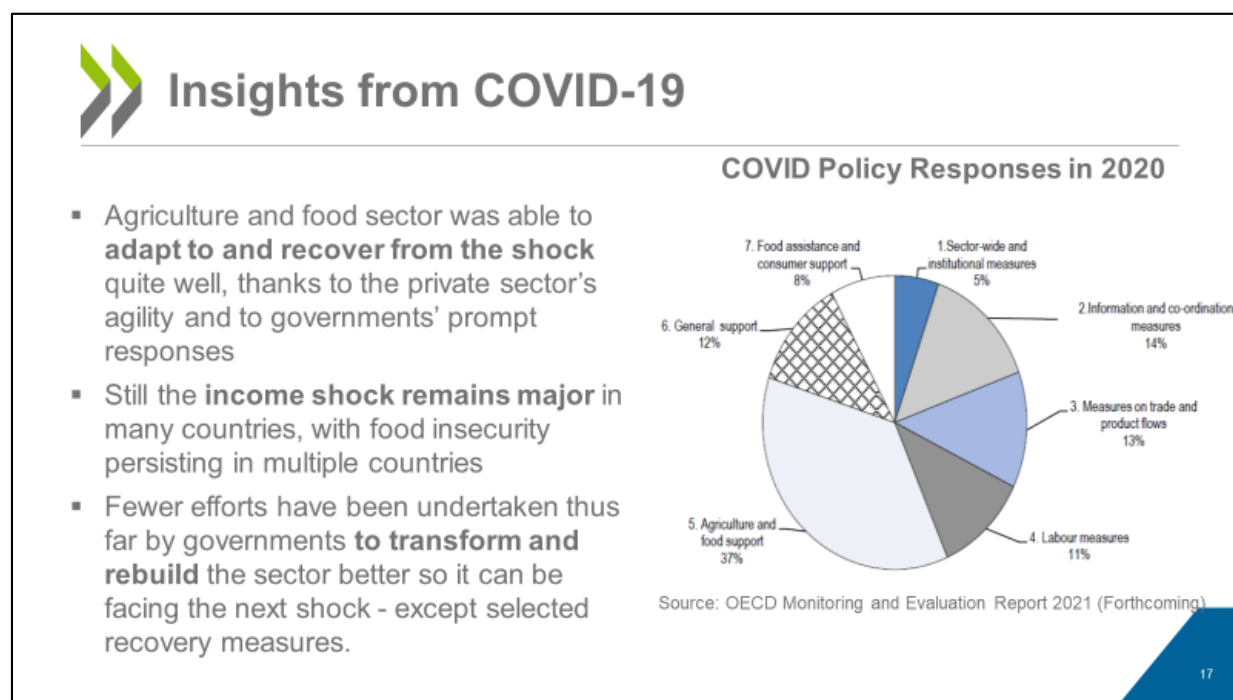
Several workshop presenters (Haniotis, 2021; Poppe, 2021; Villasante, 2021; Jackson, 2021) noted that trade during the latest COVID-19 crisis had, despite some exceptions, remained open. This was a significant difference with previous commodity crises. This allowed and enabled responses at a global level to what was a global crisis. Avoiding ‘adding fuel to the fire’ by taking response measures such as restricting trade that only makes the crisis worse is an important lesson to be taken from this crisis management. Another lesson is that all elements of sustainability – economic, environmental and social – are present in crises and need to be present in the solutions. Care should be taken to avoid falling into the trap of thinking that we can solve the economic components of a crisis at the expense of the environmental component or the social aspect. Solutions should not only provide answers in the short term but also for the longer term.

There was a consensus that the EU food supply chain had proved resilient, and that the agility of the private sector together with the policies taken by the EU enumerated above – as well as ad hoc coordination between the Commission and Member States – had contributed to this (Anton, 2021). But speakers also identified problems that had arisen.

Many countries experienced a severe income shock that adversely affected food security. Most responses to COVID-19 had taken the form of temporary relief to producers and the food value chain as well as to consumers (Figure 1). There were also targeted interventions to solve specific bottlenecks such as labour shortages. Fewer efforts were made by governments to transform and rebuild the sector to enable it to better withstand the next shock.

Within the EU, in the early stages of the pandemic there was a lack of coordination between Member State responses to a fast-moving situation (Anton, 2021). This led to barriers to movement between Member States of goods, services and workers needed to maintain the food supply (including cross-border and seasonal workers). There was also the sudden collapse in demand from the hospitality industry (hotels, restaurants, catering). Anton (2021) concluded that we avoided a food crisis on top of the health crisis, but that there is potential to improve *ex ante* and cross-policy coordination.

Figure 1. Global impacts and responses to the COVID-19 pandemic



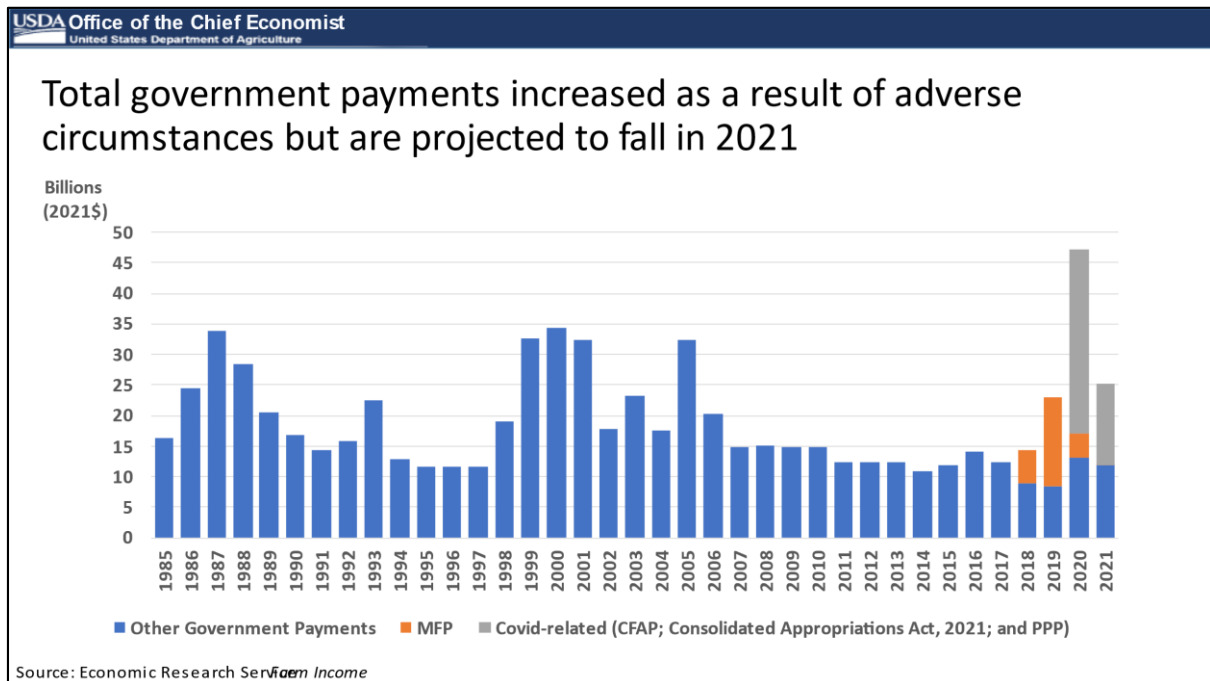
Source: Anton, 2021.

Poppe (2021) also concluded that the European food system had performed well, also thanks to open borders. He highlighted declining sales in some markets – flowers and food service and its suppliers – but noted that these were partially compensated by increasing sales in supermarkets and through short supply chains. In the Dutch context, mink farms were a COVID-19 risk and were definitively closed (which also happened in other countries), and he expected more discussion on livestock near urban centres. He observed the pattern of inequality in health outcomes due to COVID-19, where persons from lower economic classes with lifestyle and food-related problems (such as obesity) were overrepresented in hospital intensive care units. He also put the spotlight on the labour and housing conditions of migrant workers in slaughterhouses, etc. Other trends that may have longer-term consequences were increased working from home, more interest in living in the countryside and in rural tourism. He concluded by noting that the pattern of the economic recovery from the crisis (for example, the uneven impact of the crisis which has had a disproportionate impact on the job prospects of young people) may well have longer-term consequences for political competition in Europe.

Other workshop participants also highlighted lessons from the COVID-19 pandemic, including valuable insights from the US experience (Meyer, 2021). There were many similarities to the US experience of the COVID-19 pandemic. As in the EU, fluctuations in agricultural trade during the pandemic appeared modest. In the USA, the impacts of COVID-19 differed between farm and consumer levels. Food prices spiked in the early months (March to June 2020) – particularly for meat, poultry, fish and eggs – but then fell back to more normal yet still elevated levels. At the same time, producer prices fell sharply, reflecting supply bottlenecks due to a drop in beef and pork plant capacity as processing plants were either required to shut down or slow production lines due to COVID-19 outbreaks within their workforces. Capacity utilisation recovered quickly and, by June, had returned to close to its historical level. Nonetheless, whether the very high degree of concentration of processing facilities in the USA is optimal from a resilience perspective will require further analysis.

Meyer (2021) underlined the very considerable financial assistance provided to the US farm and food sector during the pandemic under the Consolidated Appropriations Act and the American Rescue Plan (Figure 2). Measures supported under this legislation included grants for improvements to meat and poultry processing facilities to allow for interstate shipment; grants for the dairy donation programme, intended to keep milk from being dumped; food supply chain assistance through the purchase and distribution of agricultural commodities; grants, loans and other assistance to respond to COVID-19 and maintain and improve supply chain resilience; and funds for worker protection against COVID-19.

Figure 2. Financial assistance to US farmers during the COVID-19 pandemic



Source: Meyer, 2021. MFP refers to Market Facilitation Programmes.

In summary, several key lessons emerge from the management of the COVID-19 pandemic. Every crisis is different and has unpredictable elements. However, procedures can be put in place to ensure better coordination and better preparedness to manage future crises. Responses to a crisis should not make the crisis worse. In particular, when a crisis has global dimensions, trade embargoes are an example of counter-productive responses that were mostly avoided during the COVID-19 pandemic. All elements of sustainability must be built into the resolution of crises. The economic components of a crisis should not be solved at the expense of the environmental component or the social aspect. There was a consensus that the EU food supply chain had proved resilient, and that the EU had avoided a food crisis as well as a health crisis, but that there is potential to improve preparedness and *ex ante* policy coordination.

## **2 Crisis preparedness and crisis management – a modern conceptual framework**

### **2.1 Understanding crises**

Crisis management emerged as a distinct area of study in the 1980s in countries such as the USA, Netherlands, Sweden and France. The American management expert Ian Mitroff is widely regarded as the founder of the discipline of crisis management and he established the first centre for crisis research at the University of Southern California in 1986 (see, for example, Mitroff (2003)).

One mainstream definition of a crisis in management literature is ‘a low-probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organization’ (Pearson and Clair, 1988). This definition points to three characteristics of a crisis: the rarity of the event, the significance of the event and the level of impact on stakeholders. Within this crisis-as-event perspective, it is not possible to foresee a crisis event because of the impossibility to consider the probabilities of potential risks that are inconceivable, unscheduled and unexpected. This contrasts with an alternative paradigm of crisis as a process which focuses on the need to understand crisis-fostering environments and how organisations respond to the stages of a crisis (Williams et al., 2017).

Crises can be distinguished from emergencies, though there are many similarities. It is possible to consider all crises as emergencies, but most emergencies are not crises. Emergencies are situations that require immediate action to address a serious threat; but these threats are foreseen. Specialised processes and teams are in place to carry out predetermined measures to address the threat. Crises, on the other hand, are distinguished by their complexity and by the presence of unknowns that cannot be handled by the normal line functions of an organisation.

It can still be problematic to determine whether an organisation is facing a crisis situation. Some workshop participants saw merit in defining *ex ante* parameters that might trigger a crisis response, especially where this might involve the suspension of current procedures or the mobilisation of additional financial resources (Rudloff, 2021). Within risk management literature, there is broad agreement on the classification of risks between normal risks, market risks and catastrophic risks, where the latter can be equated to a crisis situation (Anton, 2021). However, there are few hard and fast rules to distinguish where one type of risk ends and another begins. On the one hand, policymakers need the flexibility that the absence of fixed and rigid rules provides to face unknown and sudden events developing quickly in a context of great uncertainty. On the other hand, the absence of predetermined rules can make decision-making more politicised at a time when tempers may already be running high. One relevant example for discussion might be whether pre-agreed trigger rules would make the activation of the agricultural reserve more or less effective.

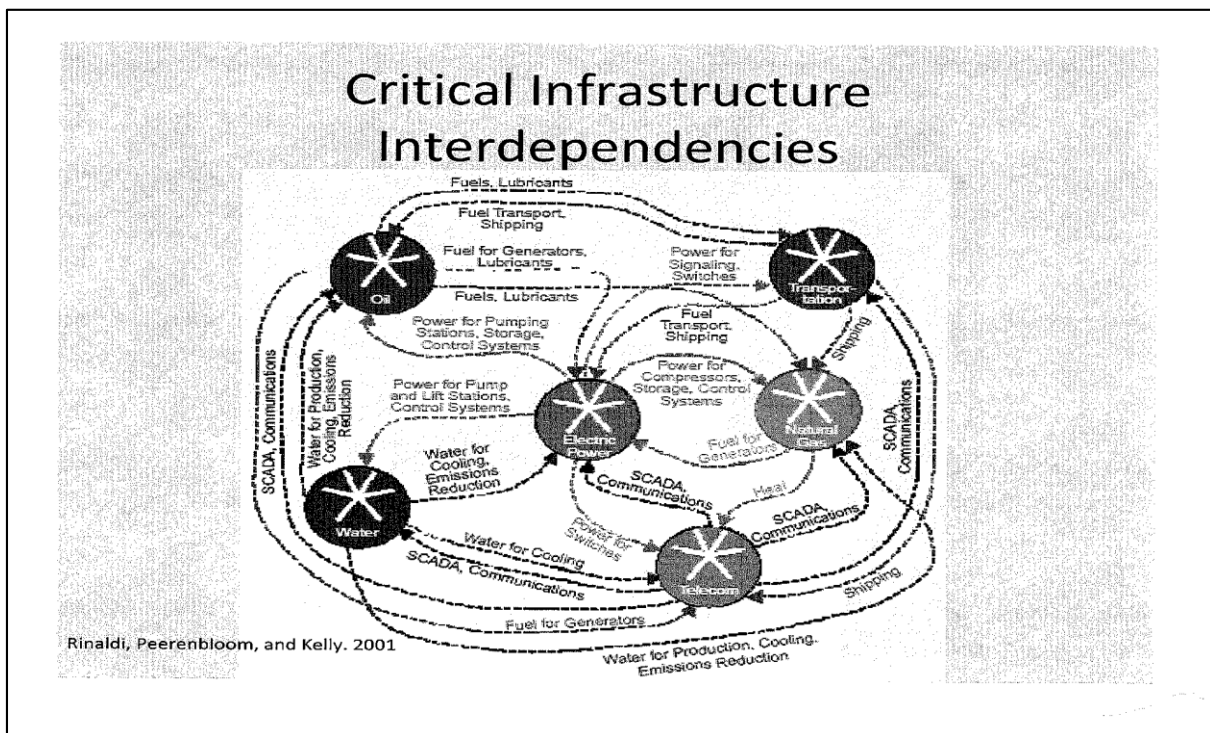
### **2.2 The transboundary nature of vulnerabilities and threats**

Other trends in the world of crises also make the identification of crises more difficult (Boin, 2021). One set of issues relates to changing vulnerabilities and threats. The ‘new normal’ presents with increased complexity and the growing importance of transboundary crises which are particularly hard to manage. Complex systems are systems that we no longer understand and that are often interlocked with other complex systems. Examples of transboundary crises include the 2008 financial crisis,

Icelandic volcanic ash, health pandemics, climate change, immigration and cyber-attacks and foreign intrusions. There are also changes in the social and political environment that shape the response to crises. Examples here include the declining legitimacy of public institutions, including a decline in trust in expertise; the emergence of social media; and the concerted use of disinformation campaigns (Boin, 2021).

One characteristic of modern crises is that they often affect multiple countries and sectors. There is a time dimension, with periods of incubation, punctuation and escalation. They are often incomprehensible (black swans), with the 2008 financial crisis a good example. There may be clashing responsibilities because the crisis spreads across several countries and several policy domains. And there are no ready-made solutions given that crises are unique combinations of developments, requiring solutions to be developed ‘on the fly’ and often under great pressure and without sufficient information. The importance of planning for flexibility and the ability to improvise during a crisis emphasises the need to give priority to the process in contingency planning rather than focusing on a single crisis response strategy. The combination of increasingly complex systems, and the fact that they are more tightly linked together, gives rise to enhanced vulnerability. When threats emerge, they are addressed through improvised patches rather than a re-engineering of the system from the ground up. The result is the constant incubation of transboundary threats. A map of critical infrastructure interdependencies created twenty years ago after 9/11 already illustrated these complexities (Figure 3).

Figure 3. Critical infrastructure complexity and loops



Source: Boin, 2021. SCADA refers to Supervisory Control and Data Acquisition systems that provide monitoring and control of critical systems across industries.

These complex systems are constantly being challenged by what Boin (2021) calls ‘accelerators’ – a range of exogenous developments that constantly challenge our brittle systems. As examples, he

mentioned technical jumps (ICT revolutions, drones, DNA editing, 3D printing, bitcoin, etc.), demographics (population decline in the western world, population growth elsewhere), geo-political shifts (Russia, China) and climate change.

This new context creates challenges for strategic crisis management, or the ways in which we respond to and manage crises. Many of these challenges arise from the fact that it is hard to manage transboundary crises. They are hard to detect, hard to understand and it is hard to assign responsibilities (Who decides? Who communicates? Who takes the blame?). Boin (2021) concluded that existing crisis management systems do not suffice in the face of transboundary disasters. These crises put pressure on national leaders (or CEOs in the context of business), who often come up empty-handed or fail to adequately protect populations. The consequence of this failing capacity to deliver is the delegitimisation of existing arrangements.

There is a need to create a truly transboundary crisis management capacity. This should be based on a clear recognition of boundaries: coordination works when boundaries are in place. This can be seen as an organisational design issue (see also Trondal, 2021). One key issue is how to establish who is in control during a transboundary crisis. One solution is hierarchical schemes. The U. system of Incidents of National Significance (INS) defined in its National Response Framework delivers a good example: INS concentrate power during a crisis in the hands of the federal authorities. However, this is not an option that will work in the EU<sup>2</sup>. This will require the EU to come up with a unique solution, something that the EU is good at – but in terms of crisis management, we are not yet there. A recent mapping of EU crisis management capacities covered counter-terrorism, cybersecurity, energy, transport, health and migration, but not food (Andrée et al., 2017). The challenge, also in the food sector, is to progress towards a truly transboundary crisis management capacity.

### 2.3 The crisis management cycle

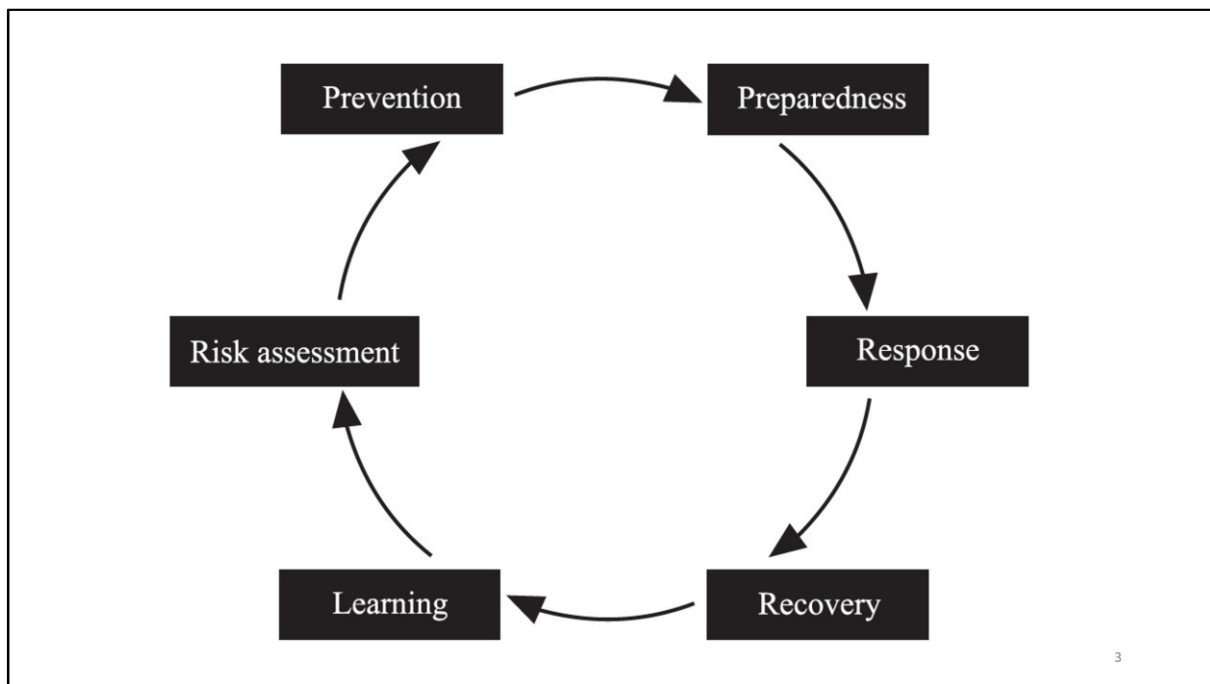
The main elements of the crisis management cycle are shown in Figure 4 (Pursiainen, 2018; 2021). The crisis management cycle begins with the **risk assessment phase**. The importance of a well-planned and functioning risk assessment system is stressed by Pursiainen (2021). Focusing on the example of animal disease risks, he suggests the kind of questions that can be asked. What is the relevant legislation? Who are the actors? What is the role of the competent national authority? Is some kind of risk assessment/management standard followed (e.g. ISO 31000)? Are animal diseases included in the national risk assessments as required under the Commission's Reporting Guidelines on Disaster Risk Management (Decision No 1313/2013/EU)? Which animal diseases are assessed, and how often?

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<sup>2</sup> For the US National Response Framework, including the Emergency Support Function for Agriculture and Natural Resources, see <https://www.fema.gov/emergency-managers/national-preparedness/frameworks/response>.



Figure 4. The crisis management cycle



Source: Pursiainen, 2011.

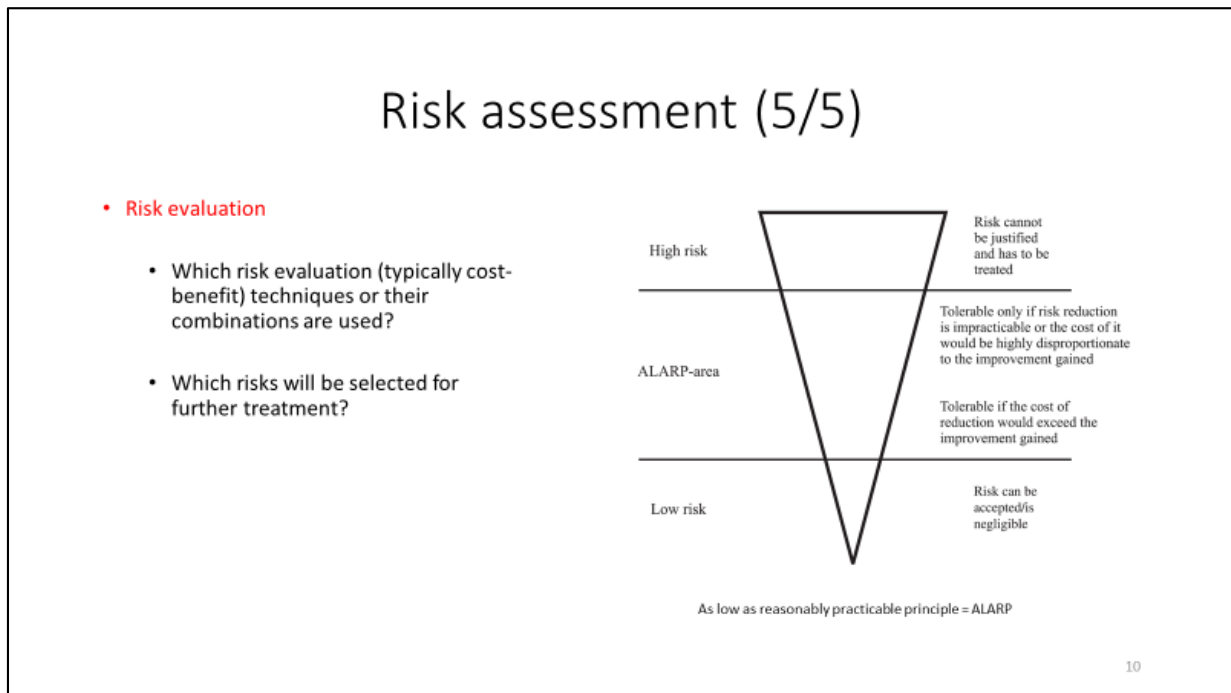
The risk assessment phase consists of the three elements of risk identification, analysis and evaluation. **Risk identification** can benefit from the use of specific risk identification techniques. Pursiainen (2021) illustrates this again using animal diseases as an example. A-class diseases are the most transmittable and serious (examples include foot-and-mouth disease, chronic wasting disease, African swine fever virus and avian influenza). Some of these diseases may be transmitted to humans and cause specific health problems. But even if mostly harmless to humans, animal diseases may severely damage the reputations of farms or companies, require long-term regulatory bans on selling and exporting or necessitate the mass slaughter of animals. Further, new, unexpected serious animal diseases may emerge. Greater risks may be associated with climate change, due to the increased survivability of diseases and reduced development times and extended transmission times for marine fish diseases, terrestrial parasitic diseases, bacterial diseases and insect-borne diseases, permafrost melting, etc. The animal origins of SARS-CoV-2 and similar animal-to-human transmitted diseases are a warning that the frequency of zoonoses may increase as humans come into ever-closer contact with wild host species as natural ecosystems disappear.

The second element in risk assessment is **risk analysis**. The process of identification can produce a long list of risks. How to select those risks that warrant further analysis is not an easy decision because it takes both resources and knowledge. Scenario analyses are needed to evaluate both their likelihood and salience. With known risks, such as specific animal diseases, it is possible to run Monte Carlo simulations with a lot of data to help answer this question. One example is a study (Lyytikäinen et al., 2011) that found that the potential for the spread of foot-and-mouth disease in Finland is low given the structural characteristics of Finnish livestock farming. Such an analysis is much more difficult when facing a new kind of risk for which such data is not available.

The third element in risk assessment is **risk evaluation** to determine which risks will be considered for subsequent treatment and to do something about them. Risk evaluation techniques (typically cost-

benefit) can help when making choices about where to put resources for further treatment. Do you accept the risk as it is, or should some action be taken? There are certain high risks where something must be done, but there is usually a rather wide range of risks where further evaluation will be necessary (Figure 5).

**Figure 5. Illustrating the risk evaluation phase in risk assessment**

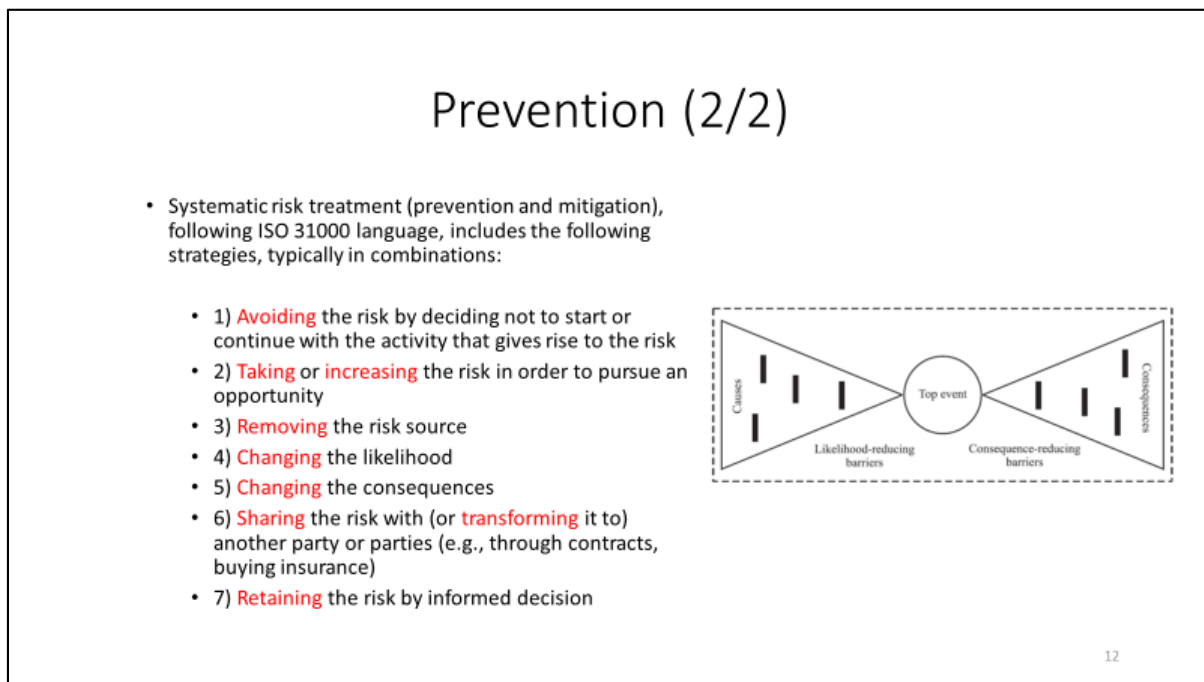


Source: Pursiainen, 2021. ALARP refers to ‘as low as reasonably practicable’.

Once risks are identified and assessed, risk **prevention** strategies should be put in place. Pursiainen’s (2021) view is that this should be seen as an **important part of contingency planning** to avoid the emergence of crises in the first place. Others would reserve contingency planning for risks that cannot be prevented. Systematic risk treatment (preventing or at least mitigating risks), following ISO 31000 language, includes the following strategies – typically in combination – to either reduce the likelihood of risks or to mitigate their consequences:

- avoiding the risk by deciding not to start or continue with the activity that gives rise to the risk;
- taking or increasing the risk in order to pursue an opportunity;
- removing the risk source;
- changing the likelihood;
- changing the consequences;
- sharing the risk with (or transferring it to) another party or parties (e.g. through contracts, buying insurance);
- retaining the risk through an informed decision.

Figure 6. Strategies for treating risks (prevention and mitigation)



Source: Pursiainen, 2021.

The next phase in the crisis management cycle is **preparedness**. It is impossible to prevent all risks or crises, thus the requirement to be ready to identify them and to create the capacities and capabilities to respond. Preparedness can help to mitigate the consequences of a crisis when it hits. Good preparedness involves the continuous building of consequence-reducing barriers, and hence the sharp demarcation between prevention and mitigation efforts and preparedness disappears. Contingency planning is an important element of preparedness. This includes planning; organisation and procedures, including communication; capacity-building, including training and exercises; redundancy; agreements and pre-arrangements; and early warning. Planning is the core element of preparedness (Pursiainen, 2018).

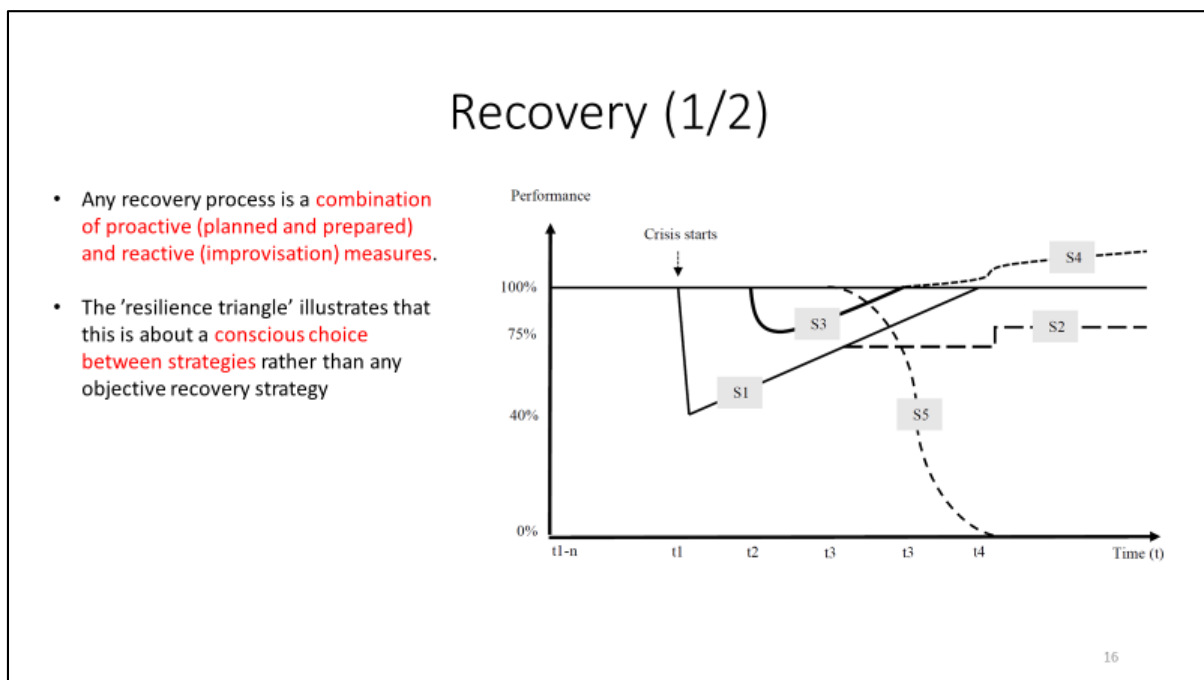
**Crisis response** is the next phase in the crisis management cycle. Crisis response takes over once a crisis occurs; it involves the activation of the procedures, tools and measures that have been put in place as part of contingency planning. Three elements are always present when responding to a crisis, according to Pursiainen (2021).

- *Sensemaking*. Is this a crisis, how should it be ‘framed’, what kind of a crisis, for whom? For example, COVID-19 began as a health crisis but also became a social and economic crisis and has more recently taken on geopolitical dimensions.
- *Decision-making*. Who is making the decisions, how is multidimensional crisis-decision-making (administrative levels, affected sectors, etc.) coordinated (Rudloff, 2021; Trondal, 2021)?
- *Communication (meaning-making)*. The danger is unintentionally creating a communication crisis (‘a crisis within a crisis’) which may have a serious impact on the management of the crisis and reputation of the decision-makers (Eriksson, 2021).

There are two further stages in the crisis management cycle. The **recovery** stage lies even further from contingency planning. Any recovery process is a combination of proactive (planned and prepared) and

reactive (improvisation) measures. Looking at Figure 7, the various lines labelled S1, S2, etc. represent different recovery strategies. The 'resilience triangle' represents the cost of the crisis and the objective is to minimise this cost. The different strategies lead to different outcomes. S5, for example, demonstrates a high level of preparedness and manages the early phases well, but then the crisis gets out of hand and the system implodes. Many outcomes can be represented by strategy S2 where there is recovery from the depths of the crisis, but the system never returns to its previous level of performance. In some cases (strategy S4), it is possible to 'build back better', where post-crisis performance improves on the pre-crisis performance. The message is that recovery is a conscious choice between strategies rather than being able to rely on a single-objective recovery strategy.

**Figure 7. Recovering from crises**



Source: Pursiainen, 2021.

The final stage in the crisis management cycle is **post-crisis learning**, which seeks to draw lessons from the management of the crisis to inform the contingency planning process and to lead to updated contingency plans and guidelines. Learning happens before a crisis – through training, simulations and so on – but also during a crisis. If we consider that learning takes place in the human brain, the question is how to transfer this to an organisation (an agency, the EU) and changes in organisational policies. Simple learning feedback can be relatively straightforward – how to make existing response mechanisms work better. It becomes more complicated if the lessons from a crisis require rethinking one's goals and even values, for example, whether health or economic outcomes are considered more important. Key questions here include whether there is a structure to make systematic, institutionalised efforts to draw lessons from a particular crisis. Are the measures adopted re-assessed and contingency plans and guidelines updated? Is this followed by arranging additional training or education?

Other workshop participants presented similar models of crisis management drawing on other disciplinary frameworks and fields of experience. The disaster risk cycle model presented by Baldwin (2021) (Figure 8) maps almost exactly on to the crisis management model in Figure 4, but omits the

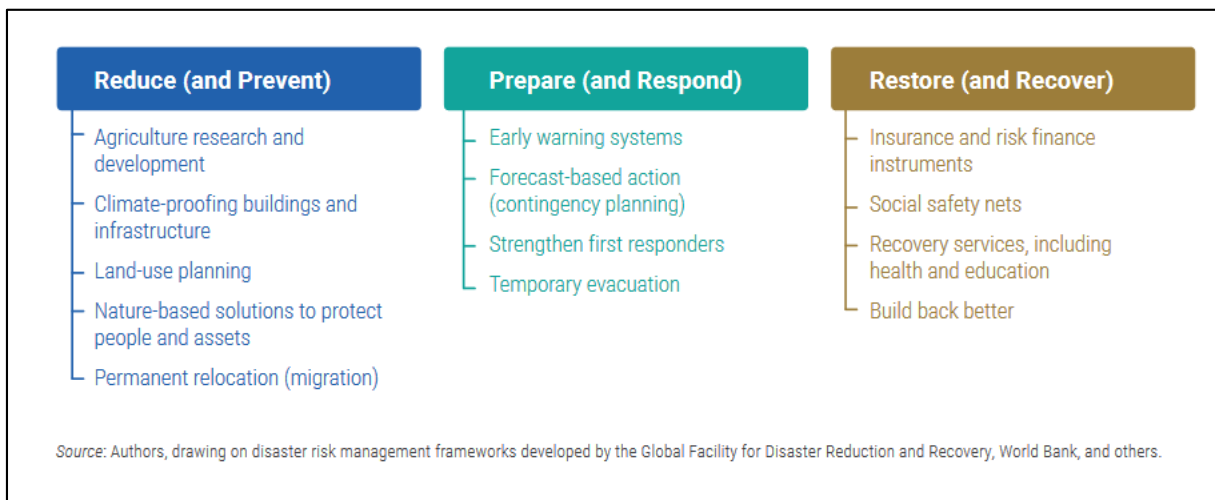
'Learning' component. The risk management planning framework presented by Baruth (2021) (Figure 9) also sees contingency planning as part of the 'Preparedness' phase. The resilience systems cycle model relating to the seafood industry put forward by Villasante (2021) broadly highlights the same steps (Figure 10). The 'Build robustness' step in that model embraces the risk identification and assessment, prevention and preparedness steps in Pursiainen's crisis management model. In summary, there was broad agreement among participants on the essential steps within crisis management.

**Figure 8. The crisis management cycle from a disaster management perspective**



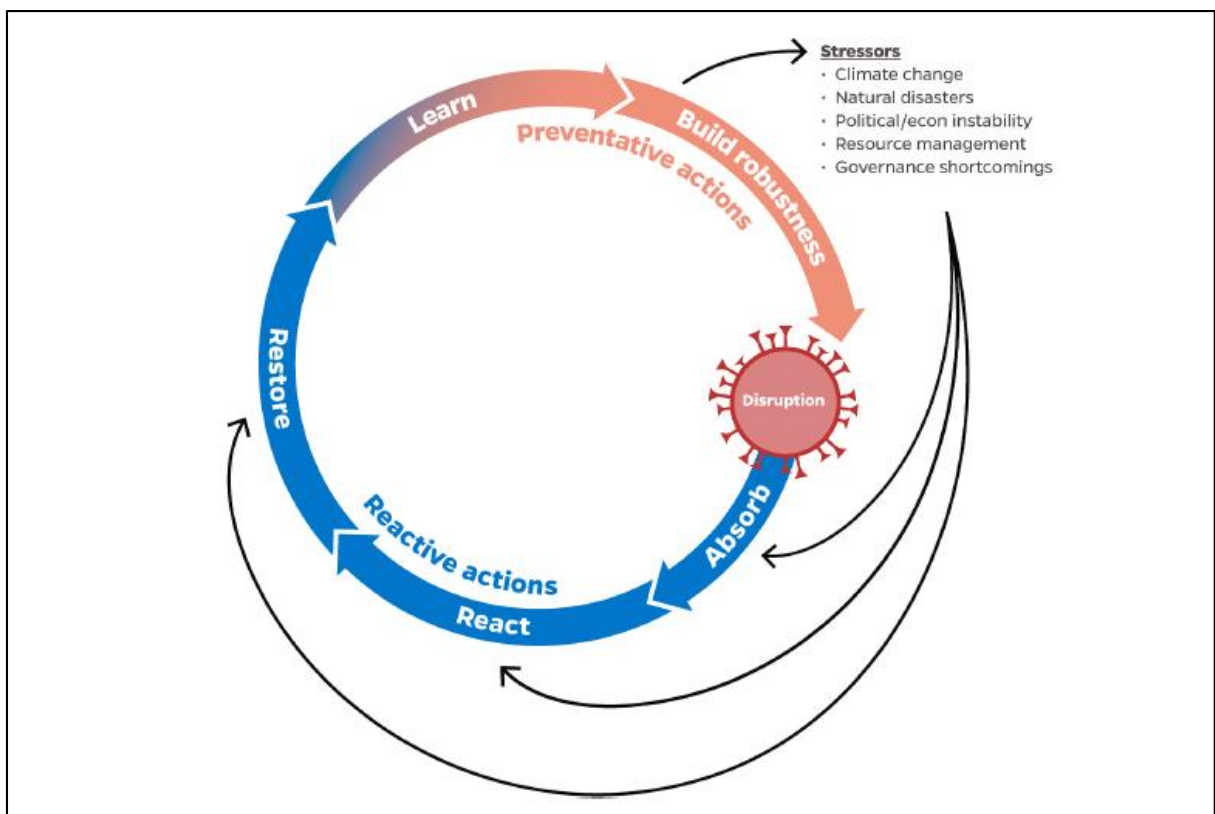
Source: Baldwin, 2021.

**Figure 9. Contingency planning in a risk management framework**



Source: Baruth, 2021, drawing on the Global Commission on Adaptation report, 2019.

**Figure 10. Seafood system resilience system cycle**



Source: Villasante, 2021

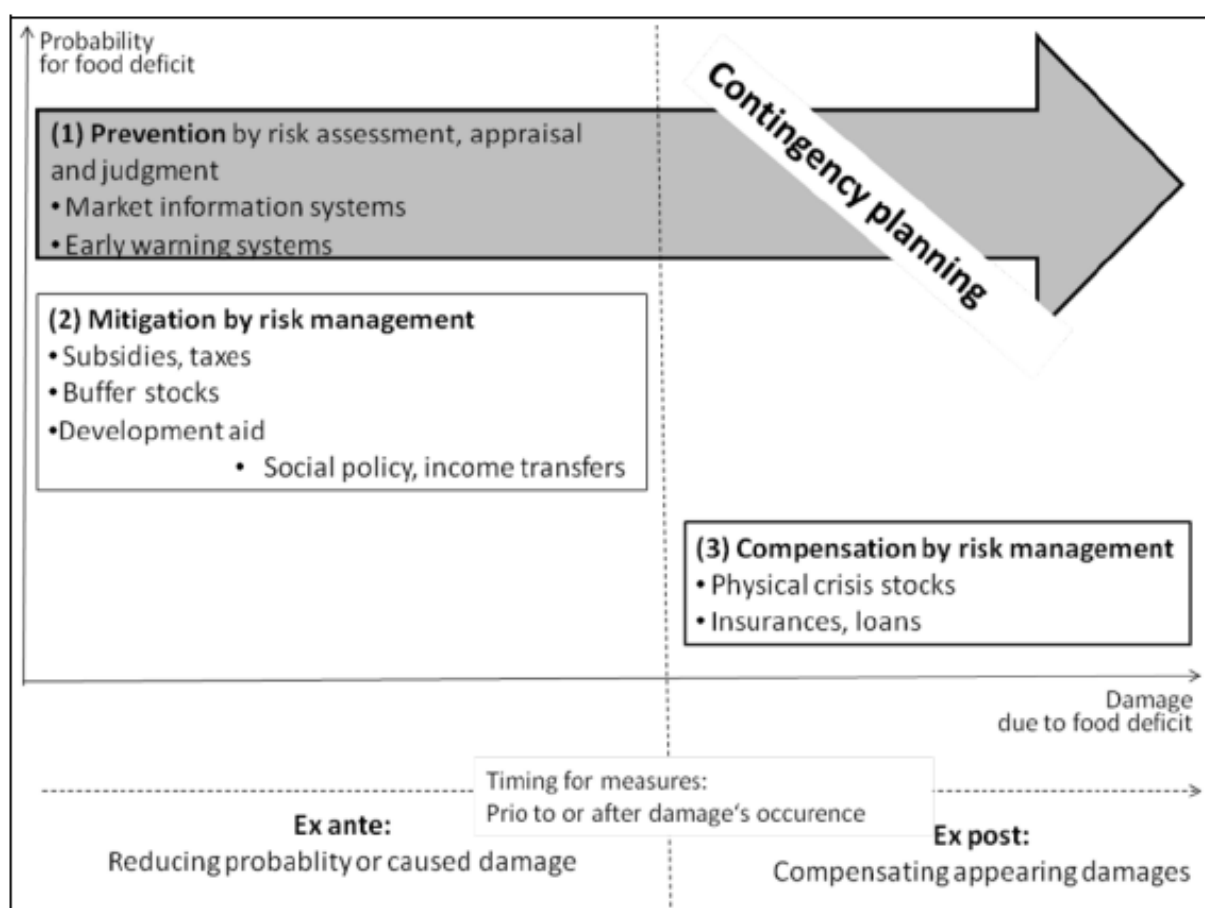
## 2.4 Contingency planning – clarifying the boundaries

Workshop participants put different emphasis on the scope of contingency planning in the crisis management cycle. All are agreed that contingency planning is part of the preparedness phase of crisis management. There is also broad agreement that contingency planning must engage with risk assessment, including the identification, analysis and evaluation of risks. Within the Sendai Framework

for Disaster Risk Reduction, contingency planning is defined as a management process that analyses disaster risks and establishes arrangements in advance to enable timely, effective and appropriate responses. This is also the framework within which the Commission is reflecting on the role of the proposed food crisis response mechanism, as it also sees a role for this mechanism to continuously evaluate threats and risks to the EU food system.

Other participants saw a role for contingency planning in proposing measures to prevent or reduce the probability of threats (Pursiainen, 2021), as well as ensuring that there is an adequate toolkit of measures in place to activate during the response step in a crisis. Rudloff et al. (2012) even argue that contingency planning can be seen as a tool that addresses all stages of crisis management (Figure 11). While it starts with the classic functions of risk assessment and appraisal, prevention and preparedness (referred to as *ex ante* measures), these authors also extend the function of contingency planning to planning the *ex-post* measures – that is, designing the instruments and compensatory measures that can be put in place once a crisis has occurred. Given this potential for divergent perspectives, it will be important to clearly define the scope envisaged for contingency planning and the role of the permanent forum.

**Figure 11. Contingency planning in the context of other approaches**



Source: Rudloff et al., 2012.

## 2.5 The relationship between contingency planning and building resilience

Contingency planning and resilience are two aspects of the same challenge – the challenge of addressing adversity; but there are important differences. Resilience is defined as the food system’s capacity to prevent, mitigate and/or respond effectively to shocks. Resilience is about building the capacity to survive, recover, adapt and transform in the face of shocks and stresses. Resilience-building occurs before a crisis strikes through preparedness, mitigation and prevention activities. It also occurs after a crisis through recovery activities that allow for adaptation and positive transformation. Contingency planning can be seen as contributing to building resilience. The role of contingency planning is to ensure the supply of food when the system can no longer cope due to a crisis, while resilience is a longer-term strategy that will be further developed in the proposed legislative framework for sustainable food systems (Haniotis, 2021). However, how the food system responds to a crisis will be determined, in part, by its resilience.

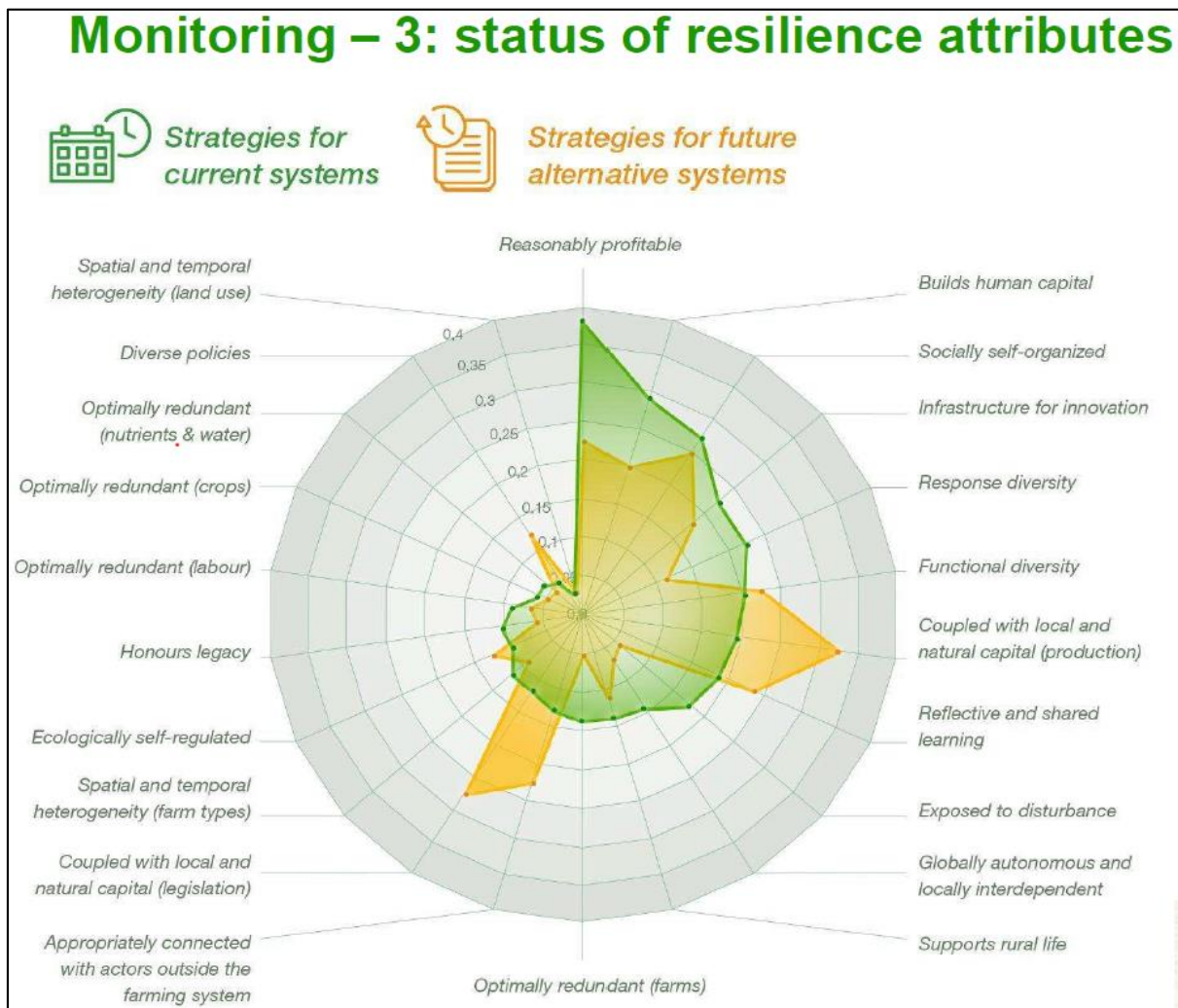
A focus on resilience raises the question of how it can be measured and monitored and the resilience status of the food system assessed. Relevant lessons on monitoring the resilience of farming systems have been derived in the SURE-Farm (Sustainable Resilient EU Farming Systems) research project (Meuwissen, 2021)<sup>3</sup>. Resilience is not a directly observable characteristic of systems, more a latent variable, which raises the question of how to monitor it. The scale of the system to be examined must first be determined (the resilience of what?). In the case of the SURE-Farm project, this related to farming systems. Resilience monitoring was carried out at three levels. An initial option was to ask how successful farming systems are in the delivery of public and private goods (resilience for what purpose?). A second option was to focus on the status of resilience capacities – robustness, adaptability and transformability. The project developed a methodology to measure perceptions of capacities while also inferring capacities by observing previous responses and strategies adopted by farms. A third option was to measure resilience attributes which are really at the heart of resilience. Figure 12 shows the resilience attributes that were monitored in the SURE-Farm project. The project applied these various monitoring options to eleven farming systems across the EU.

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<sup>3</sup> More details on the SURE-Farm project can be found at <https://www.surefarmproject.eu/>.



Figure 12. Status of resilience attributes of farming systems in the SURE-Farm project



Source: Meuwissen, 2021.

Meuwissen (2021) concluded that the importance of resilience attributes shows that system design matters, i.e. being impacted by a crisis is not ‘just a matter of bad luck’. The systematic resilience assessment of farming systems points at system vulnerabilities. Many farming systems in Europe face a looming resilience crisis. This can feed into stress tests on food systems. If transformations are required, e.g. to respond to concerns about transnational value chains and future pandemics from zoonoses, the transformative capacity of many farming systems needs to be actively enhanced through an enabling environment. There are also pitfalls in monitoring that need to be avoided. One is to adopt an overly narrow focus, for example, just looking at income trends and stability and income recovery rates after a crisis. This can be done, but it misses many other important aspects of resilience. A second pitfall is to rely on just a single indicator. Again, this fails to capture the complexity of resilience and multiple indicators are required. A third pitfall is the existence of blind spots, not only in policymaking but also in research, requiring an openness to thinking about potential outcomes, which may be difficult and uncomfortable to do.

According to Anton (2021), who applied a ‘resilience’ lens to risk management, resilience is defined as the ability to:

- **prepare** for likely or imminent shocks;
- **absorb** the impacts of shocks, mitigating or preventing risks;
- **recover** from a shock;
- **adapt** to an evolving risk environment;
- **transform** if the current system is no longer viable.

The OECD has undertaken several resilience country case studies<sup>4</sup>. A common message in all of them is the importance of trusted networks (Anton, 2021; see also Baldwin, 2021). Industry and farm organisations can ‘bridge the gap’ between research organisations and knowledge, on the one hand, and farmers and other supply chain actors on the other, as in the USA and New Zealand. It is important to provide guidance to farmers to make their own contingency plans, as occurs in Japan, the USA and New Zealand. Another important message is the need to connect public and private actors before a crisis occurs, as in the US Critical Infrastructure Sectors framework. Leveraging existing networks during crises is also important, where the proactive role of agricultural cooperatives in Japan is a good example. This would also include agricultural ministries and, in particular, their locally based staff as well as staff on the ground from other agencies.

Good policies also play a role in preparing for crises. Participatory processes are important, such as the cost-shared public-private partnerships to manage animal and plant health risks in the Netherlands, which are a good way to allocate responsibilities *ex ante* prior to a crisis. Structured arrangements to enable learning from previous crises (beyond agriculture) are valuable, such as Japan’s system of ‘pairing’ prefectures. Simulations and table-top exercises can enhance the preparedness of all relevant stakeholders to respond to crises as well as motivate their engagement. Information and science-based tools and platforms can facilitate crisis response efforts and obtain greater stakeholder engagement. While it is important to prioritise business continuity, this should not be at the expense of disincentivising preparedness and building back better (Anton, 2021).

Anton (2021) asked whether agricultural policies are focused on resilience. The OECD Producer Support Estimate (PSE) database shows that producer support is diverse and high in some countries. There is some evidence that government expenditure on risk management tools has been increasing over the 2000-2019 period though it varies considerably across countries. For example, the EU’s share of the PSE on risk management tools is 3% compared to 40% in the USA (2017-2019). However, considerable producer support is potentially significantly distorting support and not targeted towards resilience. Examples include market price support that requires border measures and coupled support measures that promote continuity rather than innovation, preparedness, adaptation and transformation. Decoupled payments have both positive and negative impacts from a resilience perspective. They help farmers to absorb and recover from adverse shocks, and they keep land in

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<sup>4</sup> Relevant reports include OECD (2018), *Assessing Global Progress in the Governance of Critical Risks*; OECD (various), *Reviews of Risk Management Policies*; OECD (2020), *Strengthening Agricultural Resilience in the Face of Multiple Risks*; and OECD (forthcoming), *Building Agricultural Resilience to Natural Hazard-induced Disasters – Insights from Country Case Studies*.

agricultural use to respond to future shocks. However, they can potentially maintain the inertia of producing as in the past. Support for public goods, innovation, information and infrastructure contributes to preparedness, but it has a minimal share of support expenditure. Several initiatives to operationalise policies for resilience could be pursued (Anton, 2021):

- investments in on-farm resilience capacities,
- no-regret policies and investments in public goods,
- greater focus on *ex ante* policies and strategies,
- consideration of outcomes and interests of stakeholders,
- participatory and collaborative processes.

### **3 Risks, threats and vulnerabilities to food security and food system resilience**

There is now recognition in food security literature that the vulnerability of a food system relates to both its likelihood of being exposed to hazards or shocks and its capacity to respond to them (Dilley and Boudreau, 2001). Critical concepts for disaster management and prevention, such as ‘hazards’, ‘vulnerability’ and ‘risk’, were delineated and standardised in the context of natural disasters at a United Nations Disaster Relief Organisation workshop in 1979 (UNDRO, 1980). Vulnerability is contingent on the occurrence of a hazard event. The threat of a natural hazard is the probability of occurrence of a potentially damaging event at a specific place and within a specific time period. Vulnerability is defined as the degree of loss or damage expected as a result of a specific hazard. Risk is then the expected degree of loss due to a particular natural phenomenon as a function of both the natural hazard and vulnerability. Vulnerability can be reduced by building resilience, which enhances the system’s capacity to respond to hazards. These concepts are relevant, beyond natural disasters, to also include the disruption to food systems due to socio-economic, health or other causes.

Several workshop presentations addressed the identification and monitoring of threats to food supplies and food security. Anton (2021) identified several potential threats specific to the food supply chain (Table 1).

**Table 1. Being prepared for a wide range of risks to food supply & food security**

Shocks	Stressors
<b>Biophysical and environmental</b>	
Adverse weather conditions	<b>Climate change</b>
Power outages	Water-related risks
<b>Socio-economic and demographic</b>	
Economic crisis	Socio-economic development
	Population growth
<b>Health</b>	
Pandemic or food safety outbreak	Antimicrobial resistance or persistent food safety issues
<b>Socio-political and legal</b>	
Civil unrest and displacement crisis	Corruption
Trade barriers	Distress migration

Source: Anton, 2021.

Those hazards can be prioritised by means of a two-dimensional risk analysis (Pursiainen, 2021), which considers both the probability of a hazard occurring and the potential impact or damage expected from the respective hazards. Developing scenarios can also help to analyse the impacts of identified hazards as well as different ways they may unfold. Scenarios outline the possible humanitarian consequences of a crisis. They specify, for example, the possible number of people affected, the time span and location. It is then for planners to determine what kind and quantity of assistance would be needed in each scenario, enabling preparations for potential contingencies (Rudloff et al., 2012).

An issue in defining vulnerabilities is whether the focus of the new food crisis response mechanism will be on addressing the food availability consequences of supply disruptions (whether caused by production shocks at the level of primary production, or logistical or other disruptions to the processing sector or the broader supply chain) or on protecting the livelihoods and income of those working along the supply chain. The experience of COVID-19 in both the EU and the USA indicates that both elements were important (Anton, 2021; Meyer, 2021; Poppe, 2021). Pursiainen (2021), in his discussion of animal disease epidemics, also highlighted the importance of compensation as part of the response toolkit. In several of the food-related crises reviewed by Haniotis (2021), traditional commodity crises

were marked by severe difficulties for primary producers but without necessarily having an adverse impact on food supply (indeed, periods of very low farm prices are often associated with excess supplies on world markets). Safety nets for primary producers are already managed by the Commission under the CAP regulations, meaning that the focus of the new contingency planning mechanism will be on assessing and preparing for threats to food supplies.

### **3.1 Early warning systems**

Early warning is recognised as an essential element in reducing the risk of disasters and crises. In the case of natural disasters, early warning empowers people to take action to protect their lives and property prior to a disaster. Effective early warning systems (EWSs) combine risk analysis, monitoring and location and intensity prediction for the disaster, as well as communicating alerts. Alert warnings can trigger emergency responses for which contingency planning has prepared. Investment in EWSs is thus an important element in supporting effective contingency planning (see Figure 9 above).

In the case of food systems, EWSs can provide timely and accurate information on current and forecasted global food production to better prepare for disruptions in food supply and global crop market price fluctuations of the types witnessed over the last 10 years (Baruth, 2021). Improved monitoring will enable more accurate forecasting of commodity prices and a better understanding of the key risks to food supply, helping to reduce global food insecurity. Out of five investment areas with the highest potential return for climate adaptation, EWSs are the area with the highest benefit-cost ratio (10:1).<sup>5</sup> The two most common drivers of food security crises are weather and conflict, and EWSs – by providing early warning alerts – can improve response planning. In summary, the role of EWSs focused on agricultural production is to increase market transparency and improve food security by producing and disseminating relevant, timely and actionable information on agricultural conditions and production outlooks at national, regional and global level. EWS information can be used to help prepare crop balance sheets for supply and demand, design policy interventions and allocate investments, but also provide early warning alerts to trigger emergency responses.

Agricultural production-focused EWSs primarily concentrate on timely qualitative assessments of crop/pasture conditions based on meteorological and remote sensing data. They focus in particular on anomaly detection with respect to a long-term average for a range of potential variables: temperature (number of hot days, heat waves, minimum/maximum temperatures) (observed or modelled); precipitation (cumulates, longest dry period) (observed or modelled); soil moisture (satellite or model-based); biomass (derived from earth observation data or modelled); crop conditions / vigour (proxies derived from earth observation data such as the Normalised Differential Vegetation Index (NDVI) or biophysical variables such as the Fraction of Absorbed Photosynthetically Active Radiation (FAPAR) or modelled); and drought indicators such as the Standardized Precipitation Index (SPI). All indicators should be spatially tailored to the presence of agricultural land or, even better, be crop-specific, and are ideally put in relation to the respective crop development stages for a proper assessment. The first

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<sup>5</sup> Global Commission on Adaptation, *Adapt Now: A Global Call for Leadership on Climate Resilience*, 2019, available at [https://gca.org/wp-content/uploads/2019/09/GlobalCommission\\_Report\\_FINAL.pdf](https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf).

EWSs were developed in the 1970s but some basic information such as crop type maps or crop calendars are still difficult to obtain and to update for national and global systems.

One example of EWS outputs is the Anomaly hotSpots of Agricultural Production (ASAP) on-line Early Warning Decision Support System to further improve the early warning of food production anomalies for food security assessments. It complements the Joint Research Centre MARS (Monitoring Agricultural ResourceS) bulletins for Europe for countries at a high risk of food insecurity (Baruth, 2021). ASAP is predominantly based on satellite and agro-meteorological data and consists of three information platforms: hotspot analysis (country-level monitoring, 80 countries, monthly, intended for decision-makers and policy analysts); warning explorer (global at province level, 10 daily, fully automated, intended for agricultural analysts); high-resolution viewer (field-level monitoring, Sentinel imagery, intended for analysts with remote sensing knowledge). ASAP makes latest generation earth observation data and cloud computing accessible to users without programming experience or their own hardware/software infrastructure completely free of charge and has a high level of user interaction.

Another EWS example is GEOGLAM (Group on Earth Observations Global Agricultural Monitoring Initiative). GEOGLAM works to increase market transparency and improve food security by producing and disseminating relevant, timely and actionable information on agricultural conditions and outlooks for production at national, regional and global level. The GEOGLAM policy mandate initially came from the Group of Twenty (G20) Agriculture Ministers during the French G20 Presidency in 2011. In 2013, the Agricultural Market Information System requested that GEOGLAM provide monthly consensus crop conditions on the four major commodities (wheat, rice, soy, maize) in countries responsible for 80-90% of global production. Since then, GEOGLAM has published the *Crop Monitor for AMIS* bulletins, which are one of the most valuable components of AMIS' Market Monitor.

Agricultural production-focused EWSs assess production availability based on meteorological information and remote sensing. A further step could take account of the likelihood of risks and how these relate to food security indicators, but this is not part of the EWS. Integrating food safety and pest and disease risks is also being considered. The European Food Safety Authority makes use of EWS meteorological information to assess the risk of emerging threats (for example, there is a clear correlation between very wet springs and subsequent disease incidence), but this is still on a one-off basis and not yet in the operational workflow.

### **3.2 Insights from futures studies**

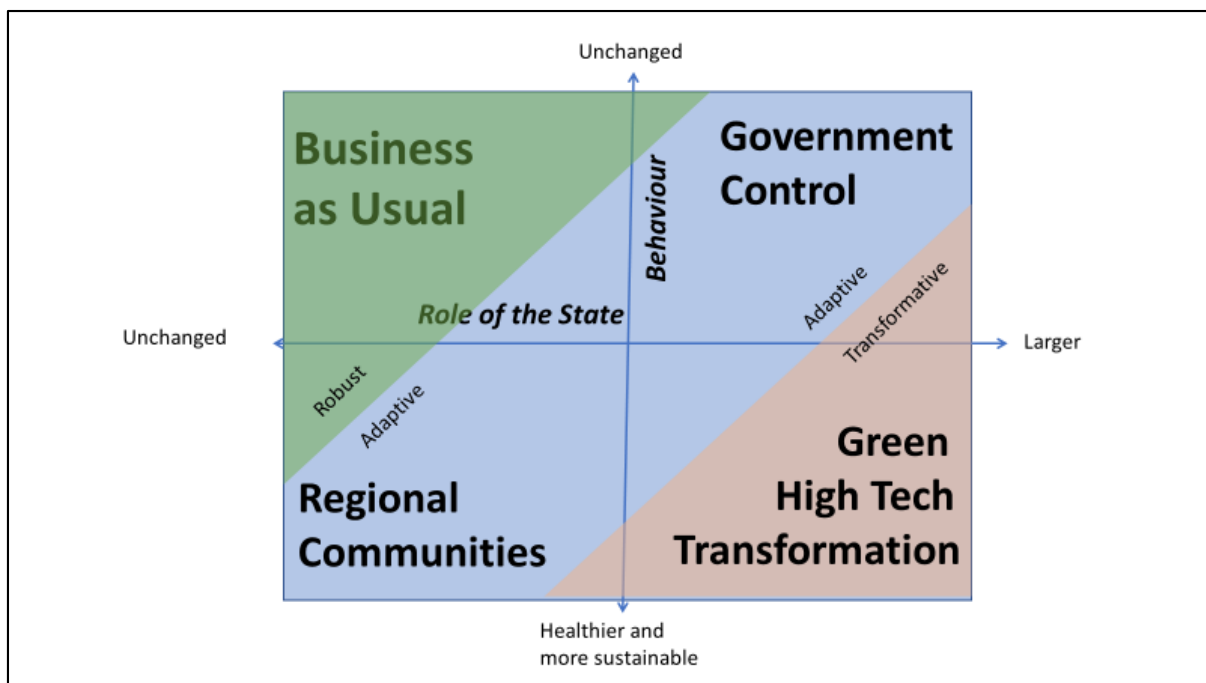
Poppe (2021) highlights the role that foresight ('futures studies') could play in helping businesses to create insights into potential future threats, although this technique is also relevant to public organisations. There is a range of available foresight techniques – identifying trends and megatrends, horizon scans, Delphi studies, scenario thinking/planning, forecasting and backcasting, science fiction / visionaries, prototyping and system modelling. Foresight studies can add value to the ongoing debate about how the economy and society will respond to the COVID-19 experience. Some of the observed responses at household, business, supply chain and macro levels may well prove temporary as markets respond and return to the pre-COVID-19 situation, but others may well be more permanent.

Building on the insights of institutional economics and the range of various regulating mechanisms for social behaviour, Poppe (2021) sees the risks and uncertainties for businesses after COVID-19 being

not so much at the level of market organisation (e.g. new forms of contracts to help share risks) but rather around the question of how governments will react to the crisis and how society will be organised in the long run. The COVID-19 crisis has re-ignited the debate on the future role of the state – liberal or neo-interventionist – and may also influence citizens’ preferences concerning their living environment and greener lifestyles. These great uncertainties are a good source of motivation to conduct a scenario analysis.

Poppe (2021) illustrates the technique by presenting four scenarios showing combinations of the ‘role of the state’ and ‘behaviour’ in a Dutch context (Figure 13). The ‘Business as usual’ scenario foresees little change in our lifestyles and the role of government in society. ‘Government control’ is a scenario in which our lifestyles change very little but the government is given stronger powers, implying increased public spending and more regulatory intervention. The ‘Regional communities’ scenario is one in which lifestyles change (more emphasis on short supply chains and social coherence) but neo-liberal policies continue to dominate. The final ‘Green high-tech transformation’ scenario is the most extreme, where the government is tasked with the creation of a radically different socio-economic system and its governance (Poppe 2020).

**Figure 13. Potential post-COVID-19 outcomes for the Netherlands**



Source: Poppe, 2021.

Scenarios are not predictions of the future. Their role is to help to structure thought and encourage discussion about the strategic directions or options for society, and in turn the implications for key sectors including the agri-food system. They provide businesses and public organisations with an opportunity to try to predict the legal and cultural circumstances in which they will have to operate over the coming 10-15 years and for which they must invest today. The idea is not that organisations should bet on a particular scenario – which can be a highly risky approach – but the point of scenarios is to instead allow organisations to stress-test investment plans or policy interventions against a range

of potential outcomes. These actions may not make sense in all scenarios, but an organisation will at least have a better awareness of the risks that it runs.

### 3.3 Addressing supply chain vulnerabilities

The resilience of supply chains has also been the focus of attention in the USA where the Biden administration is taking steps to address perceived vulnerabilities in supply chains revealed during the COVID-19 crisis (including food and agriculture) (Meyer, 2021). On 24 February 2021, President Biden signed Executive Order 14017, Executive Order on America's Supply Chains, requiring a review of global supply chains that support key US industries and ordering US government agencies to identify ways to secure the American economy against shortages of critical and essential goods<sup>6</sup>. The review was prompted, at least in part, by a global shortage of semiconductors that began shortly after the start of the COVID-19 pandemic in 2020. The shortage highlighted the need for the USA to refocus on its supply chain security for critical items by reducing its dependency on foreign countries. But, as noted in the Order, the government is looking further afield at other issues beyond semiconductors, attempting to ensure that the USA (and other friendly nations) continue to have access to cutting-edge technologies while reducing their reliance on supply chains that are vulnerable to disruptions and to interference by foreign powers.

The Executive Order defined resilient supply chains as secure and diverse – facilitating greater domestic production, a range of supply, built-in redundancies, adequate stockpiles, safe and secure digital networks and a world-class American manufacturing base and workforce.

The Order outlined two types of assessments by government agencies: (1) an initial 100-day supply chain review focusing on key supply chain risks in four specific sectors relating to semiconductors, batteries, strategic minerals and pharmaceuticals; and (2) more in-depth, one-year reviews (sectoral supply chain assessments) in certain critical business sectors (e.g. national defence, public health, information and communication technology, energy, transportation, but also including supply chains for the production of agricultural commodities and food products). These assessments will determine the extent to which these critical sectors are reliant on products from those deemed 'competitor nations'.

The Executive Order focused on information gathering, with more comprehensive reforms and supply chain strategies to follow once relevant information is collected. On 8 June 2021, the White House released the findings of the 100-day assessment of critical supply chains<sup>7</sup>. The 100-day assessment report identified actions needed in both the immediate and long term to bolster the domestic manufacturing of critical goods, reduce the dependence on China and other foreign nations for supply chain needs, create jobs and address unfair trade practices. In response, the Biden administration

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<sup>6</sup> White House, Executive Order on America's Supply Chains, available at <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/02/24/executive-order-on-americas-supply-chains/>, 24 February 2021.

<sup>7</sup> White House Fact Sheet, Biden-Harris Administration Announces Supply Chain Disruptions Task Force to Address Short-Term Supply Chain Discontinuities, available at <https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/08/fact-sheet-biden-harris-administration-announces-supply-chain-disruptions-task-force-to-address-short-term-supply-chain-discontinuities/>, 8 June 2021.



announced a range of sweeping measures intended to reduce the country's dependence on foreign suppliers for critical goods. The White House also emphasised in its response that the administration would focus on diversifying supply chains 'away from adversarial nations and sources with unacceptable environmental and labour standards,' noting that 'US investments abroad must incentivize environmentally and socially responsible production.'

Based on the White House briefing, the stated aim is to 'ensure that production shortages, trade disruptions, natural disasters and potential actions by foreign competitors and adversaries never leave the United States vulnerable again.' To accomplish this, the order instructs federal agencies to: (1) identify critical goods and materials within supply chains; (2) make specific policy recommendations to address risks; (3) commit to long-term supply chain resiliency, including a quadrennial review process; and (4) consult with external stakeholders including those within state government and industry groups.

Each sectoral supply chain assessment, including that for agriculture and food, should review:

- the critical goods and materials as well as other essential goods and materials underlying the supply chain in question, including digital products;
- the manufacturing or other capabilities needed to produce these goods and materials;
- sources of contingencies that may disrupt, strain, compromise or eliminate the supply chain (examples given include cyber, homeland security, health, climate, environmental, natural, market, economic, geopolitical, human rights or forced labour risks or other contingencies) and that are sufficiently likely to arise so as to require reasonable preparation for their occurrence;
- in the event that any of the contingencies identified occur, the review should include:
  - an assessment of the needed manufacturing or other capabilities including the ability to modernise capabilities to meet future needs;
  - gaps in domestic manufacturing capabilities, including single-point-of-failure capabilities;
  - supply chains with a single point of failure, single or dual suppliers or limited resilience;
  - the location of key manufacturing and production assets, with any significant risks identified posed by the assets' physical location;
  - exclusive or dominant supply of critical goods and materials and other essential goods and materials from nations that are, or are likely to become, unfriendly or unstable;
  - the availability of substitutes or alternative sources of critical goods;
  - current domestic education and manufacturing workforce skills;
  - the need for research and development capacity.

The issue of dependence on critical ingredients is not solely a US concern. The EU feed industry, for example, is highly dependent on China, in particular, for the supply of micro ingredients such as vitamins and amino acids. Prices for these ingredients rose sharply as supply was disrupted during COVID-19 when quarantine measures in China curbed operations in plants and ports, highlighting the risk of dependence on a single supplier.

## 4 Insights from business responses to food crises

As previously noted in relation to the steps proposed by the US administration to increase the resilience of food supply chains, ensuring the preparedness of private sector actors is fundamental to contingency planning. Several workshop presentations illustrated different aspects of supply chain readiness and responses with a focus on case studies and business processes.

### 4.1 Seafood case study

How the EU seafood industry was affected by the COVID-19 crisis and how it responded is discussed by Villasante (2021). Seafood is one of the most traded food commodities and the EU is the largest seafood market in the world. The expansion of the seafood trade has resulted in a range of socio-economic benefits, including increased employment opportunities and food security. However, it also makes the seafood system more vulnerable to systemic shocks that disrupt the flow of product and the livelihoods that depend on it. Such shocks are becoming an increasingly common feature of food systems, including those associated with seafood – a trend that can be expected to continue, given the challenges presented by climate change and biodiversity loss.

During the pandemic, governments imposed a temporal cessation of large parts of their economies to ensure social distancing and reduce infection rates. There was a global reduction in landings and fishing activity, partly due to a decline in the demand but also because of these health measures. Both the COVID-19 outbreak and the different responses by countries had the potential to affect the seafood sector in multiple ways.

Early reactive responses were mostly aimed to:

- protect public health, including the health of fishery sector workers. For example, seafood workers were quickly labelled ‘essential workers’ in order to maintain food supply;
- support those whose enterprises, jobs and incomes are affected by COVID-19-related disruptions. Large-scale commercial actors sought to secure production and supply chains. Small-scale fish-worker networks shared information, documented impacts and pushed for government support;
- maintain seafood supplies to consumers.

Attempts were also made to avoid the mistakes in past responses. Examples of such past mistakes included trade bans and hoarding behaviour. Instead, this time efforts were made to maintain food supply buffers and cooperate internationally. Another past problem has been overfishing, which can harm fish populations and the environment. This happened in Europe after WWII and in Sri Lanka after the 2004 tsunami. During past shocks, the quality of the diet often suffered as families shifted their purchasing behaviour towards less expensive staple foods.

The COVID-19 pandemic exposed an interconnected and coupled globalised world in rapid change. It revealed vulnerabilities and opportunities for future shocks across the seafood industry. Strategies to absorb shocks, react and restore the functions of the seafood sector are critical. Emerging technologies, social innovations and a diverse portfolio of active stewardship of human actions in support of a resilient seafood system are examples of potential strategies that could be used (Villasante, 2021).

## 4.2 The role of logistics

Food supply chains have become increasingly complex. They are often seen as a linear pipeline, but in practice they involve multiple stakeholders and hand-offs. Supply sourcing can change throughout the year to follow the seasons, and there are different modes of appearance by category and season. Morgan (2021) quoted the example of importing fresh produce from Spain, where production is scheduled months in advance and there is a tightly timed conveyor belt of transit stock. A high level of understanding of the decisions required to ensure the safe and timely transport of produce is required, covering policy issues such as phytosanitary certification, customs entry procedures and competition issues; and operational realities such as the need to convert loads to full trailer load equivalents.

There are various sources of supply chain risk from a logistics perspective. Morgan (2021) put ignorance at the top of his list (examples included a lack of awareness of history and geography such as when thinking about the feasibility of alternative routes if there is a sudden blockage in the Suez Canal, or not understanding the distinctions between road trailer and container traffic or the limitations of different ports to cater for ships of different sizes, types and capacities). A disparaging attitude towards the importance of logistics can also be detrimental to successful contingency planning. Differing national and organisational cultures can also play a role, reflected in inadequate identification and weighting of possible risks and conflicting attitudes to product 'push' versus 'pull' within supply chains. New political scenarios such as Brexit can pose obvious threats to border management, for example. The issue of supply chain ownership and control in determining who has the power to plan and respond and ensuring that they have the necessary supply chain visibility is a fundamental issue.

Advice to help businesses prepare and respond effectively to supply chain shocks includes the following check list (Morgan, 2021).

- Watch the world and improve awareness. This reflects the importance of risk identification, analysis and evaluation emphasised by Pursiainen (2021).
- The importance of mapping supply chain processes for knowledge and understanding, distinguishing between physical flows and information flows and their respective infrastructure and control. This should include mapping schedules, routes and constraints affecting deliveries.
- Recognising dependencies and how they can affect cycle times, costs, compliance, service levels and quality, also taking into account actors and their changing relationships.
- Always listening and communicating, both internally (up / down / either side within the organisation) and with external parties (formal contracts are not enough).
- Promoting best practice across the network and striving for logistical excellence.
- Have informed and well-trained teams within commercial organisations, and encourage training and scenario planning, as trained teams who are used to working together can handle the unexpected.

## 5 Government-level preparation for food crises

### 5.1 Food crisis management in developed countries

The OECD has published several reports on agricultural resilience that provide examples of crisis management in developed countries from a food security perspective throughout the phases of the crisis management cycle (Figure 8). Findings from these reports are reviewed and summarised in Baldwin (2021)<sup>8</sup>. Food security has four dimensions (availability, access, utilisation and stability) and crisis management can affect all of them. Impacts on availability can occur through changes in production, trade or stocks. Access means both physical access (Can people get to the food they need?) and economic access (Can people afford the food?). Utilisation refers to whether food is safe, whether it is nutritious and whether it meets dietary needs. Stability refers to the availability of food all of the time and whether there are seasonal or other interruptions to food supplies. In developed countries, most of the time these dimensions are not problematic. The biggest issue in and out of crises is economic access to food, but in crisis situations supply chain interruptions can also affect supply chain stability. Two lessons can be highlighted from the outset, drawing on crisis management in developed countries. Firstly, the importance of acting quickly to prevent a crisis from escalating and getting out of hand and causing even greater economic damage. Secondly, food insecurity in developed countries is mainly due to problems of economic access and that is largely a matter of low incomes.

**Risk identification and assessment.** Risk assessment is the first phase of crisis management and also a task for contingency planning. Most developed countries have carried out national risk assessments and strategic plans but the extent to which they take food security considerations into account is mixed (OECD, 2018). For example, Iceland is a country with a national strategic plan but does not have a strategic plan for food security. In Japan, natural disaster risk management is one of eight priorities for its agricultural policy, including a mandate to prepare for a stable food supply during unforeseen circumstances. In the United Kingdom, the ministry with responsibility for agriculture has undertaken some food security assessments covering availability, food chain resilience and household food security. Some countries have taken the risk assessment exercise further with more detailed stocktaking and scenario analysis focused on food security. The Netherlands has conducted a series of studies since 2008, identifying potential risks such as climate change and trade risks and proposing risk-mitigating strategies. Other countries such as Finland and Sweden have gone further still to consider not only the current risk environment but also what future risks may be developing, or could develop, through foresight and horizon scanning.

**Risk prevention and mitigation.** Once risks have been identified, countries can take steps to prevent or reduce their exposure to these risks or to mitigate their impacts. Examples with respect to food security are the management of disease outbreaks and the spread of animal and plant diseases. In Australia, strict biosecurity rules, including restrictions on imports of products, prevent outbreaks of

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<sup>8</sup> See footnote 4.

plant and animal diseases that may bring disease into Australia. In the Netherlands, its Animal Health Fund brings together public and private actors and assigns responsibilities for monitoring, preventing, reporting and control. Other initiatives have looked at supply chain resilience. Japan's most recent 3-year emergency plan mandated securing emergency power and business contingency plans for wholesale markets, while also formulating response plans and ensuring back-up power for dairies and slaughterhouses. Canada's emergency management framework for agriculture prioritises prevention and mitigation to stop emergencies from escalating, while assigning shared responsibilities to mitigate risk and take collaborative action.

**Preparedness.** Preparedness requires that all actors, and not just the government, have plans and networks in place to reduce the risk to food security in emergencies, although governments do play a role in supporting the preparedness of other actors. Most governments have strategic plans for critical risks, but some countries (e.g. Australia, Canada, USA) go further and designate food and agriculture as critical infrastructure, with specific mechanisms and networks for emergencies. Countries can organise drills and scenario exercises to raise awareness and test drive procedures in the absence of crisis (Germany, USA) (see also Morgan, 2021; Horobin, 2021). The outcomes of these exercises provide feedback on how to improve the protection of critical infrastructure and help to raise awareness and stimulate horizontal and vertical cooperation. Some countries keep emergency food reserves (Germany, Israel). The importance of private sector preparedness should not be overlooked. In the USA, the private sector can participate in critical infrastructure planning and preparedness activities. The plans are developed and implemented collaboratively – something which is particularly emphasised in the food and agriculture plan, given that most of the critical infrastructure is almost entirely in private hands. Other countries (Australia, France, UK) emphasise the uptake of business continuity management principles (OECD, 2018).

Citizen preparedness can also limit the impact of crises on food security. In lieu of the panic buying and stockpiling that was observed in the early stages of the COVID-19 pandemic, governments can encourage citizens to be prepared for emergencies. Keeping emergency kits, including sufficient food supplies to cover needs for several days, is recommended in Australia and New Zealand. Creative risk communication and outreach programmes have been developed to reach more people. In the USA, the Center for Preparedness and Response under the Centers for Disease Control and Prevention launched a 'zombies preparedness' website to encourage better all-hazards preparedness, including keeping emergency food supplies<sup>9</sup>. Drills are another tool that raise risk awareness and preparedness more generally and are used in Japan and Mexico.

**Response and crisis management.** The previous steps are generic and are relevant to all kinds of risks. Response measures will depend on the nature of the crisis in question – How big is the shock? How long will it last? How pervasive is it? Is the impact mainly limited to certain sectors, or is it economy-wide? To illustrate how the nature of a food security crisis influences the response, Baldwin (2021) drew on the examples of an isolated natural hazard crisis caused, say, by a flood, and a cascading crisis represented by responses to COVID-19.

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<sup>9</sup> The website and other resources can be accessed through <https://www.cdc.gov/cpr/zombie/index.htm>.

A common characteristic of a natural hazard crisis is that there is potential damage to localised production, food supplies or infrastructure. Some citizens may be cut off from supplies of food, but the needs are typically short-term. The policy responses coordinate with these characteristics: to restore productive capacity, address food supply chain issues and provide emergency food supplies to affected citizens. Pertinent examples of responses to natural disasters include the Italian response to the 2016-2017 earthquakes where the authorities developed innovative solutions to maintain livestock rearing activities, as well as the New Zealand rural support trusts that assist farm families to overcome adverse events. To address supply chain issues, there is a benefit to regular communication between government and stakeholders to address any issues potentially affecting supply chains, and countries have invested in apps and web-based platforms to encourage the sharing of information between public and private stakeholders (Italy, USA). Damaged infrastructure needs to be repaired quickly, while access to trade can buffer local impacts on food prices.

When either physical access to food is disrupted or stability is impacted, governments provide emergency food aid to displaced people, in particular. In some of the examples quoted by Baldwin (Japan, USA), emergency food aid was automatically triggered and the authorities did not necessarily have to wait for requests from local bodies. The role of voluntary organisations in many countries for natural hazards should not be overlooked (see also Eriksson, 2021).

While food security impacts from natural hazards are usually isolated and short-term, cascading crises that lead to large economic shocks can have considerable food security implications. Typically, availability is not affected but stability can be an issue if supply chains are interrupted, as seen during the COVID-19 crisis. The greatest food security concern is the loss of income from economic shocks causing a lack of economic access. Policy responses are therefore oriented to addressing access and stability issues: making sure trade and supply chains are functioning normally (requiring a focus on information and coordination, logistics, the availability of labour) and social safety nets (income support, food assistance benefits, food banks).

The COVID-19 pandemic provides examples of multiple responses to a cascading crisis documented in the most recent OECD *Agricultural Policy Monitoring and Evaluation* report (OECD, 2021) (Figure 1). There was a huge rise in online platforms for information (Australia, Japan), recruiting (France, Switzerland), direct sales (Austria) and e-commerce (Ireland, Korea) to ensure continued supply chain functioning. International coordination was also important, where the AMIS platform in particular contributed to enhanced food market transparency and policy response coordination. Initiatives to improve government coordination with the private sector were launched in Canada, Denmark and Mexico to discuss food supply chain issues and policy response coordination. Specific initiatives to improve logistics were also taken, including priority ('green') lanes for shipment of goods in the EU and regulatory flexibilities such as the exemption of lorry and aircraft crews from travel bans in Canada, allowing the acceptance of electronic documents to facilitate trade in the EU, and reduced or suspended border checks in Portugal.

Labour is fundamental to supply chain functionality, and the potential impact of a cascading crisis on labour supply deserves particular attention. Huff et al. (2015) estimated that a multi-wave pandemic could have a large negative impact on US food security because of its implications for labour, because sick or affected employees would be absent throughout the supply chain. Policies to keep workers safe have an additional benefit for food security. During the COVID-19 pandemic, worker safety and health

regulations were amended in Canada, Denmark and Spain to safeguard workers' health. Specific measures were taken to facilitate seasonal worker availability in France and Norway, for example.

Effective social safety nets are critical to minimise food security impacts from crises given the important role played by income. During the COVID-19 crisis, income support was offered in countries such as Canada, France and Ireland, while other countries offered food assistance in either physical or monetary forms, such as the provision of digital supermarket vouchers to low-income families in the UK. Other countries prioritised support to food banks, for example, by redirecting supplies intended for school meal programmes as in Czechia or by providing fruits and vegetables through food banks, as in Portugal.

**Recovery and reconstruction.** As there is usually little physical damage from most crises that affect food security in developed countries, the role of recovery and reconstruction mainly refers to examining processes, learning lessons and improving systems to be better prepared for the next crisis. Key questions to ask include: where were previously unidentified vulnerabilities? How effective were the interventions? What can be done to prevent future crises? Most countries carry out reviews, although these are often ad hoc rather than systematic.

Some overarching conclusions can be drawn from this review of developed country responses to food security crises (Baldwin, 2021). Effective crisis management for food security starts with risk identification, assessment and awareness. There is evidence that countries have undertaken a specific analysis with respect to food security, but many of these exercises appear to be one-off (for example, undertaken following the 2007-2008 food price crisis). Since the risk environment is continually evolving, risk assessment should evolve too and this requires continuous monitoring to identify new threats and consider how previously identified threats have changed. A proactive approach addresses threats and vulnerabilities to prevent emergencies from escalating into crises. Acting quickly matters to prevent escalation and to limit negative food security implications. This includes having emergency plans and response networks in place, engaging networks for public-private coordination and having safety net programmes that can be scaled up to meet requirements. Evaluation is also crucial. There is a need to learn from past experiences and mistakes. Finally, Baldwin (2021) noted that stakeholders sometimes raise the spectre of food nationalism and self-sufficiency as a means to food security. Such policies may well have counter-productive effects and be detrimental to food security, particularly if they raise domestic food prices.

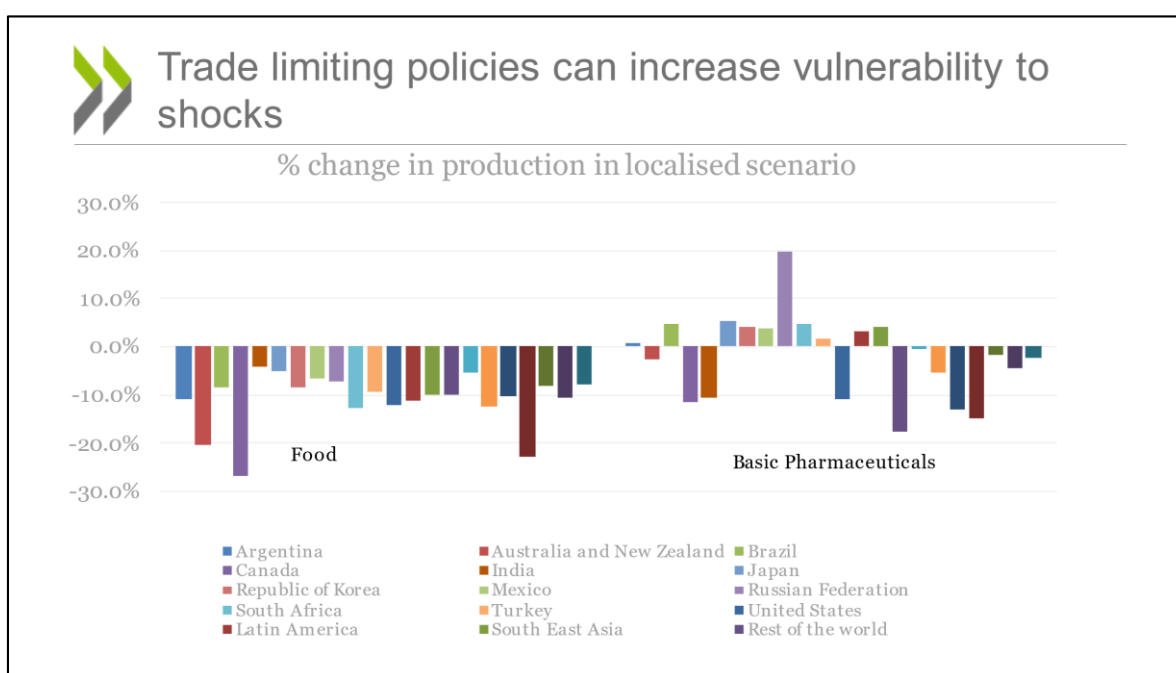
## **5.2 Building robust supply chains across borders**

The COVID-19 experience revealed a pressing need for international cooperation and the need to develop effective policy action in a world that is so interconnected (Jackson, 2021). Divergent regulations can create stickiness across international trade. Many observers advocate shorter supply chains as a way of creating resilience, but Jackson noted that there was a risk that talking about resilience could create a justification for increased protectionism. The OECD work on modelling the impact of shorter supply chains compared two scenarios – one with dispersed supply chains much like today, and another where production was much more localised. The results highlighted that the

localised scenario was rather detrimental to the food sector, showing a consistent reduction in production across countries and regions, unlike in pharmaceuticals (Figure 14)<sup>10</sup>.

This result arises partly because of the importance of trade in inputs in the agriculture and food sector, but it also reflects differences in agro-ecological conditions between countries. These allow producers to specialise in the products most suited to those conditions and allow trade to match production with consumption. These linkages were broken in the localised scenario resulting in higher costs and lower incomes for producers, and higher prices for consumers. The study emphasises the importance of ensuring that this interconnectedness works. Projections of global trade show a continuing specialisation and underline the importance of trade for import-dependent countries in ensuring food security and for exporting countries in providing a livelihood for farmers. Trade will also play an increasingly important buffer role in smoothing supply availabilities in the face of the increasing risk of global shocks.

**Figure 14. Trade-limiting policies can increase vulnerability to shocks**



Source: Jackson, 2021.

The role that trade can play in food security emphasises the importance of ensuring robust supply chains and building cooperative relationships along value chains and across borders. A toolkit of policy options is available to governments for this purpose (Jackson, 2021).

- Investing in transparency to build trust. Transparency can help reduce market uncertainty, expose bottlenecks and highlight risks. Export restrictions in food are particularly disruptive, as was shown in the 2007/2008 food price crisis, because they can induce a domino or

<sup>10</sup> OECD, *Shocks, risks and global value chains: insights from the OECD METRO model*, June 2020, Paris, available at <https://www.oecd.org/trade/documents/shocks-risks-gvc-insights-oecd-metro-model.pdf>.



cascading effect where restrictions introduced by one country then encourage other countries to do the same. The Agricultural Market Information System (AMIS) is an example of a response to that experience, designed to provide accurate information on the state of markets and to provide reassurance that supplies are available where this is the case. The much more limited recourse to export restrictions during the COVID-19 pandemic may be taken to demonstrate the value of this initiative.

- Enhancing trade facilitation efforts. Bridging gaps in trade facilitation performance can enhance agro-food trade. During the COVID-19 crisis governments took various steps to facilitate goods crossing borders, including the use of 'green lanes' and simplifying certification requirements. More can be done to enhance cross-border cooperation, including making sure that all requirements are transparent and connections and procedures are developed to cooperate with trading partners.
- Lowering costs and increasing access to digital trade. Digital tools can enhance the resilience of agro-food supply chains. Flexible solutions can help avoid future risks to food supply.
- Working with the private sector on stress tests for supply chains to assess their ability to mitigate or rebound from the impact of disruption. This may involve an evaluation of the concentration in export or import markets, the existence of alternative suppliers along the value chain, the identification of weak links and the assessment of redundancy or stockpiles. An issue raised by private sector respondents was the importance of visibility along the supply chain, including the dependence on transport and logistics.
- Stockpiling for essential goods. The management of stockpiles is not straightforward; issues include the fiscal impacts, the extent to which public stocks crowd out private sector stocks and ensuring that stock management (purchase and release of stocks) does not exacerbate market instabilities (Deuss, 2015). Scenario planning can help governments to decide what might be the appropriate level of security stocks, and there may be scope for thinking about cooperative solutions across countries.

The key lessons for food security in an interconnected world, according to Jackson (2021), are the need to strengthen cooperation and connection and to ensure consistency. Cooperation can promote transparency around global food supply; prevent harmful policies, such as export bans or tariffs; reinforce predictable, transparent, rules-based trade; and build trust. Better connections support flexible transport, logistics and border processes in moving goods as fast as possible and facilitating certifications. Consistency can reduce unnecessary regulatory friction and promote fewer trade-restrictive measures.

### **5.3 Improving the process of contingency planning**

Important insights can be gained by examining the role played by government contingency planning in previous crises with a view to drawing lessons for more efficient management of government-level contingency planning. Eriksson (2021) reviewed the factors affecting crisis outcomes. Her purpose was to not only show the challenging connection between planning and crisis outcomes, but to also underline that planning can be improved if what affects the outcome of a crisis is understood. She identified the following factors.

- **Nature of the crisis.** Crises come in different forms and vary in terms of their speed, level of complexity, level of uncertainty, scale, etc. The nature of the crisis itself will have a significant impact on the management of the outcome, as can be seen by comparing the COVID-19 pandemic with a forest fire.
- **Leadership, stress and decision-making.** Leadership during a crisis has been intensively studied. It is an enormous emotional and cognitive challenge and who leads during a crisis is essential to the outcome. Many leaders have personality traits and management styles that are well-suited to steady state situations and normal conditions, but they may or may not be equipped in terms of personality and training to effectively manage a crisis.
- **Organisational settings.** Crisis management occurs in a specific institutional and political setting. There are likely to be many differences in goals, structures, procedures, power, resources, culture and trust that will have a major impact on crisis outcomes.
- **Political system and regulation regimes differ,** with differences in legislation and jurisdiction that will affect the crisis response. During the COVID-19 pandemic, countries used different mixes of coercive regulation and voluntary guidelines. The rules that can be implemented may differ between countries depending on their legislation and culture.
- **Citizens, volunteers and extra-governmental organisations.** Disaster response requires cooperation between organisations that may not have much contact in normal situations, which can result in complex coordination problems. It has long been recognised that, following a disaster, there is a spontaneous movement of people towards the disaster area who want to help. Those who are involved in the response will have an effect on the outcome. While there are examples of crisis situations where volunteers played a decisive supporting role, there are other examples where they may put themselves in danger so that the response organisation has to not only deal with the crisis but also rescue volunteers. Spontaneous gifts of supplies or food (during a food crisis) can also be very helpful but sometimes may also be inappropriate given a particular situation.
- **Framing contest, blame game and media.** Measuring success or failure when it comes to a crisis outcome is not obvious and can depend on who wins what can be described as the 'blame game' or the framing contest. This is because competing narratives often develop as to the cause of the crisis and therefore potential solutions, and the question is: which narrative takes hold?

Eriksson (2021) highlighted several requirements for efficient contingency planning. Her list including the following elements.

- **Ability to imagine the future.** A frequent comment by crisis preparedness managers after a crisis is that they simply had not imagined the scale of the catastrophe they had just experienced. The difficulties in imagining the future are well known both in the research community and in more popular discourse (Taleb's black swans, Rumsfeld's unknown unknowns, Clark's view that we should focus on possibilities and not just probabilities). Too often there is a focus on the last crisis with insufficient attention paid to planning for the

future. This requires investment in scenario planning (Poppe, 2021) as well as forward-thinking capabilities in the crisis management team (Horobin, 2021).

- **‘Sticking to the plan’ is no guarantee of successful crisis management.** Improvisation and creativity are important components in emergency situations. From this perspective, contingency planning provides the backbone in a response on which improvisation can build. It is simply not possible to plan for every detail.
- **Contingency planning processes are just as important as contingency plans.** The process of planning brings together organisations and actors that may not normally work together and helps to create a mutual understanding, common purpose and trust. These capacity-building outcomes are just as important as the resulting plan.
- **Resources.** The resources put into planning in terms of staff, but also to carry out activities, are important. It can be difficult to attract resources to address a problem that may not arise, and it can be hard to generate sufficient interest until a crisis actually happens. Horobin (2021) also emphasised the importance of adequate resources for the crisis management team.
- **Learning and knowledge transfer.** The issue here is what happens once a contingency plan has been developed and the risk analysis completed. Research has concluded that in many cases the documents end up on the shelf, and that preparedness is assumed once a written plan has been completed. Knowledge generated during the contingency planning process is not necessarily transferred to others. In some cases, those who are intended to use the plan may not have heard of it. This links to the previous point that the important thing is the process of developing the plan – developing ability and not just documents. Preparedness should be designed and viewed as a learning process, using exercises, simulations and other techniques to help the relevant actors to get to know each other and to understand different organisational settings before a crisis occurs (see also Horobin, 2021).

#### 5.4 Focus on the crisis management team

How to ensure the effectiveness of a crisis management team (CMT) is discussed in Horobin (2021) based on consultations undertaken by the Geneva Centre for Security Policy with stakeholders drawn from many different backgrounds over the previous 12 months on lessons to be learned from the management of the COVID-19 crisis. He summarised the emerging lessons in five reflections, as provided below.

- The necessity to manage this crisis remotely (virtually) because of the pandemic restrictions on movement and meeting together created significant challenges. These included the loss of the osmosis of knowledge and experience in trying to find creative solutions; as well as challenges associated with the work-life balance and stress levels of CMT members now working from home. Enforced remote working reduced the effectiveness of CMTs. By anticipating these effects and introducing relevant procedures and mechanisms, we can try to mitigate the risks associated with remote crisis management in future.
- The need to think about how to get the attention of senior decision-makers, including politicians, to seriously consider how decisions might be made during a crisis and, if necessary,

get relevant training. He specifically highlighted the need for awareness among CMT members of different styles of decision-making.

- An important lesson from COVID-19 crisis management has been the importance of trust. This is a vitally important asset both within the CMT and also in dealing with external stakeholders, including the public. Trust is best built within a CMT by understanding and applying the concept of trustworthiness. This means a combination of competence – relevant skills and knowledge; reliability – where work is done on time and with quality, nevertheless under high pressure – and empathetic behaviour, meaning developing understanding and relationships between team members and stakeholders who may have different responsibilities, different needs and different approaches (Horobin, 2021).
- Another emerging lesson is the lack within CMTs of structured and calibrated forward-thinking teams, with the responsibility to look at what has happened before, what could get worse and to develop contingency plans. There is a need to give greater priority within a CMT to this function, as well as attracting and recruiting the right staff to undertake it. Eriksson (2021) also underlined the need to ensure sufficient resources are allocated to contingency planning.
- The human dimension of running an effective CMT is often undervalued (Horobin, 2021). A CMT cannot be driven purely by protocols and processes. Training together, practicing together and running simulations together are valuable not only to test protocols but to build this human capital. An aspect of this human dimension is that CMTs must be able to deal with the social media frenzy that will arise in a food security crisis. This means that the challenges of dealing with social media should be factored into staff training.

## **6 Strengthening coordination mechanisms within EU countries**

### **6.1 The EU disaster coordination mechanisms**

Given its unique constitutional structure, the EU has the additional challenge of ensuring sufficient coordination between the European Commission and Member States. The current framework for disaster risk management is laid down in the Commission Notice Reporting Guidelines on Disaster Risk Management pursuant to Article 6(1)d of Decision No 1313/2013/EU<sup>11</sup>. This Decision on a Union Civil Protection Mechanism requires Member States to provide the Commission with summaries of the relevant aspects of their risk assessment and the assessment of their risk management capability, focusing on key risks. It also requires Member States to provide information on the priority prevention and preparedness measures needed to address key risks with cross-border impacts and, where appropriate, low probability risks with a high impact. The objective is to ‘achieve a high level of protection against disaster by preventing or reducing their potential effects, by fostering a culture of prevention and by improving cooperation between the civil protection and other relevant services’<sup>12</sup>. The impact of potential risks on food security is highlighted as part of the political/social impacts (along with human, economic and environmental impacts) that should be assessed in both qualitative and,

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<sup>11</sup> Commission Notice 2019/C428/07, Reporting Guidelines on Disaster Risk Management, Art. 6(1)d of Decision No 1313/2013/EU, Official Journal C 428/8, 20 December 2019.

<sup>12</sup> Article 3.1(a) of Decision No 1313/2013/EU.

where possible, quantitative terms. Where possible, assessing the impacts should be aligned to the goals, targets and reporting guidelines of the Sendai Framework for Disaster Risk Reduction (Sendai Framework)<sup>13</sup>.

The national summaries should provide the Commission with the information needed for it to fulfil its obligations under Article 5, in particular: (a) take action to improve the knowledge base on disaster risks, and to better facilitate and promote cooperation and the sharing of knowledge, the results of scientific research and innovation, best practices and information, including among Member States facing common risks; (b) support and promote Member States' risk assessment and mapping activity through the sharing of good practices, and facilitate access to specific knowledge and expertise on issues of common interest. The Commission guidelines take the form of a template with accompanying guidance for properly completing the template. It is up to Member States to define their key risks. Member States provided their national summaries for the first time by 31 December 2020 and are required to update them in 3-year intervals or whenever a significant change occurs.

## **6.2 Good practice examples of coordination**

The proposed contingency plan for ensuring food supply and food security intends to go further than merely sharing information on Member State plans to respond to threats and risks. This raises the question of how to design the institutional mechanisms and settings needed for coordination. A general starting point is to ask why coordination is relevant (Rudloff, 2021). From an economic perspective, there is a case for coordination where a public good is concerned or there are external spillovers that individual actors or countries do not take into account. Another case is where there is insufficient information for decision-making, or where risks cannot be managed by individuals (the case of catastrophic risks highlighted by Anton (2021). Economic welfare can be increased if there is a coordinated approach. An institution like the EU also needs coordination between different policies and different actors to avoid silo approaches and potential conflicts. Whether these general criteria are also relevant to food security and food crises and, if so, what the implications are for coordination is addressed in the workshop contribution by Rudloff (2021).

She argued that food security and crisis reaction can be considered (at least partially) as a public good. In this context, the principles of fiscal federalism (fiscal equivalency) suggested by writers such as Musgrave (1969) and Olson (1969) are relevant. The spatial level at which a public good problem is addressed should relate to the spatial scope of the affected actors. Decisions on a global public good should be made at global level and also relate to the level that bears the financial burden of financing these public goods. Another general principle drawn from the work on policy design by Tinbergen and others is to have as many instruments as there are targets to avoid overburdening a particular instrument with multiple objectives. Yet another principle, drawn from political science literature, is the principle of coherence across different policy domains and policy instruments.

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<sup>13</sup> UNDRR, *Technical guidance for monitoring and reporting on progress in achieving the global targets of the Sendai Framework for Disaster Risk Reduction*, available at <https://www.preventionweb.net/publications/view/54970>.

There are relatively few examples of creating overarching guidelines on achieving coordination. Some examples are the UN Sendai Framework for disaster risk reduction (especially Priority 2: Strengthening disaster risk governance) as well as the UN/EU Policy Coherence for (Sustainable) Development framework where the OECD has provided some relevant recommendations (for example, on the use of inter-ministerial groups and coordinators, joint budgets and regulatory processes). More examples exist at sectoral level of guidelines and criteria on how to organise cooperation. These include, at global level, examples in the areas of trade and food safety; coordination at regional level (for example, the ASEAN Integrated Food Security Framework and the ASEAN Plus Three Emergency Rice Reserve, or the African Union African Risk Capacity that acts to pool risks regarding natural disasters via a joint insurance mechanism); and at sectoral level, for example, the African Union Comprehensive African Agricultural Development Programme coordinating agricultural policy initiatives or the EU CAP, again coordinating agricultural policy interventions within the EU.

The African Risk Capacity joint insurance mechanism was cited by Rudloff (2021) as an example of a coordination mechanism that creates benefits compared to the more usual ad hoc reaction of the international community due to its speed of response, lower costs, high self-commitment and improved governance preparedness. Drawing on IFPRI research, two general criteria for its successful governance appear important. One is the mechanism that sets out predictable conditions and binding institutional settings *ex ante*, based on a clear code of conduct, national reporting and approval by a trusted institution and clear criteria for premiums and triggering payments based on historical experience. The other is that there is a comprehensive contingency and implementation plan when assistance is provided. This element, requiring a recipient government to follow certain procedures – including preparedness, monitoring and taking steps to reduce the basic risks – can be seen as even more important than the financial assistance itself.

In the case of the EU, there is the potential for risks to arise due to an incoherent mix of different policies. Rudloff (2021) outlined a series of EU policies relevant to crisis management with different mixes of EU and Member State competences (Figure 15). These include the following.

- The **Common Agricultural Policy**, with a range of tools to support farm incomes as well as market stocks.
- The **Fund for European Aid to the Most Deprived** which supports Member States' social emergency relief schemes.
- Under the **Civil Protection Mechanism**, the EU has the solidarity clause and two crisis reaction mechanisms. The solidarity clause was introduced by Article 222 of the Treaty on the Functioning of the European Union (TFEU). It provides the option for the EU and Member States to act jointly to prevent a terrorist threat in the territory of a Member State and to provide assistance to another Member State which is the victim of a natural or man-made disaster. The European Union Solidarity Fund is an instrument that finances operations in the field of civil protection, first created in 2002. In 2014, the EU adopted a decision updating the rules and procedures for the operation of the solidarity clause. It ensures that all parties concerned at national and EU level work together to respond quickly, effectively and consistently in the event of terrorist attacks or natural or man-made disasters<sup>14</sup>. Two specific

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<sup>14</sup> Council Decision 2014/415/EU on the EU's implementation of the solidarity clause.

mechanisms are in place to respond to disasters, including the Civil Protection Mechanism and rescEU, which was recently extended to include medical protective equipment<sup>15</sup>.

- **Measures to protect critical infrastructure.** At EU level, three sectors have been defined as being critical: energy, transport and cyber (information technology). Member States can use a different classification; for example, in Germany there are nine sectors defined as critical, including food. Defining a sector as critical imposes certain duties on operators (for example, they have to maintain emergency plans) but it also provides certain rights (for example, the right to be supported in being given priority access to protective equipment, social support, etc.).
- **Maintenance of the internal market.** The early stages of the COVID-19 pandemic saw unprecedented closures of internal borders within the EU. But the provision was quickly made to allow cross-border movement for goods and workers defined as critical or essential through a system of ‘green lanes’, which was also relevant to agricultural goods and seasonal workers.
- **Trade policy.** Under WTO rules, restrictions on exports are possible if a potential shortage is feared. During the COVID-19 crisis, relatively few restrictions were introduced globally on food exports, but restrictions on the export of medical goods were more common.

**Figure 15. Broad set of different competencies, time frames and objectives**

Policy area	Tools on food security
Common Agricultural Policy	<ul style="list-style-type: none"> <li>• <b>Range of tools</b> since long under reform: subsidies for production/income of farmers or market <b>stocks</b></li> <li>• New „socially“ motivated fund with food aid</li> <li>• <b>Contingency plan and potetial crisis stocks</b></li> </ul>
<b>Crisis management/ Civil protection</b>	MS, EU addressing <b>different critical infrastructures</b> <ul style="list-style-type: none"> <li>• Range of tools like stockpiles, private suppliers’ guarantees, emergency plans</li> </ul>
<b>Trade Policy</b>	<b>Exceptions from open markets</b> <ul style="list-style-type: none"> <li>• Export restrictions for „<b>essentials</b>“ due to shortages</li> <li>• Exceptions from tariff cuts for „<b>sensible goods</b>“</li> </ul>
<b>Transport/ Internal Market</b>	<b>Exceptions lfrom free border crossing</b> <ul style="list-style-type: none"> <li>• Closing due to internal security (Schengen borders code)</li> <li>• But <b>green lanes for „essential“ goods and services like agricultural workers</b></li> </ul>
Investment Screening	Exceptions to reject FDI for critical infrastructures and to <b>ensure critical supply</b>
Industrial Policy	Newly stressed as coordinative approach
• Policy on stategic raw materials	Strategic <b>raw material alliance for foreign delivery</b> e.g. for 3 relevant pesticides and fertilizer-materials (Wismut, Boratm Phosphorit, Phosphor))

Source: Rudloff, 2021.

This wide range of EU policies that may be used to address a crisis raises challenges for coordination and the risk of going in contradictory directions. Possible solutions include joint procedures and task forces across the EU/MS, and making better use of the regulatory impact assessment mechanism for new legislation to encourage a more holistic assessment of its impact on other policy objectives and

<sup>15</sup> A short explanation of the EU’s civil protection instruments can be found at [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:2009\\_2](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM:2009_2).

not only its direct impact on its own objective. The EU has also introduced a strategic foresight process with a proposal for sectoral dashboards on resilience covering both economic but also social and ecological sectors in order to assess the sectors in which problems are likely to arise. Information deficits could be tackled by strengthening reporting requirements and adopting a proactive approach to providing information. The principles of fiscal federalism should be applied and, if a financing mechanism is involved, trigger points and disbursement rules should be clearly defined *ex ante* as experience shows how difficult these discussions can be in the middle of a crisis. The African Risk Capacity is a potentially useful precedent in this regard.

Rudloff (2021) concluded her presentation by making two points. The first was the value of improvisation and flexibility in responding to a crisis. The second was to warn against the dangers of ‘indicator hype’. Monitoring risks is important, but we should be sure to avoid this becoming only a bureaucratic and symbolic process and instead support the key capacities of flexibility and the need to be aware that the next crisis could be completely new and unexpected.

### **6.3 Developing coordination in a system of multi-level governance**

Coordination structures for crisis management in a time of turbulence – that is, times that are more fluid and more difficult to govern – pose particular challenges (Trondal, 2021). Turbulence is not something to be fixed and possibly controlled, but more a condition for public governance. Turbulence includes events, demands and support that are characterised by variability, inconsistency, unexpectedness and unpredictability. Trondal’s work has identified three types of turbulence: the most common is where an organisation (a state, the EU) faces a change in its external environment; turbulence may also rise from internal challenges within an organisation; and lastly, there is turbulence of scale, the most challenging type, where solutions to a challenge introduced by one actor cause problems for another (for example, where an action by the EU creates problems for the Member States).

The envisaged EU food crisis response mechanism will be an exercise in multi-level governance. This immediately raises the question of how best to ensure multi-level coordination – the challenge of coordination across levels of governance as well as coordination at each level of governance. This is an inherently incompatible coordination challenge. Strong coordination at one level of governance is potentially incompatible with strong coordination across multiple levels of governance. There is also the challenge of change and continuity, of maintaining stability while engaging in reform, which relates to the concept of dynamic resilience. Related to this is the ever-present tension between efficiency and legitimacy – how to solve problems functionally while upholding the possibility of democratic oversight and legitimacy. One final challenge is how to govern political orders that are inherently turbulent (Riddervold, Trondal and Newsome, 2020). Trondal (2021) introduced insights from the field of organisation theory and public administration to explore how focusing on administrative units and agencies – what he called ‘an administrative turn’ – can help us to better conceptualise the process of multi-level governance.

Central to Trondal’s conceptualisation is the role of the multi-level administrative state, which he contrasts with the traditional ‘Westphalian’ view of the state. In the latter view, administration is subordinate to the political leadership which also controls all foreign relationships. This model increases coordination within the state, but it hinders coordination across the levels of governance. The multi-level administration model emphasises administrative bodies and their networks and



assumes that they have greater independence and freedom from political control. They are in effect semi-autonomous administrative networks. This model may allow for strong levels of coordination between levels but may well undermine coordination on the same level. States need to find some balance between these two ideal types and the best way to combine the two. One approach is to promote agency networks that allow staff working at different levels of governance to get together. Within the EU, comitology and Council expert groups are examples of agency networks that can add flexibility to more traditional political structures.

In contrast to the more conventional conceptualisation of multi-level governance that emphasises the relative autonomy of regions and how this autonomy supplies regions with a capacity to bypass state governments in their interaction with the Brussels apparatus, the multi-level administrative approach directs attention towards an emergent administrative order in Europe through the development of novel institutional configurations. The more the EU is involved in policy coordination and implementation, the more important issues of administrative interaction between the various involved political levels become – if only because the EU lacks an administrative basis to conduct ‘supranational’ policies independently from Member States’ administrative systems (Trondal and Bauer, 2017). What characterises the multi-level administrative state is the emergence of some level of independent administrative capacity at European level, represented by the rise of relatively permanent and separate institutions that can act somewhat independently from Member State governments.

Trondal describes this as a process of ‘agencification’ where the EU establishes its own agencies in order to have better control of the implementation of EU legislation and policies, and to have more expertise at EU level. There are different views on what these EU agencies are – are they inter-governmental, transnational or supranational? These agencies have increased in number, in size and in power for different reasons. They are established to resolve collective action problems, often in response to contingency events and crises. A typical EU response to a crisis is to either strengthen an existing agency or to establish a new one. These agencies often evolve from pre-existing organisational formats and networks, for example, informal meetings of directors of agencies outside the framework of the EU. The EU can then seek to establish itself in a hub role and the supranationalism of these networks.

Various policy consequences flow from the concepts of ‘agencification’ and the multi-level administrative state (Trondal, 2021). It provides a genuinely European perspective on problems and solutions. Since these agencies are at EU level, they are more likely to frame and define situations in a non-national way. They can pool administrative resources in a way that Member State administrations cannot easily achieve. For example, an EU agency can distribute work tasks among national administrative units. But this also means that they complicate accountability relationships by making the political control of the agencies more difficult. For national agencies involved in EU processes, the national minister may no longer have full control or be able to coordinate perfectly what that agency is doing under the EU umbrella. EU agencies that have a close and productive working relationship with their parallel agencies in the Member States seem to be more successful in getting the ear of and influencing the Commission (Trondal, 2021).

In summary, Trondal’s message was the need to solve the structural coordination dilemma that arises when administrative infrastructures are organised at multiple levels. The desire for coordination both within and between levels can collide. At the same time, turbulence is a condition for multi-level

governance, and raises the question of how to live with and cope with such coordination dilemmas. His view was that organisational structures are design elements that can be manipulated or constructed to provide solutions, pointing to flexible arrangements such as collaborative platforms, collegial bodies or networks of experts that can be inserted between these levels of government. The need to take organisation and the design of administrative structures seriously has obvious relevance to the design of the proposed food crisis response mechanism.

## 7 Conclusions

The preceding sections reflect the rich discussions at the workshop and the many insights that can contribute to preparing the contingency plan for food supply and food security. This concluding section summarises some of the main messages highlighted by workshop participants.

**Understanding crises.** Crises are distinguished by their rarity, their significance and their impact on stakeholders. What distinguishes crises from emergencies in general is that they may not be foreseen. They are both complex and characterised by the presence of unknowns that cannot be handled by standard emergency procedures. Crises today increasingly take the form of transboundary crises. This new context creates challenges for strategic crisis management, where an important issue is to establish who is in control. This question takes on particular significance in a multi-level governance structure such as the EU.

**The value of preparedness.** The crisis management cycle is a helpful framework for considering the issues that arise in managing crises. The impact of crises can be limited by building resilience. An important aspect of resilience is preparedness. It is impossible to prevent all risks or crises, hence the requirement to be ready to identify them and to create the capacities and capabilities to respond. Good preparedness involves putting in place measures that can limit the consequences of potential crises, and hence the sharp demarcation between prevention and mitigation efforts and preparedness disappears.

**Contingency planning is an important element of preparedness.** Preparing management processes in advance of a crisis is necessary for resilience. Within the Sendai Framework, contingency planning is defined as a management process that analyses disaster risks and establishes arrangements in advance to enable timely, effective and appropriate responses. This includes the planning; organisation and procedures including communication; capacity-building, including training and exercises; redundancy; agreements and pre-arrangements; and early warning. Planning is the core of preparedness.

**Act quickly, prevent escalation.** A proactive approach addresses threats and vulnerabilities to prevent emergencies from escalating into crises. Acting quickly matters to prevent escalation and to limit negative food security implications. This includes having emergency plans and response networks in place, engaging networks for public-private coordination and having safety net programmes that can be scaled up to meet requirements.

**Plan for flexibility and improvisation.** All crises are different. 'Sticking to the plan' is no guarantee of successful crisis management. Improvisation and creativity are important components in crisis situations. Contingency planning provides the backbone for a response on which improvisation can build. It is simply not possible to plan for every detail.

**Invest in risk assessment.** Early warning is recognised as an essential element in reducing the risk of disasters and crises. Effective early warning systems combine risk analysis, monitoring and communicating alerts. Alert warnings can trigger emergency responses for which contingency planning has prepared. Investment in EWSs is thus an important element in supporting effective contingency planning.

**Make use of foresight studies.** Foresight studies are important to avoid linear thinking and to develop imagination for thinking the unthinkable and preparing for it. A frequent comment by crisis preparedness managers after a crisis is that they simply had not imagined the scale of the catastrophe they had just experienced. There is a range of available foresight techniques – identifying trends and megatrends, horizon scans, Delphi studies, scenario thinking/planning, forecasting and backcasting, science fiction / visionaries, prototyping and system modelling. The idea is not that organisations should bet on a particular scenario, which can be a highly risky approach. The point of foresight is to allow organisations to stress-test contingency plans against a wide range of potential outcomes.

**Build cooperation with private supply chains.** Part of contingency planning involves working with the private sector on stress tests for supply chains to assess their ability to mitigate or rebound from the impact of disruption. This may involve an evaluation of the concentration in export or import markets, the existence of alternative suppliers along the value chain, the identification of weak links and the assessment of redundancy or stockpiles. To address supply chain issues, there is a benefit in regular communication between government and stakeholders to highlight any issues potentially affecting supply chains. Apps and web-based platforms can be used to encourage the sharing of information between public and private stakeholders. Business supply chains can be particularly vulnerable to logistical disruption. Private sector actors need to ensure visibility along the supply chain, including the dependence on transport and logistics.

**Do not neglect the importance of training.** Resources need to be allocated to necessary exercises, simulations and other techniques to engage stakeholders and to help the relevant actors to get to know each other and to understand the differences in organisational settings before a crisis occurs. It is also important to persuade decision-makers to take part, which can be difficult given the many demands on their time. Leadership during a crisis often makes different demands on those in charge than in normal decision-making. Training exercises help to build trust within the crisis management team, which is a vital asset when a crisis occurs.

**Properly resource the crisis management team.** The resources put into planning in terms of staff, but also to carry out activities, are important. It can be difficult to attract resources to address a problem that may not arise, and it can be hard to generate sufficient interest until a crisis actually happens.

**Planning should focus on coordination and coherence.** Ensuring coordination across the EU and between the EU and Member States when dealing with a crisis is an obvious challenge that has been underlined by the sometimes-conflicting responses to the COVID-19 pandemic. The EU itself also has a range of different policies that can play a role in crisis response and where coordination is needed. New theories on the multi-level administrative state emphasise the importance of administrative agencies at EU and Member State levels working together by developing common platforms and sharing responsibilities. Organisational structures can be designed to provide solutions, making use of flexible arrangements such as collaborative platforms, collegial bodies or networks of experts that can help to coordinate between government levels.

**Do not underrate the importance of communication.** The importance of good communication during a crisis cannot be over-emphasised, and this also requires training and planning. Attention should be paid to communication within the crisis management team and with external stakeholders, as well as external communication. During a crisis there will be a need to address rumours, conspiracy theories and fake news that are often effective because they appeal to emotions. Official communications may need to become less bureaucratic and frame their messaging with a more human dimension. Strategies will need to be designed that take account of the influence of social media. Treating social media as the enemy can be a major mistake. A great deal can be learned about how people perceive authorities and their responses by studying social media – rumours and conspiracy theories can give valuable insights into why people do not trust the authorities and what their uncertainties and fears are. Assuming that just providing facts will be sufficient to win support for the crisis response is unlikely to work. Trusted networks play an important role in disseminating information during a crisis.

**Learning lessons from past crises.** Evaluation is crucial. There is a need to learn from past experiences and mistakes so that systems can be improved to be better prepared for the next crisis. This should be structured into contingency planning procedures and not just undertaken on an ad hoc basis.

**Strengthen interconnectedness.** Trade can be a vector for transmitting crises (if supplies moving across borders are disrupted) but can also play a vital role in responding to them. The role that trade can play in food security emphasises the importance of ensuring robust supply chains and building cooperative relationships along value chains and across borders. A toolkit of policy options is available to governments for this purpose. It will be important to support the building of robust supply chains across borders, where digital solutions in particular offer the promise of greater flexibility. Cooperation can promote transparency surrounding global food supply; prevent harmful policies, such as export bans or tariffs; reinforce predictable, transparent, rules-based trade; and build trust.

**The importance of the process, not just the plan.** In developing a contingency plan, the planning processes are just as important as the plan itself. The purpose of planning is to create a mutual understanding, common purpose and trust among participants who may not normally work together. The process of contingency planning allows skills to be developed and tested, interactions to be fostered and knowledge shared between the team and with other stakeholders, networks to be established and flexible capabilities built. These capacity-building outcomes are just as important as the resulting plan. The importance of planning for flexibility and the ability to improvise during a crisis also emphasises the need to give priority to the process in contingency planning. Participatory and formal processes can be used to understand uncertainty and potential bottlenecks, thus helping to avoid wrong responses during a crisis. Contingency planning should not only be limited to operational aspects but should also be used to support an overall awareness of risks and responses.

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**Presentations at the workshop on developing a contingency plan for ensuring food supply and food security which took place over a video link on 20 May 2021** (the agenda and presentations are available at: [https://ec.europa.eu/info/events/academic-workshop-farm-fork-contingency-plan-ensuring-food-supply-and-food-security-2021-may-20\\_en](https://ec.europa.eu/info/events/academic-workshop-farm-fork-contingency-plan-ensuring-food-supply-and-food-security-2021-may-20_en))

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## Annex 1. Workshop agenda

### Workshop – Contingency plan for ensuring food supply and food security

Thursday, 20 May 2021, 9:30–18:00, Videoconference

1. Introductory session: Why contingency planning?		
9:30 – 9:45	Welcome and introduction Contingency planning in the EU	<b>Tassos Haniotis</b> DG AGRI Director (Belgium)
9:45 – 10:05	Overview contingency planning issues in the US	<b>Seth Meyer</b> Chief Economist, USDA (USA)
10:05 – 10:25	Agricultural Resilience: Preparing for Risk and Disasters	<b>Jesús Antón</b> Senior Economist, OECD (France)
10:25 – 10:40	Q&A	
10:40 – 10:50	Break	
2. Crisis preparedness and crisis management: Modern conceptual framework		
10:50 – 11:10	The crisis management cycle, conceptual framework	<b>Christer Pursiainen</b> Professor at the Arctic University of Norway (Norway)
11:10 – 11:30	Transboundary Crisis Management	<b>Arjen Boin</b> Professor of Public Institutions and Governance at the Institute of Political Science, Leiden University (The Netherlands)
11:30 – 11:45	Q&A	



### 3. Risks, threats, vulnerabilities to food security and food system resilience: How to identify and assess key risks? How to prepare for and manage them? What are suitable Early Warning Indicators?

11:45 – 12:05	Early Warning systems: availability, adequacy and how to use for anticipation of potential crises	<b>Bettina Baruth</b> Deputy Head of Unit, Food Security Unit, European Commission's Joint Research Centre (Italy)
12:05 – 12:25	Building resilience in the seafood system	<b>Sebastian Villasante</b> Associate professor at the University of Santiago de Compostela (Spain)
12.25 – 12:45	Monitoring food system resilience to potential hazards	<b>Miranda Mewuissen</b> Professor of cost-effective risk management in food supply chains at WUR (The Netherlands)
12:45 – 13:00	Q&A	
13:00 – 14:00	Lunch break	

### 4. Businesses: How do (food supply chain) companies prepare and respond to crisis? What is effective/good practice? A view on global risks in 2021

14:00 – 14:20	Businesses contingency planning: How businesses prepare and respond to crises?	<b>Andrew Morgan</b> Director of Global78 (United Kingdom)
14:20 – 14:40	Lessons from COVID-19 on how the agri-food system will change	<b>Krjin Poppe</b> Professor Emeritus, WUR (The Netherlands)
14:40 – 14:55	Q&A	

<b>5. Government level preparation for food crises: How should countries prepare and respond to crises from a food security perspective? What is effective/good practice?</b>		
14:55 – 15:15	Pros and cons of government level contingency planning	<b>Kerstin Eriksson</b>  Researcher at the RISE Research Institutes of Sweden (Sweden)
15:15 – 15:35	What governments can do in crisis management (before, during and after) for ensuring food supply and food security	<b>Lee Ann Jackson</b>  Head of Agro-food Trade and Markets Division - Trade and Agriculture Directorate, OECD (USA)
15:35 – 15:55	Examples of crisis management from developed countries from a food security perspective	<b>Katherine Baldwin</b>  Agricultural Economist, USDA (USA)
15:55 – 16:10	Q&A	
16:10 – 16:20	Break	
<b>6. Mechanisms of coordination among EU countries and global and examples of good practices</b>		
16:20 – 16:40	What institutional settings and coordination mechanism among countries in the EU and global is needed?	<b>Bettina Rudloff</b>  German Institute for International and Security Affairs (Germany)
16:40 – 17:00	Coordination structures for crisis management	<b>Jarle Trondal</b>  Professor of Political Science and Management at the University of Agder (Norway)
17:00 – 17:20	How to manage when a crisis hits?	<b>David Horobin</b>  Head of the Crisis Management at the Geneva Centre for Security Policy (GCSP) (Switzerland)
17:20 – 17:35	Q&A	

## 7. Wrap-up

17:35 - 18:00	Wrap-up	<b>Alan Matthews</b> Professor Emeritus of European Agricultural Policy, Trinity College Dublin (Ireland)
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## List of Abbreviations

AMIS	Agricultural Market Information System
ASAP	Anomaly hotSpots of Agricultural Production
ASEAN	Association of South-East Asian Nations
CAP	Common Agricultural Policy
CEO	Chief Executive Officer
CMT	Crisis Management Team
DG AGRI	Directorate-General for Agriculture and Rural Development
DG SANTE	Directorate-General for Health and Food Safety
DG MARE	Directorate-General for Maritime Affairs and Fisheries
DNA	Deoxyribonucleic acid
EAFRD	European Agricultural Fund for Rural Development
EMFF	European Maritime and Fisheries Fund
EU	European Union
EWS	Early Warning System
fAPAR	Fraction of absorbed photosynthetically active radiation
GEOGLAM	Group on Earth Observations Global Agricultural Monitoring Initiative
HORECA	Hotel, restaurant and café sector
ICT	Information and communication technology
IFPRI	International Food Policy Research Institute
INS	Incidents of National Significance
ISO	International Standards Organisation
JRC	Joint Research Centre
MARS	Monitoring Agricultural Resources
MS	Member State
NDVI	Normalised Differential Vegetation Index
NGO	Non-governmental Organisation

OECD	Organisation for Economic Cooperation and Development
PSE	Producer Support Estimate
SPI	Standardised Precipitation Index
TFEU	Treaty on the Functioning of the European Union

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