Building National Resilience

強国靱化
NATIONAL RESILIENCE
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Lessons Learned from Past Major Disasters

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◯It is important to be prepared by learning from past disasters, keeping the worst scenarios in mind, and avoiding the repetition of serious damage and long process of post recovery.

	Ise Bay Typhoon (1959)	Hanshin-Awaji Earthquake (1995)	Great East Japan Earthquake (2011)
	Large number of fatalities and missing persons  Damaged by Ise Bay Typhoon (photo provided by Aichi Prefecture)	Collapses of buildings and viaducts; Large spread of fire in residential areas  Collapsed Viaduct of Hanshin Expy. (photo provided by Kobe City)	Damage by enormous tsunami; Large number of stranded ppl  Firefighters Searching for the Missing (photo provided by Sendai City)
	Basic Act on Disaster Management enacted **Clarified the idea of "Disaster Prevention"**	Importance of seismic reinforcement, protection of populous areas, self and mutual support recognized **Promotion of "Disaster Reduction"**	Limitation of hard measures, importance of DRR education recognized **Towards "National Resilience"**
Fatalities	4,697 people	6,434 people	19,533 people
Missing	401 people	3 people	2,585 people
Injured	38,921 people	43,792 people	6,230 people
Damaged bldgs.	153,890 buildings	249,180 buildings	401,928 buildings
Total damage	Approx. 0.5 trillion yen	Approx. 10 trillion yen	Approx. 17 trillion yen

What is National Resilience? (Strong and Resilient Society)

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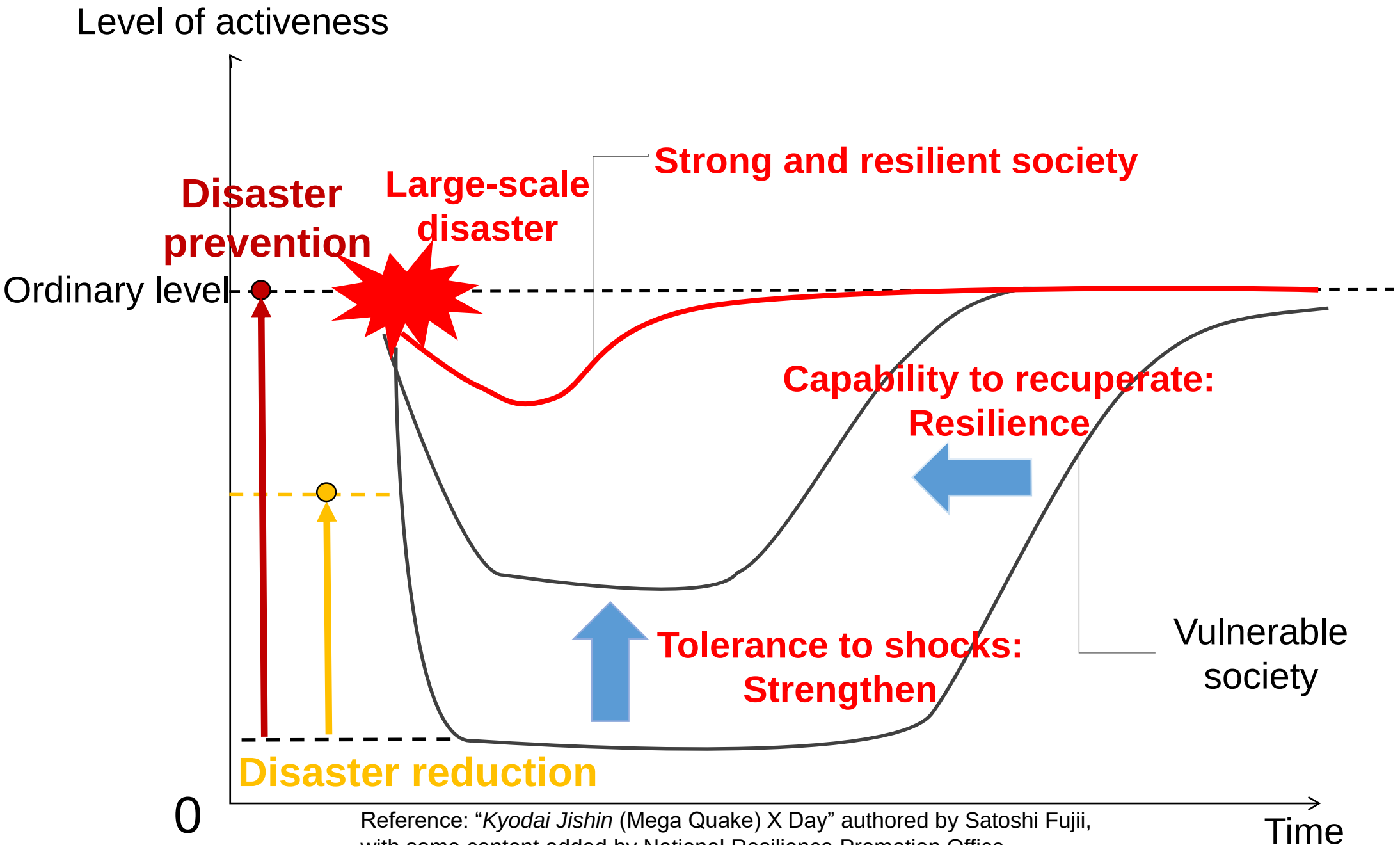

Reference: "*Kyodai Jishin* (Mega Quake) X Day" authored by Satoshi Fujii, with some content added by National Resilience Promotion Office

Building “Strength” (Ex Ante Prevention)

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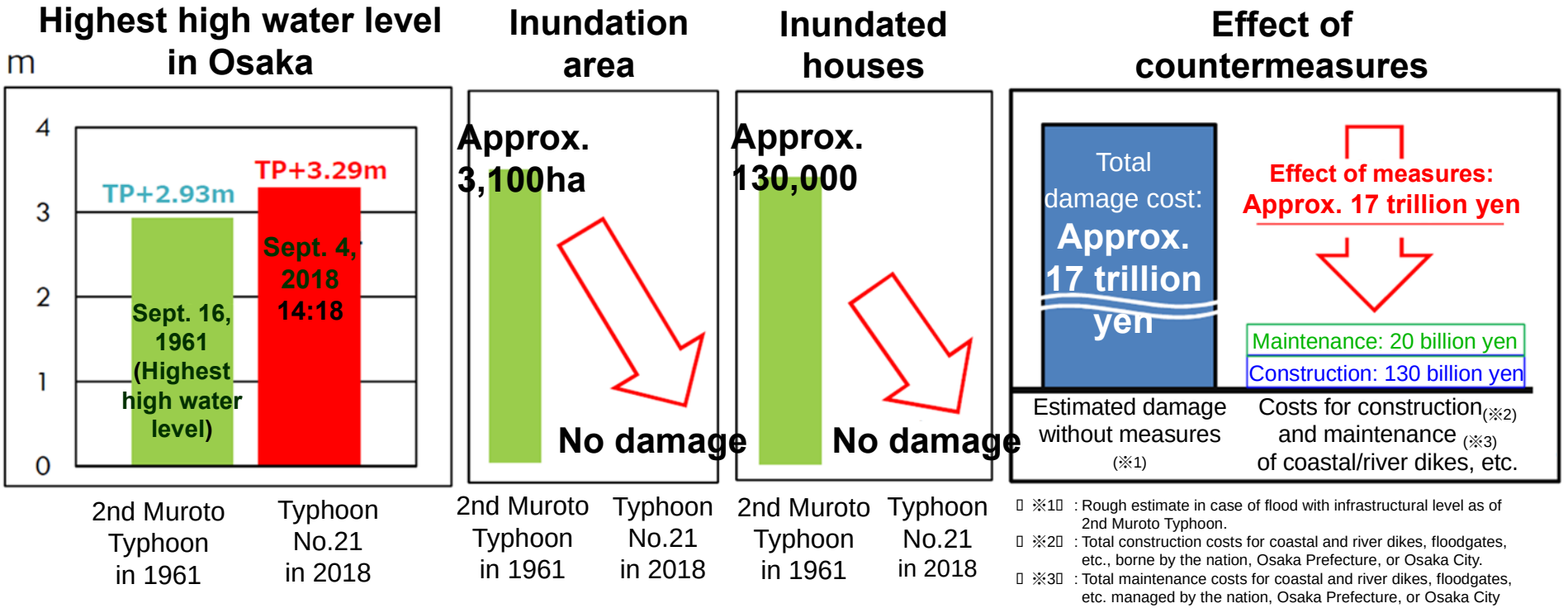
○Example from Osaka Bay (Typhoon No.21 in September 2018): Effective countermeasures prevented flood damage in spite of highest high water level

■Typhoon No.21 marked the highest high water level of Osaka bay, exceeding 2nd Muroto Typhoon

■130,000 houses were inundated by the 2nd Muroto Typhoon in 1961. Since then, damage from high tides in urban areas have been completely prevented by the construction of coastal/river dikes and floodgates (approx. 130 billion yen) and their proper management (approx. 20 billion yen).

■ The effect of these measures is estimated to reach approx. 17 trillion yen.

The tide exceeded highest high water level by approx. 40cm → **Inundation prevented by the countermeasures for high tides that have been implemented in Osaka Bay**



※1 : Rough estimate in case of flood with infrastructural level as of 2nd Muroto Typhoon.

※2 : Total construction costs for coastal and river dikes, floodgates, etc., borne by the nation, Osaka Prefecture, or Osaka City.

※3 : Total maintenance costs for coastal and river dikes, floodgates, etc. managed by the nation, Osaka Prefecture, or Osaka City since year 1965.

Reference : *Kasen Jigyo Gaiyou* (Outline of River Management) 2019 published by Ministry of Land, Infrastructure, Transport and Tourism

Fostering “Resilience” (Flowchart Analysis)

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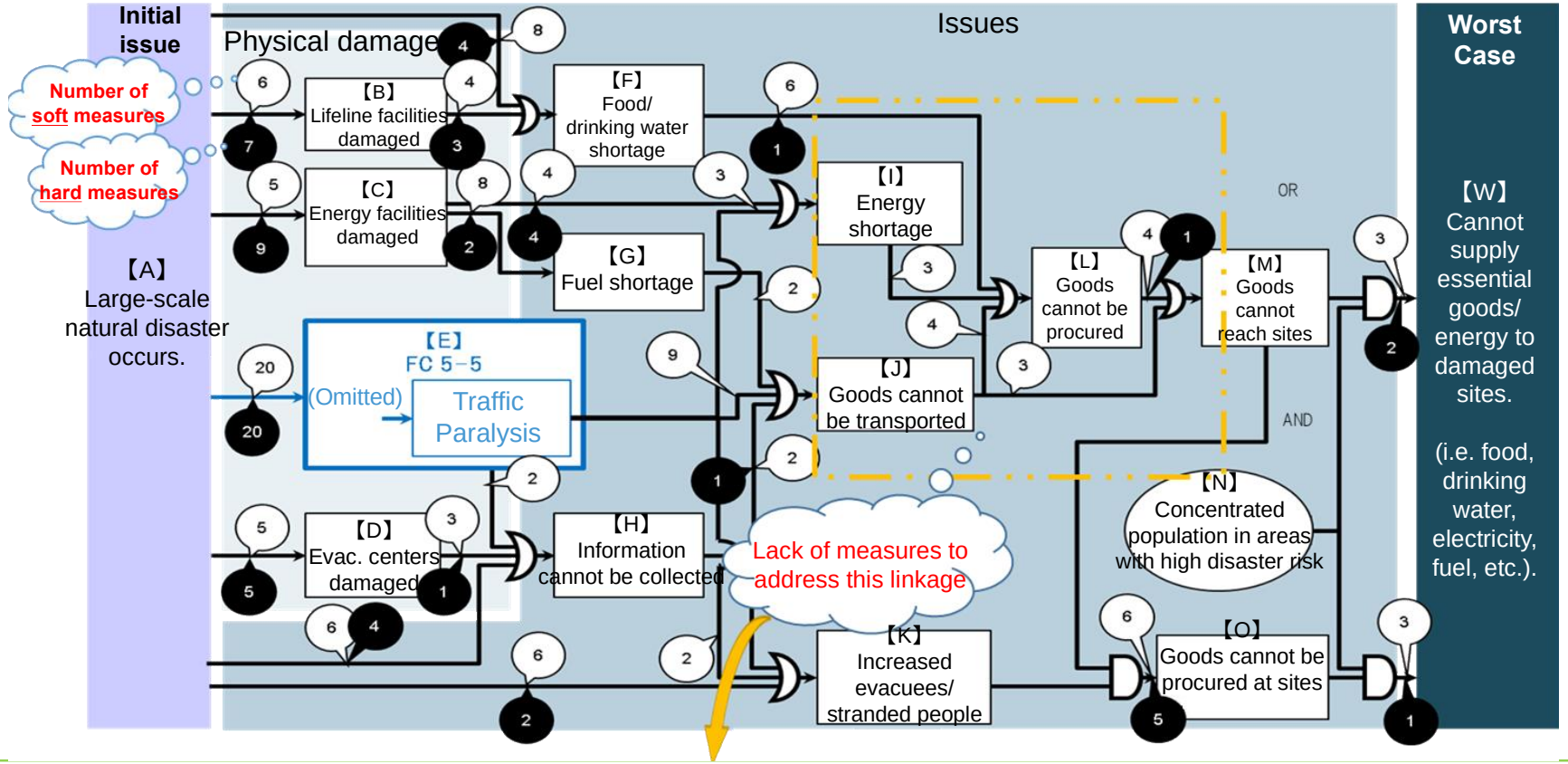
■Vulnerability Assessment:
①Investigation of situation, and assessment of the progress of measures.
②Analysis of the lessons learned from disasters that happened since plan proposal.
③Analysis of the process leading up to “the worst case”:
Flowchart analysis on the process from occurrence of disaster to the worst case was conducted.
Inadequate or lacking measures were identified through the visualization of causal relationships among conditions/phenomena that could not be expected from past experience or assumptions.

【E.g.】(2-1) Unable to supply essential goods/energy to damaged sites. (i.e. food, drinking water, electricity, fuel, etc.).



【Example of an issue identified from the process analysis】
○The establishment of a decent supply system through the collaboration of public and private sectors is required for the smooth supply of essentials to damaged areas.

Framework for National Resilience Promotion

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Basic Act for National Resilience Contributing to Preventing and Mitigating Disasters for Developing Resilience in the Lives of the Citizenry (Lawmaker-drafted legislation; Enacted on Dec. 4 and promulgated & enforced on Dec. 11, 2013)

Vulnerability Assessment

Fundamental Plan for National Resilience
(Cabinet Decision on June 3, 2014)

Vulnerability Assessment

Revision of the Fundamental Plan for National Resilience
(Cabinet Decision on Dec. 14, 2018)

Heavy rain in July 2018, and Typhoon No. 21 and Hokkaido Eastern Iburi Earthquake, etc. in the same year largely affected the lives and economic activities of residents

Emergency inspection of important infrastructure (Nov. 2018)

Three-year emergency response plan for disaster prevention, disaster mitigation, and building national resilience
(Cabinet Decision on Dec. 14, 2018)

Formulation and Promotion

2019 Annual Plan for National Resilience
（Decision by National Resilience Promotion Headquarters on June 11, 2019)

Regional Plan for National Resilience
(Formulated by local governments)

45 Worst-Case Scenarios

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Pre-Disaster Preparatory Goals (Categories) / Worst-Case Scenarios to Be Avoided	
1. Prevention of deaths directly caused by disaster by all means	
1-1	Many casualties due to complex or large-scale collapses of houses, buildings, traffic facilities, or where a large number of people gather.
1-2	Many casualties due to large fires in densely populated urban areas or facilities, where a large number of unspecified people gather.
1-3	Many casualties due to large-scale and massive tsunami.
1-4	Many casualties due to sudden, extensive and long-term floods in urban areas.
1-5	Many casualties due to large volcanic eruptions and landslides (including deep collapses).
1-6	Many casualties due to severe snowstorms or heavy snow
2. Prompt rescue, first aid and medical activities, and securing of evacuees' health and living environment	
2-1	Disruption of supply of essentials and energy in affected areas, such as food, drinking water, electricity, and fuel.
2-2	Simultaneous occurrence of prolonged isolation in many areas.
2-3	Unavoidable lack of rescue and first aid due to rescue authorities being affected, such as the Self-defense Forces, Police, .Fire Department, and the Coast Guard
2-4	A large number of displaced people, leading to confusion.
2-5	Medical facilities and staff afflicted or lacking, support routes and energy supply disrupted, leading to medical services being paralyzed.
2-6	Massive spread of epidemic and infectious disease in disaster-hit areas.
2-7	Many deaths and illnesses among evacuees due to poor living conditions and poor health management
3. Securing of essential governmental function	
3-1	Decline in public order due to disaster-hit security authorities' malfunction.
3-2	Malfunction of central government in metropolitan areas, etc.
3-3	Malfunction of local governments due to staff and facilities being affected.
4. Securing of essential functions and information and communication services	
4-1	Communication networks for disaster response paralyzed or impaired.
4-2	Disaster information for those in need hampered due to disrupted broadcasts
4-3	Disaster information service impaired, information not collected or transmitted, and evacuation, rescue and support delayed
5. Prevention of economic activities from being malfunctioned	
5-1	Supply chain disrupted, and companies' production and international competitiveness deteriorating
5-2	Energy supply impaired, afflicting social economy and supply chains.
5-3	Industrial complexes or other key facilities destroyed, fires, explosions.
5-4	Maritime transportation disrupted, seriously affecting overseas trade.
5-5	Arterial routes of the Pacific Belt Zone and main land and maritime traffic network disrupted or blocked, hampering the flow of people and goods.
5-6	Multiple airports damaged, seriously affecting international air transport.
5-7	Financial services and mail suspended, hampering livelihood and commerce.
5-8	Stable supply of foods and other goods hampered
5-9	Serious drought affecting water supply and hampering productions.
6. Minimize damage to lifelines, fuel supply facilities, transport networks, etc., and restore them promptly.	
6-1	Prolonged stoppage of power supply network (power generation, transformation and distribution), urban gas, or supply chain of oil or LP gas
6-2	Prolonged stoppage of water supply
6-3	Prolonged suspension of operation of sewage treatment facilities.
6-4	Prolonged blockage of land, maritime and air traffic networks from arterial transport such as Shinkansen to regional networks.
6-5	Prolonged malfunction of disaster prevention infrastructures.
7. Prevention of uncontrollable complex or secondary disasters	
7-1	Many casualties due to massive fires in urban areas after an earthquake.
7-2	Extensive and complex disasters in maritime and coastal areas.
7-3	Traffic network blocked or paralyzed due to collapse of roadside buildings or underground structures, and sinkholes
7-4	Many casualties due to destruction or malfunction of reservoirs, anti-disaster infrastructure or natural dams, or landslides including volcanic.
7-5	Damage worsened by extensive efflux of hazardous materials
7-6	Damage on and deterioration of national land such as farms and forests.
8. Establish more robust conditions for prompt recovery of society and the economy.	
8-1	Prolonged recovery due to hampered treatment of massive amounts of disaster waste.
8-2	Lack of personnel (experts, coordinators, workers, or technicians) and visions for better reconstruction, resulting in failure to recover..
8-3	Delayed recovery due to extensive and prolonged floods caused by wide-area land subsidence.
8-4	Precious cultural and environmental assets lost, local communities destroyed, and tangible and intangible decline and loss of culture.
8-5	Prolonged recovery due to delay in procurement of operational land or construction of temporary housing, stores, and offices.
8-6	Global reputation damage and lost credit, delayed recovery of production, massive unemployment, bankruptcies, etc., afflicting the national economy.

Development of Countermeasures

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In accordance to the vulnerability assessments conducted under each worst-case scenario, the issues identified are summarized and reorganized into 12 individual and 5 cross-sectoral categories.

Goal	Worst case	1) Govt./ Police/Fire Dep./Educ.	…	6) ICT	…	8) Transportation/ Logistics	…	12) Land Use (National)	…	B) HR Development	…
1. Prevent deaths directly caused by disaster by all means	1-1) Many casualties caused by complex or large-scale collapses of buildings and other structures.	**Seismic reinforcement of Govt. facilities and disaster prevention sites**		**Improvement and utilization of Earthquake Early Warning systems**		**Seismic reinforcement of transportation infrastructures**		**Measures to address the dense population in areas of high disaster risk**			
…											
5. Prevent economic activities from malfunctioning	5-1) Supply chain disrupted, affecting businesses and international competitiveness.	**Effective sharing of information for disaster response**								**Education of HR for increasing private business's resilience**	
…											
6. Minimize damage to lifelines, fuel supply facilities, traffic networks, etc., and reconstruct them promptly.	6-4) Land, maritime and air traffic networks, both arterial and regional, blocked for long periods.			**Utilization of probe information by public & private**		**Improvement of feasibility of plans for clearing road/marine debris**				**Securing local technical experts of each region**	
…											

Vulnerability assessment of 45 worst-case scenario

Evaluation and reanalysis based on each category

Individual categories (12)	1) Government/ Police/ Fire Department/Education	2) Residence/ Urban	3) Healthcare/ Welfare	4) Energy	5) Finance	6) ICT
	7) Industrial Structure	8) Transportation/ Logistics	9) Agriculture/ Forestry/ Fisheries	10) Land conservation	11) Environment	12) Land Use (National)
Cross-sectoral categories (5)	A) Risk Communication	B) HR Development	C) Public-Private Cooperation	D) Countermeasures for aging infrastructure	E) Research and Development	☆

Three-Year Emergency Response Plan for Disaster Prevention, Disaster Mitigation, and Building National Resilience

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A three-year (FY2018 to FY2020) plan is being conducted to address the 160 vulnerabilities that require urgent action, whether structurally or non-structurally, identified as a result of emergency inspections, focusing on the following two objectives.

I. To maintain the functions of important infrastructures that serve to reduce disaster risks

(Examples)

To reinforce embankments of approx. 120 rivers prone to flooding

To support 125 disaster-medical and other hospitals in introducing in-house power generation systems

To upgrade multilingual voice translation system for emergency use

II. To maintain the functions of important infrastructures that serve to support the national economy and people's lives

(Examples)

To protect the terminal buildings of 7 major airports against inundation

To reinforce road slopes and embankments and expand road widths at approx. 2,000 locations prone to landslide

To introduce approx. 100 additional vehicle-mounted mobile phone bases to enable major base stations to continue providing service in an emergency