

# Enhancing Resilience and the “FutureCity”

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Special Advisor to the Prime Minister

Hiroto Izumi

# Selected “Future Cities”

**Shimokawa, Hokkaido Prefecture (Population: 3645)**  
 Establishment of a self-sustaining general forest industry, using its rich forest resources. Creation of autonomous communities based on the collective living model

**Kamaishi, Iwate Prefecture (Population: 38,000)**  
 Use of locally generated power. Creation of a city unifying industry and welfare through, for example, the unification of health, medicine, welfare, and nursing in the Living Support Center.

**Ofunato, Rikuzentakata, and Sumita, Iwate Prefecture (Combined population: 67,000)**  
 Creation of a linked, compact Eco-Model and "FutureCity" which is senior-friendly and uses high land area.

**Toyama, Toyama Prefecture (Population: 417,000)**  
 Compact city initiatives focused on light rail and other public transportation. Toyama-style day service initiatives which do not separate between senior citizens, persons with disabilities, and children.

**Kitakyushu, Fukuoka Prefecture (Population: 970,000)**  
 Initiatives which use the city's experience in overcoming pollution problems, and international environmental cooperation; and manufacturing technologies, focusing on “coordination between residents, companies,” and administration, and on “community bonds.”

**Yokohama, Kanagawa Prefecture (Population: 3,692,000)**  
 Initiatives which use regional features and the dynamic power of companies and residents in citizen groups, etc., to take on the challenges faced by a major metropolis, from environment issues to issues related to the aging society.

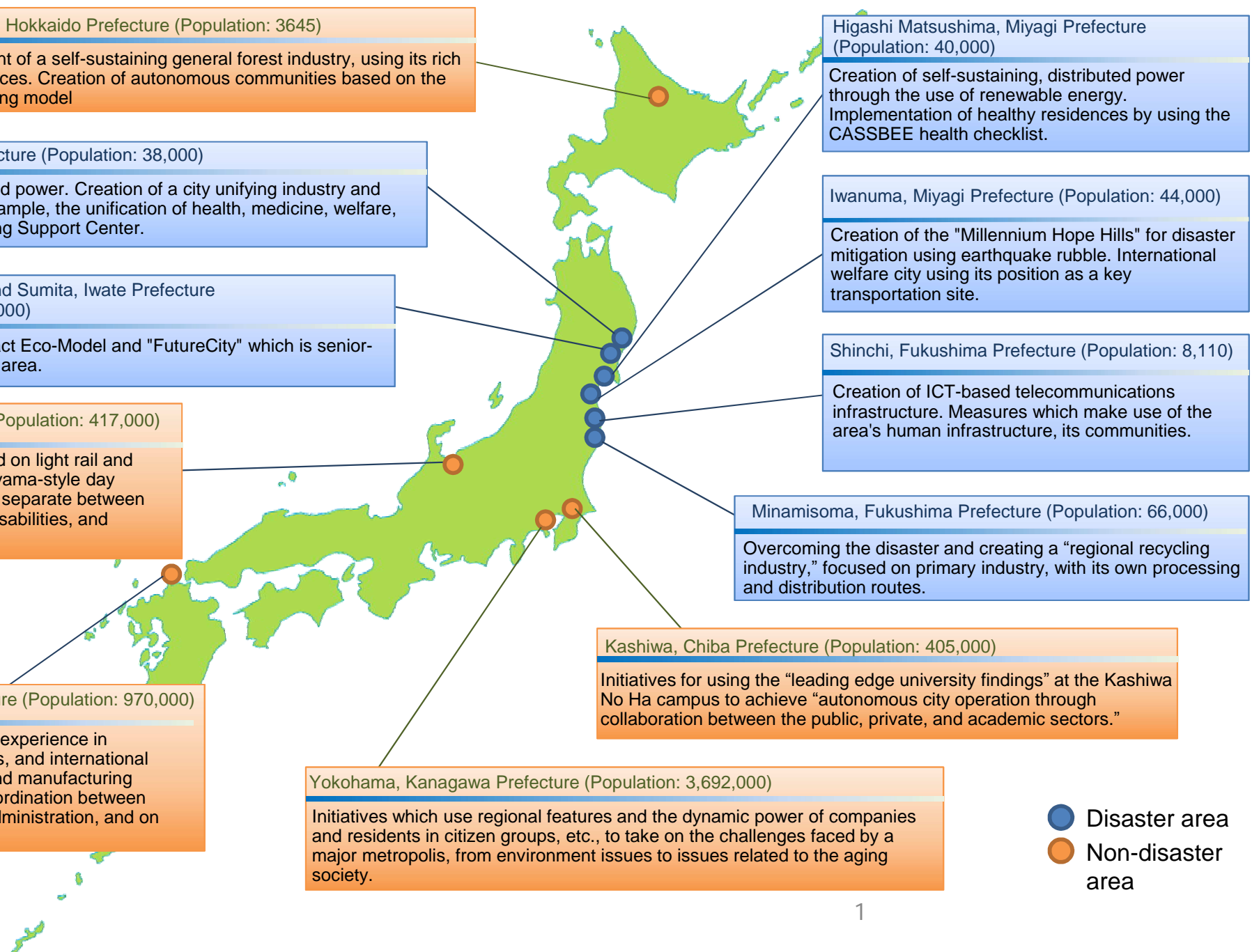
**Kashiwa, Chiba Prefecture (Population: 405,000)**  
 Initiatives for using the “leading edge university findings” at the Kashiwa No Ha campus to achieve “autonomous city operation through collaboration between the public, private, and academic sectors.”

**Minamisoma, Fukushima Prefecture (Population: 66,000)**  
 Overcoming the disaster and creating a “regional recycling industry,” focused on primary industry, with its own processing and distribution routes.

**Shinchi, Fukushima Prefecture (Population: 8,110)**  
 Creation of ICT-based telecommunications infrastructure. Measures which make use of the area's human infrastructure, its communities.

**Iwanuma, Miyagi Prefecture (Population: 44,000)**  
 Creation of the "Millennium Hope Hills" for disaster mitigation using earthquake rubble. International welfare city using its position as a key transportation site.

**Higashi Matsushima, Miyagi Prefecture (Population: 40,000)**  
 Creation of self-sustaining, distributed power through the use of renewable energy. Implementation of healthy residences by using the CASSBEE health checklist.

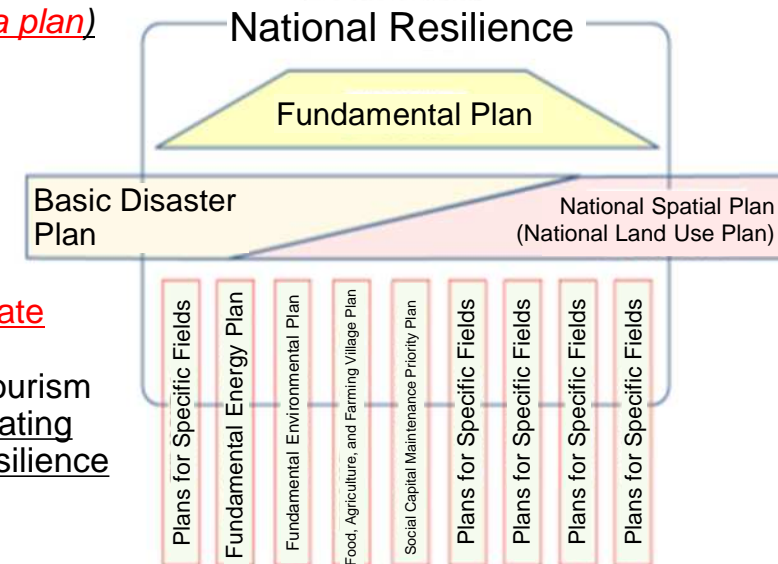


● Disaster area  
 ● Non-disaster area

What is the Resilience?

# Overview of the Basic Act for National Resilience Contributing to Preventing and Mitigating Disasters for Developing Resilience in the Lives of the Citizenry

- Objectives and basic philosophy
  - \* Preparedness for large-scale natural disasters requires comprehensive and systematic implementation of measures which contribute to disaster prevention and mitigation, and to swift recovery and reconstruction. These measures also contribute to the improvement of Japan's international competitiveness.
- Basic principles
  1. Initiatives should aim to ensure maximum protection of human lives against large-scale natural disasters
  2. Initiatives should aim to protect and maintain the critical functions of the nation and society from critical damage in the event of a disaster
  3. Initiatives should aim to minimize damage to public facilities and the private property of citizens
  4. Initiatives should aim to contribute to swift recovery and reconstruction
  - \* Furthermore, the Act provides for the creation of implementation systems which combine structural and non-structural components, the strengthening of disaster measures, etc.
- Policies for establishing and implementing measures
  - \* Existing social capital should be used effectively, private sector funding should be actively utilized, consideration should be given to symbiosis with nature and harmony with the environment, etc.
- Fundamental plan / vulnerability assessment
  - \* A fundamental plan shall be established as a guideline for fostering national resilience. Other national plans concerning national resilience shall be based on this plan (=umbrella plan) (The fundamental plan shall not include specific projects, but shall be positioned as a guideline for other, specific plans)
  - \* Before formulating the fundamental plan, a vulnerability assessment shall be implemented, its results shall be verified, and the opinions of local public authorities shall be heard
- National Resilience Promotion Headquarters
  - \* The National Resilience Promotion Headquarters shall be composed of all ministers of state
  - \* Director-General: **Prime Minister**, Vice Directors-General: Chief Cabinet Secretary, **Minister of Building National Resilience**, Minister of Land, Infrastructure, Transport and Tourism
  - \* The National Resilience Promotion Headquarters shall decide on the guidelines for evaluating the vulnerability assessment, and create a draft of the Fundamental Plan for National Resilience (-> the plan is to be approved by cabinet decision)
- Local governments
  - \* Local governments may establish Fundamental Plans for Regional Resilience



# Overview of the *Fundamental Plan for National Resilience* (1/4)

## List of situations that cannot happen and should be avoided through programs

### Basic Objectives

I. Realizing maximum protection of human life

III. Minimizing damage relating to property of the citizens and public facilities

II. Maintaining important national and community functions without suffering catastrophic failure

IV. Rapid rehabilitation and reconstruction

Notes:    15 programs that should be prioritized

The objective to be provided in advance	Situations that cannot happen and should be avoided through programs
1 Realizing maximum protection of human life even when large-scale disasters have occurred	Casualties in major cities caused by the complex and large-scale collapse of buildings, transportation facilities and the like, and by fires in densely populated residential areas
	Collapse and fires occurring in facilities where untold numbers of people have gathered
	A great many deaths resulting from large-scale tsunamis and the like spreading over a wide area
	Flooding of broad and long-term urban areas due to abnormal weather and the like
	Situations with the occurrence not only large numbers of casualties resulting from large-scale volcanic eruptions, landslide disasters (deep collapses), and the like, but also territorial vulnerability increases in future years as well
	A great many of casualties occurring due to delays in evacuation actions due to inadequate transmission of information
	2 Conducting rapid emergency, rescue, and medical activities, and the like immediately after large-scale natural disasters (including the necessary response if such actions cannot be taken)
Simultaneous occurrence of such isolated communities in many areas and over an extended period	
Absolute shortage of rescue and emergency activities for disasters by organizations such as the Self Defense Forces, police force, fire department, Japan Coast Guard, and the like	
Extended disruption in the supply of energy for rescue and first aid, and medical activities	
Short supply of water, food, and the like for a great many stranded commuters, and for an extended period, more than had been expected	
Absolute shortage of medical facilities and officials as well as a paralysis of medical functions due to disruption of the disaster support routes.	
Large-scale occurrence of infectious diseases, epidemics, and the like in disaster areas	
3 Ensuring essential administrative functions immediately after large-scale natural disaster	Deteriorating security due to the significant reduction of local police functions as inmates escaped from correctional facilities through the disaster.
	Multiple serious traffic accidents resulting from the total interruption of traffic signals, and the like
	Insufficient central government functions in the Tokyo metropolitan area
	Significant reduction in the function of the local government agency personnel and facilities due to the disaster
4 Ensuring essential telecommunications functions immediately after large-scale natural disasters	Paralysis and long-term interruption of telecommunications due to power outages and the like
	A range of important mail cannot be delivered due to long-term interruption of postal services
	Situations in which disaster information cannot be delivered to the people who need it due to interruption of television and radio broadcasting

The objective to be provided in advance	Situations that cannot happen and should be avoided through programs
5 Prevent falling into dysfunctional economic activities (including the supply chain), even after large-scale natural disasters	Declining international competitiveness due to declining corporate productivity resulting from disruptions in the supply chain
	Interruption of the energy supply needed for socioeconomic activities and the supply chain
	Damage, fires, explosions, and the like in the industrial complex and important facilities.
	Enormous impact on foreign trade due to the interruption of marine transportation functions
	Interruption of core land/maritime transportation networks, dividing the trunk line of the Pacific Belt Zone and the like
	Simultaneous disasters at multiple airports
	Situations with enormous impacts on commerce resulting from interruptions of financial services
	Stagnation in the stable supply of foodstuffs and the like
6 Securing the minimum electricity, gas, water and sewage, fuel, transportation networks, and the like needed for daily life and economic activities—even after large-scale natural disasters—and striving for their rapid recovery	Interrupted power supply networks (power plants, transmission, and distribution equipment) and oil/LP gas supply chains.
	Interruption in the water supply and the like over an extended period
	Interruption of sewage treatment facilities and the like over an extended period
	Situations of divided regional transportation networks
	Interruption in the water supply due to abnormal drought and the like
7 Not generating uncontrollable secondary disasters	Large-scale disasters occurring in urban areas
	Wide-area complex disasters occurring in of seaside/coastal areas
	Direct damage and traffic paralysis resulting from buildings collapsing along roadsides and railway lines
	Secondary disasters occurring as a result of damage and dysfunction at ponds, dams, disaster prevention facilities, landslide dams, and the like
	Large-scale outflow and diffusion of harmful substances
8 Developing conditions that regional communities and economies can rapidly be rebuilt and restored, even after large-scale natural disasters	Expanding damage caused by the devastation of farmland and forest
	Enormous impact on the national economy resulting from deforestation
	Situations where recovery and reconstruction is substantially delayed by stagnation in the processing of disaster waste occurring in large quantities
	Situations where recovery and reconstruction are substantially delayed due to the lack of human resources (specialist, coordinator, workers, technicians who are familiar with the area, and the like) responsible for the recovery and reconstruction such as elimination of road obstacles
	Situations where recovery and reconstruction are substantially delayed as the local communities collapse and security deteriorates
Situations where recovery and reconstruction are substantially delayed due to the damage of the core infrastructure of the <i>Shinkansen</i> bullet train and the like	
Situations where recovery and reconstruction are substantially delayed due to flood damage over wide areas and extended periods as a result of wide area land subsidence.	

# Overview of the "Fundamental Plan for National Resilience" (2/4)

- **Vulnerability assessment (Chapter 2) Omitted**
- **National resilience promotion policies (Chapter 3) - Implementation policies for individual fields -**

## Measures in Individual Fields

[Administrative Functions / Police, Fire Departments, etc.]

- Implementation of measures based on **overall administrative operation continuation plans**, etc.

[Residences and Urban Areas]

- **Measures against fire in high population density area**, residential and school **earthquake resistance improvements**, **long-period ground motion earthquake measures** for buildings, etc.

[Health, Medical Care, and Welfare]

- **Appropriate allocation of medical resources**, including equipment and personnel, used in the creation of a **wide-area coordination system**, etc.

[Energy]

- Enhancement of **ability for energy supply facility to respond to disaster** and **mutual accommodation capabilities** between regions, etc.

[Finance]

- **Ensure backup functionality** for financial systems, implement **cross-institution joint training** for financial institutions, etc.

[Communications]

- Rapid implementation of **measures against long-term power outages**, etc. for communications systems

[Industrial Structure]

- Promotion of construction of **company collaboration BCP/BCM**, etc.

[Transportation and Logistics]

- **Improvement of disaster resistance** of transportation and logistics facilities, etc.

[Agriculture, Forestry and Fisheries]

- **Production infrastructure and other structural measures** related to agriculture, forestry, and fishing, and implementation of **non-structural measures such as the creation of BCP/BCM** for the distribution and processing stages

[National Land Conservation]

- Comprehensive measures combining **structural measures such as the development of disaster prevention facilities, etc.** and **non-structural measures such as the development of warning and evacuation systems, etc.**, etc.

[Environment]

- **Creation of waste disposal systems**, etc., which are capable of rapidly and appropriately disposing of waste produced by disasters

[Land Use (National Land Use)]

- **Coordination between Sea of Japan and Pacific Ocean areas** in order to provide for **redundancy and substitutability**, etc.

# Overview of the "Fundamental Plan for National Resilience" (3/4)

## • National resilience promotion policies (Chapter 3) (Continued)

### Cross-cutting Sectors

#### [Risk Management]

- **Mutual communication, education, training**, etc., in order to promote autonomous efforts by the national government, local municipalities, citizens, and business operators, etc.

#### [Deterioration Measures]

- **Creation of maintenance cycles** based on plans for prolonging the life of each facility

#### [Research and Development]

- **Research and development of exceptional technologies** which contribute to natural disaster and deterioration prevention, and the **promotion of their adoption and use**, etc.

## • Plan implementation and uninterrupted review (Chapter 4)

- The plan shall be **implemented while performing review as necessary** of all other national resilience plans
- Plan contents shall be **reviewed roughly every 5 years**, and may be changed if necessary before this regular review

- **Each year the National Resilience Promotion Headquarters shall create** program promotion plans (\*) for avoiding worst case situations, to serve as **national resilience action plans**. These shall be used to **perform quantitative evaluations** through the **use of measure and program progress management** and key performance indicators, etc.

(\*) Promotion plan will be created adding key performance indicators (KPI) to the promotion policies for each program

- **15 key programs will be prioritized**



## Fundamental Plan for National Resilience

- This plan will be established as dictated by Article 10 of the Basic Act for National Resilience, to serve as a guideline for other national plans concerning national resilience (umbrella plan)
- Promotion policies will be established for individual measure fields and programs based on the results of the vulnerability assessment

### ● Basic concept of national resilience (Chapter 1)

#### [Principles]

- Basic national resilience objectives
  - 1) Protection of human life
  - 2) Protection of the critical functions of the nation and society from critical damage and maintaining them
  - 3) Minimizing damage to public facilities and the private property of citizens
  - 4) Swift recovery and reconstruction
- The plan's goal is to constantly maintain economic and social systems which will remain functional in the event of a natural disaster, and help support the nation's economic growth

#### [Basic policies, etc.]

- Ongoing decentralization of power from Tokyo, and formation of an "autonomous, decentralized, and cooperative" nation
- Strengthening of measures, appropriate combination of structural measures and non-structural measures
- Expense reduction through effective utilization of existing social capital
- Active utilization of private sector funding through PPP/PFI
- Management by repeating the PDCA cycle

#### [Areas of special attention]

- Measures related to the Olympics and Paralympics, etc.



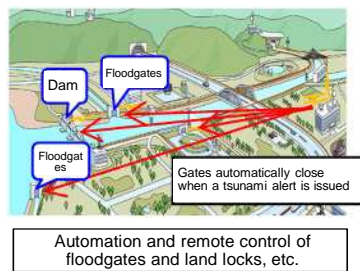
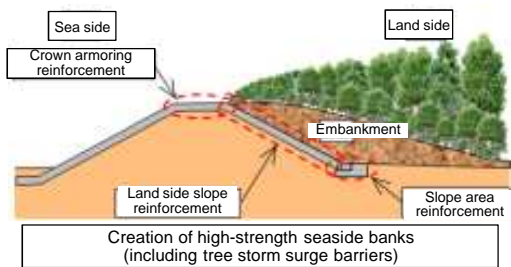
# Examples of main measures of key programs

## Ensure the protection of human lives against large-scale natural disasters

Avoid large numbers of fatalities and injuries due to major tsunamis affecting large areas or due to large scale flooding and landslides

Implementation of measures against major tsunamis, etc.

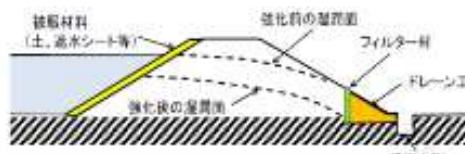
MAFF / MLIT 30,100 million yen (25,800 million yen)



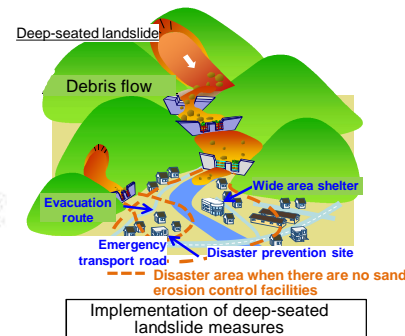
Implementation of water control measures and drought measures in order to handle large scale flooding and landslides, etc.

MLIT 293,200 million yen (286,600 million yen)

[Examples of emergency measures]



Emergency measures based on results of emergency inspections of river banks



Maintenance of coastal disaster-prevention forests



MAFF Included in 67,400 million yen (included in 55,700 million yen)



Enhancement of mountain area disaster prevention capabilities through soil conservation projects

MAFF Included in 67,400 million yen (included in 55,700 million yen)



Restoration and recovery of earthquake collapse areas (sources)



Grooming of degraded forest land

Enhancement of measures which utilize reservoir hazard maps

MAFF Included in 167,500 million yen (included in 135,900 million yen)



Hazard map creation



Implementation of disaster prevention drill

Development of evacuation routes and facilities

MAFF Included in 356,100 million yen (included in 294,500 million yen)  
MLIT Included in 1,264,700 million yen in disaster prevention and safety subsidies (Included in 1,084,100 million yen)



Development of evacuation routes from fishing ports to high land



Development of green zone for use as evacuation sites



Development of evacuation facilities

Support for measures such as conservation of village-area forests by community residents, etc.

(Examples of activities)

MAFF 3,000 million yen (3,000 million yen)



Scenery maintenance activities



Invasive bamboo felling and removal



Broad-leaf tree firewood use



Forest environment educational activities



Road network repair and function enhancement

Studies on earthquake motion, tsunami, and damage estimates due to sea trench earthquakes in or around the Japan Trench and Kuril-Kamchatka Trench

Cabinet Office Included in 200 million yen (included in 300 million yen)

Studies on effects of large scale ashfalls and measures, etc.

Cabinet Office 100 million yen (60 million yen)

Maintenance of drainage facilities for agricultural use and improvement of disaster prevention and mitigation capabilities through drainage management, etc.

MAFF Included in 167,500 million yen (included in 135,900 million yen)

Organization of approaches to visualizing and utilizing disaster prevention and mitigation through use of the natural ecosystem, and implementation of model projects

Ministry of the Environment Included in 600 million yen <New>

# Examples of main measures of key programs

## Cross-cutting sector response

### Risk communication

Carry out disaster prevention education in schools (comprehensive support for hands-on safety education, focused on disaster prevention education)

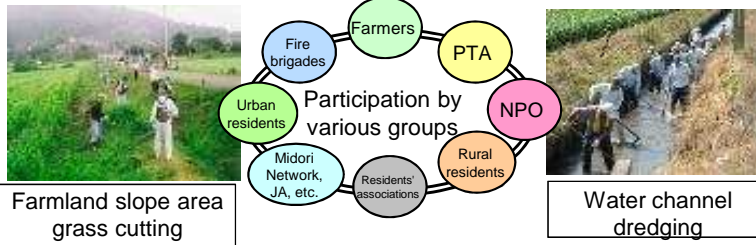
MEXT 300 million yen (100 million yen)



Regionally-tailored disaster prevention education, review of evacuation locations and evacuation routes with the assistance of school disaster prevention advisors, active participation by schoolchildren in volunteer activities, etc.

Agricultural village community maintenance and improvement

MAFF 78,300 million yen (76,700 million yen)



Studies and research aimed at creating highly disaster-resistant infrastructure, using the knowledge and findings of Japan and other East Asian countries

METI Included in 900 million yen (70 million yen (included in 900 million yen))

### Deterioration measures

Promote strategic maintenance, management, and upgrades in order to implement infrastructure deterioration measures

MLIT	440,000 million yen (366,000 million yen)
MHLW	80,100 million yen (25,400 million yen) (including figures for Cabinet Office and MLIT)
MAFF	Included in 222,600 million yen (included in 182,300 million yen)

<Bridges>



Bridge inspections using bridge inspection vehicles



Maintenance and repair with carbon fiber sheets

<Fishing ports>



Deterioration of breakwaters

<Waterworks facilities>



<Water channels>



Cross-section maintenance and repair

### Research and development

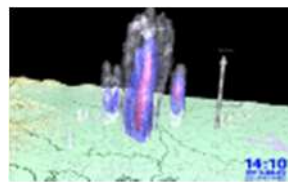
Earthquake resistance technology research utilizing E-defense

MEXT  
NIED  
1,600 million yen in facility maintenance subsidies  
<New>  
NIED  
Included in 8,200 million yen in operation subsidies (included in 7,000 million yen)



Infrastructure observation and research on forecasting of earthquakes, volcanos, wind and flood damage, and snow and ice damage, etc.

MEXT  
NIED  
900 million yen in facility maintenance subsidies  
<New>  
NIED  
Included in 8,200 million yen in operation subsidies (included in 7,000 million yen)



Example of cumulonimbus cloud radar observation

Research and development of next-generation infrastructure structural components

MEXT  
NIMS Included in 14,900 million yen in operation subsidies (included in 12,300 million yen)

2) Repair

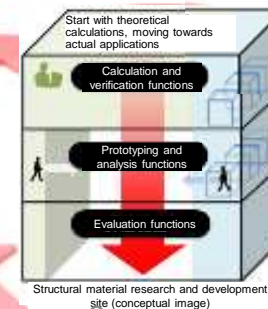
Research and development of structural member repair, reinforcement materials, and reinforcement technologies



(Ex.) Iron and steel welding methods offering high levels of fatigue resistance

1) Inspections and diagnosis

Research and development of technologies for the diagnosis of aging in structural members  
Research and development of technologies for evaluating the reliability of structural members



3) Renewal

Research and development of new high-performance structural materials

(Ex.) Development of multi-function materials such as carbon fiber reinforced panels (CFRP)



(Ex.) Long-term exposure testing of corrosion-resistant materials using an actual bridge

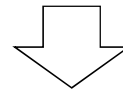


# State of national resilience measures in the UK and USA

- The UK established its "Critical Infrastructure Resilience Programme" in 2009, following the major flooding of 2007
- The USA overhauled its "National Infrastructure Protection Plan" in 2009, following Hurricane Katrina in 2005

Characteristics of both:

- **Cover a wide range of infrastructure** (communications, energy, finance, transportation, logistics, etc.)
- Both **perform vulnerability assessments on individual sectors** and focus on areas identified as needing to be addressed (structural, non-structural, and administrative)



At present

- The UK is formulating a medium- and long-term "National Resilience Plan"
- The USA has started formulating a comprehensive "Critical Infrastructure Security And Resilience Plan" (by executive order of President Obama on February 12) in order to improve coordination throughout the government and administration for improving infrastructure resilience

A "public and private sector coordination fund" has been proposed (in President Obama's State of the Union address, given on the same day)

"Building National Resilience" Davos Forum report -> global standard for resilience

**★ Intensified competition among countries -> Japan is highly prone to natural disasters, and that is why we must emerge victorious in this competition**



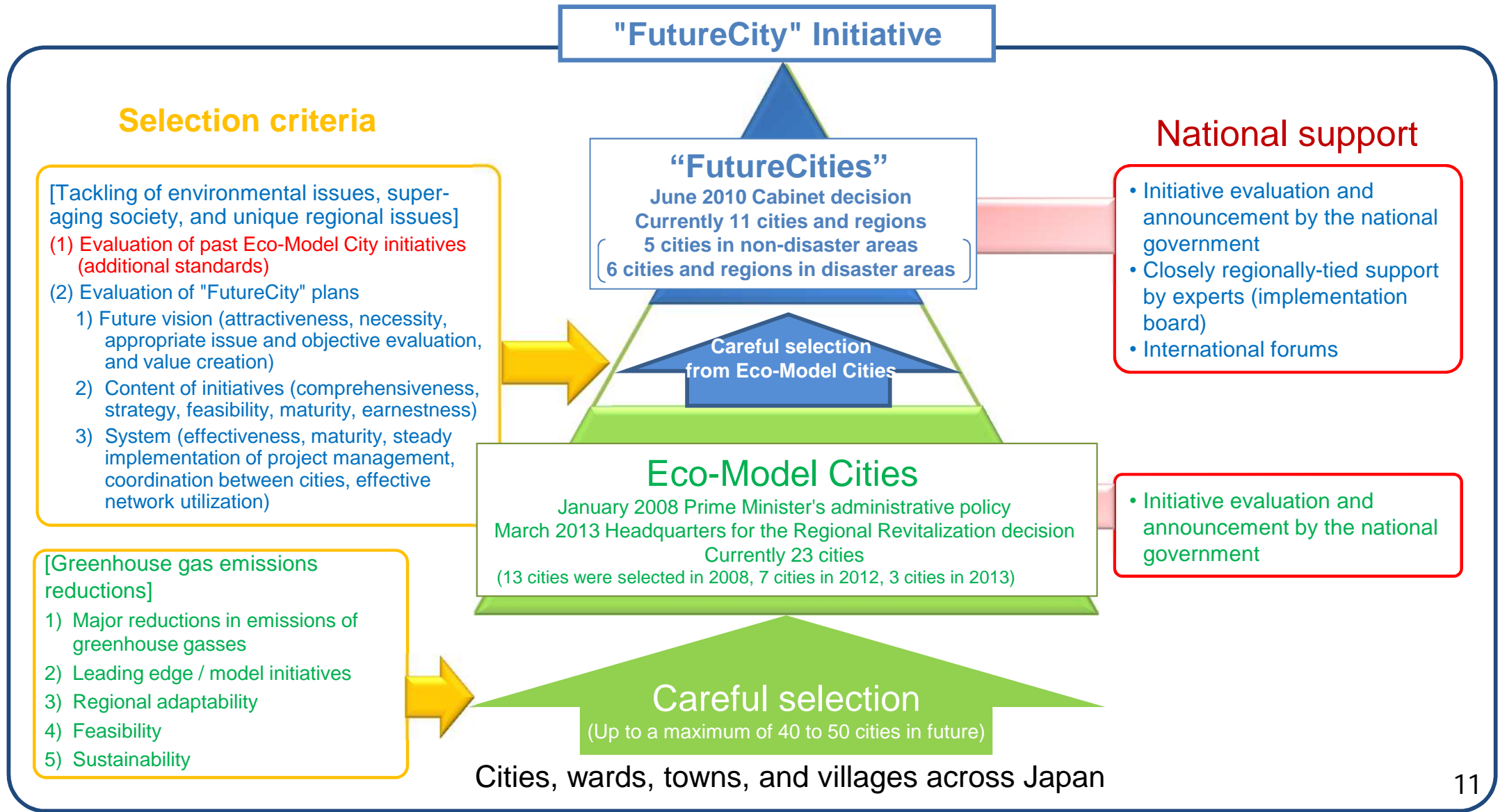
# Eco-Model Cities and "FutureCities"

## Eco-Model Cities

- A total of 23 cities were selected (13 in 2008, 7 in 2012, and 3 in 2013) as model cities and regions implementing cutting-edge measures with high targets in order to produce a low-carbon society through measures such as major reductions in emissions of greenhouse gasses

## "FutureCities"

- 11 cities and regions were selected in 2011, in line with the key concept of "cities creating new, human-centered value in order to tackle environmental and aging issues"



The 21st century is the age of cities

By 2050, 70% of people will live in cities



Creating sustainable cities is  
an issue that all of mankind  
faces together

## Issues Japan will be the first to face

### ✓ Declining and aging population

Declining population 130 million people (2004) -> 95 million people (2050)

Percentage of elderly 23% (2009) -> 40% (2050)

### ✓ Environment

Severe energy supply restraints due to nuclear power plant accident

Global warming measures

## Activities Japan needs to implement

\* Creation of new social and economic system focused on cities

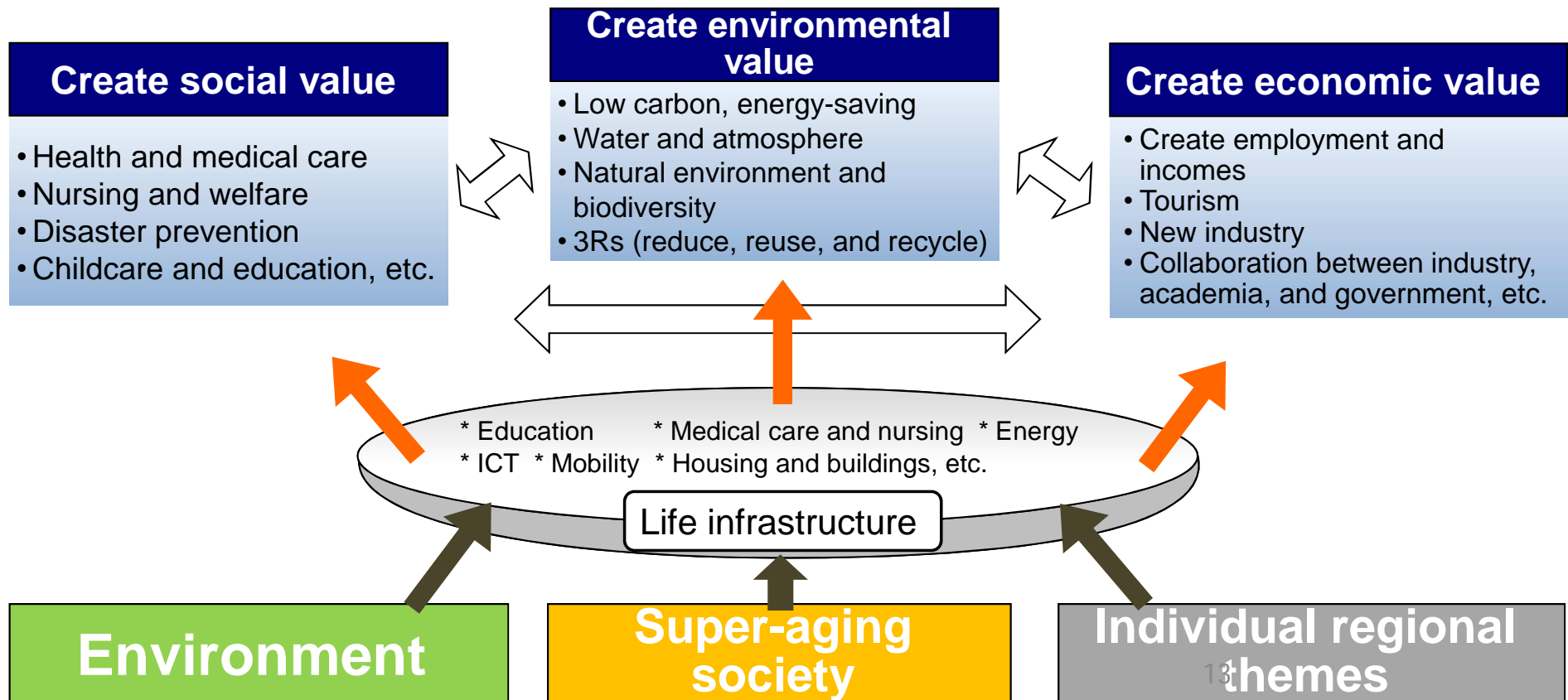
=> Regional society vitalization

\* Taking on challenges which the whole world will soon face

=> Global contributions

## Cities creating new, human-centered value in order to tackle environmental and aging issues

- **Creating "cities everyone wants to live in" and "cities where everyone is vital"** through the creation of environment value, social value, and economic value
- Restore sense of social solidarity. Improve people's lives.
- Tackling environmental issues and the problems of the super-aging society are essential themes. Additional themes are added based on conditions in individual cities and areas.
- Create a sustainable value creation model which can develop autonomously.





# Enhancing Resilience and the "FutureCity"

