

# **Tokushima Prefecture's Regional Resilience Plan (Overview)**

March 2015

Tokushima Prefecture

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## 1 Purpose of the plan

Tokushima Prefecture has been working hard towards a creation of a risk reduction measure based on lessons we have learned from the Great East Japan Earthquake to ensure zero fatalities in the event of possible inland earthquakes and of the Great Nankai Trough Earthquake. As well, with extreme weather conditions occurring around the world, concerns over large-scale flooding and landslides are growing.

Considering such situations, we will formulate a regional plan to build a resilient prefecture that is strong enough to prevent fatal damage and has the flexibility to make a swift recovery from a variety of large-scale natural disasters and to ultimately protect the lives of the residents, the local community, industry, tradition, and culture.



Location of Tokushima Prefecture



A view of Tokushima City  
from Mt. Bizan

Ochiai Village  
in Miyoshi City

Udatsu Townscape  
in Mima City

Minami Town  
along the Pacific Ocean

## 2 Regional plan and its function

Our regional plan, “Fundamental Plan for Regional Resilience,” was formulated based on Article 13 of the “Basic Act for National Resilience Contributing to Prevention and Mitigation of Disasters for Developing Resilience in the Lives of the Citizenry.” This plan will not only be used for regional planning, but will also be used as a guideline when formulating other prefectural plans, etc. that deal with prefectural resilience.

## 3 Time of implementation

The time of the implementation is targeted for the year 2018. Afterwards, the plan shall be revised roughly every 5 year.

## II Fundamental Policy

### 1 Basic Objectives

Even if large-scale natural disasters were to happen, we will make sure that:

- ① Saving the lives of our citizens will be of utmost importance.
- ② Functions vital to the prefecture and society will remain undamaged and functioning.
- ③ There will be minimal damage to properties and public facilities.
- ④ A swift recovery and rebuilding process will be possible.

### 2 Objectives that we should have as a precursor

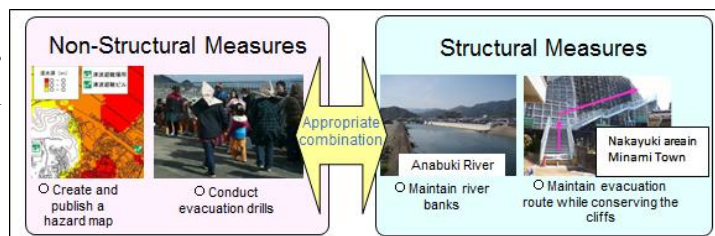
- ① Even in an event of a large-scale natural disaster, all lives will be saved.
- ② Rescue operation, first-aid and medical activity etc. will be conducted swiftly, immediately after a large-scale natural disaster. (In addition, necessary countermeasures should be prepared in case these operations are not available.)
- ③ Ensure necessary administrative functions are in place immediately after a large-scale natural disaster.
- ④ Ensure necessary information and communication functions are in place immediately after a large-scale natural disaster.
- ⑤ Ensure that economic activities will not come to a halt (including the supply chain), even immediately after a large-scale natural disaster.
- ⑥ Ensure the essentials such as electricity, gas, water, fuel, public transportation, etc. are available and make a quick recovery even immediately after a large-scale natural disaster.
- ⑦ Ensure that the situation does not develop into an uncontrollable secondary disaster.
- ⑧ Always be in state where the local society and economy can begin swift rebuilding and recovery efforts even immediately after a large-scale natural disaster.

### 3 Basic guideline for implementing regional resilience building

- ① Policy for prefectural resilient building
  - Consider all possible causes that could compromise our prefectural resilience from all perspectives.

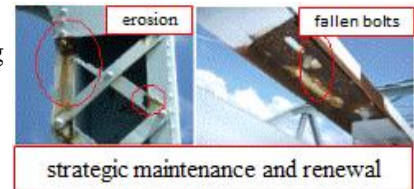
- ② Combination of appropriate measures
  - Effectively combine both structural and non-structural measures

• Collaboration of the public and private sectors by combining “Self Help” , “Mutual Help” and “Public Help.”



- Formulate countermeasures that can be incorporated into daily life and not solely for emergencies.

- ③ Effective implementation of the measure
- Effective use of funds with consideration to the changing needs of the residents, aging infrastructure, etc.
  - Effective use of existing infrastructure
  - Use of private fund through the PFI
  - Effective and efficient maintenance and management of facilities etc.



- ④ Implementation of measures with consideration to regional characteristics
- Original and unique measures that take into consideration the characteristics of the prefecture and those that reflect a forward-looking approach will be implemented.

< Example >

○ Strategic Disaster Medical Project

While considering ways to decrease the amount of preventable deaths, such as disaster-related deaths, work towards a seamless medical service where there is a smooth transition from ordinary day to day service to service in times of disaster, and vice versa.

○ Implement a nation-leading Business Continuity Planning (BCP)

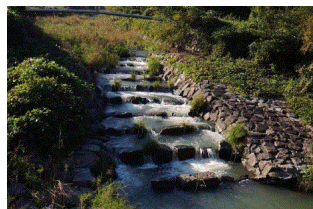
Draw up a Prefectural version of the BCP (**applicable to the Nankai Trough Earthquake**), draw up an agricultural version of the BCP, establish an authorization system for corporate BCP and promote the creation of a FCP (Family Continuity Plan).

- Strengthen human bond and local communities to build resilience as a society



- Implement measures while taking adequate consideration into gender, the elderly, children and the physically challenged

- Depending on the regional characteristics, being considerate to the cohabitation with nature, harmony with the environment, and preserving the natural scenery.



### III Ongoing Approach to Resilience Building and Challenges (Vulnerability Assessment)

#### 1 What is a Vulnerability Assessment?

Vulnerability Assessments will be conducted to identify possible challenges and problems in regards to the measures set in place to alleviate damages from large-scale natural disasters. We will look at the weaknesses of the measures while taking the characteristics of the prefecture into consideration.

#### 2 Characteristics of the Prefecture

##### ① Topography

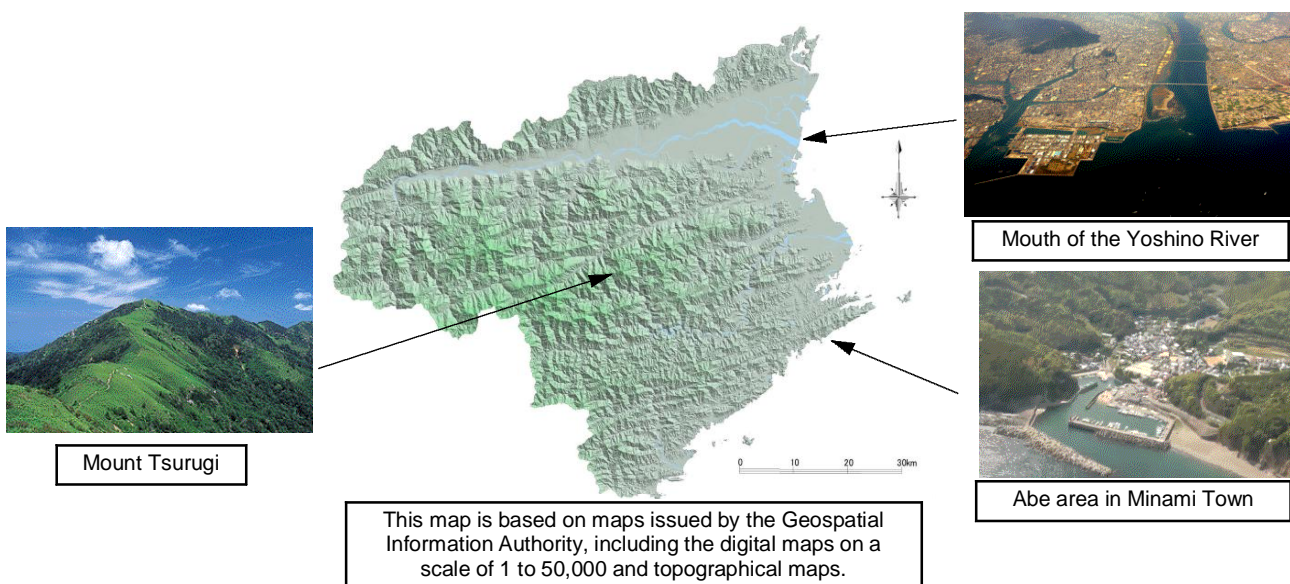
Mountainous regions account for approximately 80% of the prefecture's total land area. The Shikoku Mountains runs through the center of the prefecture from east to west and divides the prefecture into north and south. As well, the steep mountain range also functions as a watershed. The Yoshino River located on the north of the mountains, runs east along the Median Tectonic Line and the river gives way to the wedge-shaped Tokushima Plains before flowing into the Kii Channel.

And at the foot of the Sanuki Mountains, an alluvial fan spreads out.

The Naka River originates from Mt. Tsurugi (1,955 meters high), carving a deep V-shaped valley in the steep mountain range, then continuing on eastward, where the lower stream turns into an alluvial fan delta.

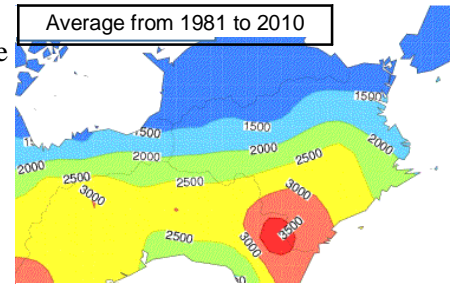
There are only a few broad plains in the South of the prefecture and south to Kamoda Cape and the rocky cliffed coast of the mountains lines the ocean. This paired with the deep ocean makes this area perfect for ports and fishing ports.

Many tectonic lines, such as the Median Tectonic Line and Butsuzo Tectonic Line, stretches from east to west of the prefecture, making the area vulnerable to landslides. This area is known to be one of the most landslide prone area in all of Japan.



② Climate

The temperature is relatively moderate throughout the year. The annual amount of precipitation for the upper Naka River basin and the Kaifu River basin exceeds 3000 millimeters.



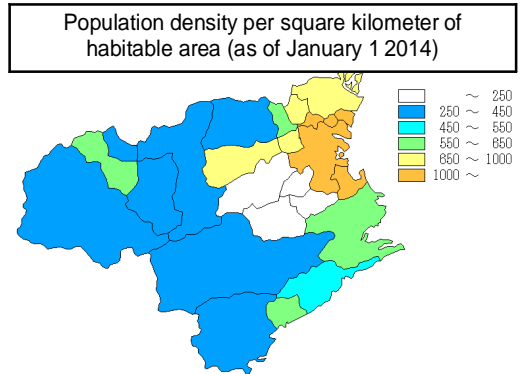
Average from 1981 to 2010  
Distribution of The annual amount of precipitation for Tokushima (provided by Tokushima Local Meteorological Observatory)

③ Population

The population of Tokushima is 785,491 (as of October 2010) and has been on the decrease since 1990; however, the number of households has been increasing due to decreasing family sizes.

74% of the entire population of the prefecture is concentrated in the eastern part of the prefecture, where it also serves as the center for politics, economy, and culture.

On the other hand, due to the declining population and aging population in the hilly and mountainous areas, conservation of farming land and forest is on the decline, making it harder to maintain multiple functions such as groundwater recharge.



④ History of Disasters

(1) Nankai Trough Earthquake

Throughout the recorded history of Tokushima, this prefecture has been heavily damaged time and time again from earthquakes and tsunamis centered on the Nankai Trough, occurring at an interval of every 100 to 150 years.

The Headquarters for Earthquake Research Promotion forecasts that as of January 1 2015, there is a 70 % of probability for the Nankai Trough Earthquake to occur within 30 years.

(2) Large-scale Flood

Many rivers in this prefecture, such as the Yoshino River and the Naka River, originating from the Shikoku Mountains, flow eastwardly into the Pacific Ocean. As well, this prefecture is frequently hit by typhoons which in turn cause large-scale floods to occur, heavily damaging the area.

In particular, the Yoshino River is known to be one of Japan’s top three rivers with the strongest currents and is nicknamed the “Shikoku Saburo.” In the past, almost every year, this river would heavily flood, tormenting those who lived in the vicinity of the river. As a result, there are many Taka Jizo statues (Buddhist monk statue placed on a raised pedestal) and taka-ishigaki (high stone walls) built in the area.



High Stone Wall  
(Mainakajima, Anabuki  
Town, Mima City)



Jizo statue looking down  
(Higashi Kuroda, Kokufu  
Town, Tokushima City)  
Built in 1811

(3) Large-scale landslide

In addition to the precipitous geography and fragile topography, typhoons often hit this prefecture causing large scale landslides. For example, in July 1892 (25<sup>th</sup> year of the Meiji Era), torrential rainfall caused by a typhoon knocked down Mount Takaiso in Naka Town burying tens of houses and more than 60 people.



Mount Takaiso Collapse Memorial (Naka Town)

(4) Heavy Snowfall Damage

The weather in winter is relatively mild in Tokushima and we do not experience much snow, but recently, due to the extreme weather conditions, chances of damage by heavy snowfall have risen. In December 2014, the western mountainous area of Tokushima was hit with heavy snowfall and the snow knocked down trees along the roads in various places cutting off traffic, electricity and telephone and isolating many hamlets for a long time.



Damage by heavy snowfall in December 2014

**3 Natural Disasters Under Question (Possible Risks They Carry)**

① Nankai Trough Earthquake /Tsunami



Source: Tokushima Local Meteorological Office

② Large scale flood damage



③ Large scale landslide damage



④ Damage by heavy snowfall



⑤ Complex disaster





## **5 Worst Case Scenarios that We Should Avoid**

Considering the possible risks and the characteristics of the prefecture, we compiled 39 possible scenarios dubbed the “Worst Case Scenarios that We Should Avoid” which might interfere with the “objectives that we should have as a precursor” .

## **6 Establishing the “KPI: Key Performance Indicator”**

To manage the progress and achievement of the measures (thereafter Program) we have in place to prevent the worst case scenarios from occurring, we have established a Key Performance Indicator for each Program.

## **7 Procedure for implementing the vulnerability assessment**

### **① Current situation examination**

Examine and manage the measures that the prefecture has in place to avoid the worst case scenarios and set up indicators to track the achievement and progress of these measures.

### **② Status quo analysis**

Look at the current achievements and progress of the measures, conduct a status quo analysis and figure out potential challenges.

### **③ Vulnerability assessment results**

Review possible challenges for each “worst case scenarios” and “cross sectional sectors” and go over the Key Performance Indicator values for the ongoing process.

## IV Guideline for the Implementation of the National Resilience Plan

(※● for structural measures, ○ for non-structural measures)

### ● Guidelines for implementation for each Program

Implementation guidelines were made so that we can avoid the worst case scenarios

#### ① Save all human lives

- Seismic upgrades for homes and buildings
- Maintenance of tsunami evacuation routes and evacuation sites
- Set up rechargeable LED lighting
- Set up measures against earthquakes and tsunamis for seashores, riverbanks, etc.
- Set up measures against flooding of the Yoshino, Naka and Old Yoshino rivers
- Set up measures against landslides and measures for forest maintenance
- Terminate radio wave blind zones in the hilly and mountainous areas
- Ensure the creation of comfortable shelters by making the most of the existing public facilities, etc.



○ Disaster awareness through the use of FCP (Family Continuity Plan) promotion activities and using materials and lessons learned from past disasters.



- Encourage preparedness against disaster by setting up a timeline
- Raise awareness in regards to tsunami evacuation and conduct evacuation drills
- Publicize geographical examination results as per the Sediment Disasters Prevention Act
- Implement measures to help people seeking assistance in times of disasters
- Strengthen information communication networks

#### ② Swift rescue, first-aid, medical activity etc.

- Measures to ensure relief goods are safely transported
- Measure against isolation by securing emergency transportation routes along slopes and trimming trees to prevent them from falling
- Establish a relief supply procurement system to shelters by making an agreement with Internet shopping companies, etc.
- Encourage stockpiling of food and water
- Develop new emergency food products using local ingredients for emergency stockpiles
- Develop human resources responsible for disaster medical operations (DMAT, DPAT etc.)
- Establish a disaster medical system
- Promote search and rescue dog training projects



Signing Ceremony for the agreement with the president of Amazon Japan



#### ③ Ensure necessary administrative functions

- Enforce prefectural building and function against earthquake
- Install solar panels or storage batteries at disaster centers, etc.
- Promote creation of BCP for cities, towns and villages
- Ensure administrative function by collaborating broadly with the Union of Kansai Governments or Tottori prefecture or with other neighboring prefectures
- Enforce information system and implement measures against loss of information



#### ④ Ensure necessary information network functions are in place

- Ensure communication among related organizations by establishing comprehensive information network
- Promote and prepare solar charged batteries and satellite phones
- Enforce information network by radio communication used by fishermen



#### ⑤ Ensure the continuation of economic activities

- Promote a national comprehensive project for farmland disaster prevention
- Promote the creation of a corporate BCP
- Raise effectiveness of an agricultural version of BCP for quick recovery from tsunami damage



Authorization Ceremony of BCP certificate

#### ⑥ Set-up a lifeline, etc. and ensure a swift recovery

- Accelerate work to resolve the missing link issue with the Trans Shikoku Expressway and Anan-Aki Expressway
- Set up measures to help make the waterworks facility earthquake-proof and against
- Encourage creation of a BCP for major ports (2 ports)
- Consolidate maritime traffic control and promote creation of measures to recover maritime routes so as to build disaster resilience



**⑦ Prevent uncontrollable secondary disasters from occurring**

- Improve dam control facilities
- Promote appropriate control and conservation of the forest
- Promote the use of locally produced wood
- Prepare an aerial firefighting system



**⑧ Prepare the foundation for swift rebuilding and recovery of local society and economy**

- Promote measures against aging public work facilities
- Promote construction of the Shikoku Shinkansen (bullet train) line to “ensure redundancy”
- Create a “disaster waste disposal plan” for prefecture, cities, towns and villages.
- Promote cadastral information research



**● Guideline for cross-sectional sectors**

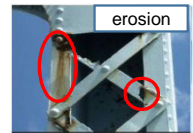
**Risk communication**

- Develop human resources to plan and operate risk communication
- Develop a disaster awareness program
- Establish Disaster Prevention Clubs at prefectural high schools



**Longevity**

- Extend longevity for aging facilities strategically and prepare an individual plan for each facility type based on the “integrated management plan for public facility, etc.”



**Research and development**

- Visualization of disaster information on a map by the “G Space Project”
- Study the effective use of local wood for temporary housing, etc. in an event of a disaster



Comprehensive mapping information

**Measures against depopulation**

- Develop non-structural for the maintenance and revitalization of hamlets
- Ensure communication means such as digital license-free radio transmission etc.
- Vitalize the community by inviting satellite offices and develop disaster prevention capabilities with the help of newcomers



## V Prioritization of Measures

Considering the very real risks that our prefecture may come face to face with and with “saving the citizens lives” as a top priority, we chose a few Programs to focus on while considering the effect and efficiency of the four fundamental objectives, the impact and urgency when the risks aren’t avoided, and the consistency with the national basic plan.

## VI Plan Implementation and Progress Management

### 1 Implementation System and the Driving Force Behind It

#### ① Implementation System

To promote the measures, along with the collective efforts of the prefecture, we will integrate the wisdom of the nation, prefecture, municipalities, private sectors, NPO organizations, residents, etc. to work together and as individuals.

As the Nankai Trough Earthquake has a high probability of causing extensive damage, the public and private sector will work together to establish a wider system of collaboration.

Furthermore, in the near future, as a regional plan beyond prefectural borders is expected to be created, we should keep that in mind when forming partnerships.

#### ② Driving force of the measures

To create a resilient prefecture based on the regional plan, we will use the “Fund to Save Lives against Large-scale Disaster” as a tangible asset.

### 2 Plan Management and Revision

To fully promote a creation of a resilient prefecture based on the regional plan, we will establish the Committee for Promoting National Resilience Regional Plan (*name undecided*) to manage the progress by using the target values set for each Program and to revise the Program repeatedly by using PDCA Cycle.

