

## Mega city and disaster risk

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### 1. Built environment of Mega city Tokyo

Tokyo is one of the Mega Cities in the world, in that various disaster risks subsist. When the Great Kanto Earthquake hit Tokyo in 1923, Tokyo was only area of central Tokyo of today, which is covered the 50 square kilometers. After the Earthquake, Tokyo was expanded rapidly without city planning, in spite of urban reconstruction planning of central Tokyo where was damaged severely by fires after the earthquake. These areas were built up unplannedly with crowded wooden houses along narrow streets of former farming roads. These areas were burnt down by air attack of 1945. However, the large parts of burnt Tokyo were not reconstructed plannedly, because the reconstruction of local cities was preceded to Tokyo due to a great shortage of houses and foods in Tokyo. These crowdedly built-up areas around center and sub-centers of Tokyo are existed as the most vulnerable zone of Tokyo. Since period of the rapid economic growth of Japan, Tokyo continues to grow up rapidly not only toward the suburban areas but also upward the high-rising and downward the underground.

#### 1) Existence of existing lawless buildings

There are a lot of lawless buildings, which were built before 1981, when the earthquake-proof standard was revised. There are the lawless wooden houses of 870 thousands buildings and the lawless steel and reinforced concrete frame buildings of 240 thousands in central Tokyo.

#### 2) Existence of the crowded wooden houses areas

These areas are expanded around center and sub-centers of Tokyo, the area of them are approximately 27,000 hectares with the vulnerable districts of 6,500 hectares.

#### 3) Many high-rising buildings

There are the 742 skyscrapers of more than 60 meters high in central Tokyo in 2004. There are the more than 15,400 buildings with ten stories.

#### 4) Expanding of underground spaces

There are many underground shopping arcades and many subways in central Tokyo, in spite of a large lowland under the sea level of Tokyo Bay.

#### 5) Coming of the elderly society

The number of the weak after the earthquake is estimated as 1.42 million people in Tokyo, who needs various supports.

#### 6) Long commuting and many people difficult to return after earthquake

There are 11 million people outside of every homes for business, schooling, shopping and so on in Tokyo. The number of people difficult to return after earthquake is estimated as 4 million of 11 million people in Tokyo.

#### 7) Concentration of central functions

Recently, the central functions of national administration, economics and business are concentrated in the central Tokyo again. There are many urban redevelopment projects in Tokyo.

### 2. Damage Estimation of the Next Tokyo Earthquake

The damage of the next Tokyo Earthquake is estimated by National Government. According to it, the 850 million buildings are collapsed and burnt down and the 13 thousands people are killed. The cost of reconstruction is approximately 6.7 trillion yen and the economic loss of one year after earthquake is approximately 4.5 trillion yen.

### 3. Combined huge disaster in Tokyo

There is probability of huge disaster combined with earthquake and typhoon. If the earthquake hits Tokyo in the seasons of spring and summer, the several typhoons may hit Tokyo damaged by earthquake and may be under the recovery from earthquake.

### 4. Many Big Earthquakes hit the Major Metropolitan Regions in Japan

The three major metropolitan regions of Tokyo, Nagoya and Osaka are located in the areas probable to strong shakes by Tokyo Earthquake, Tokai Earthquake and Tohankai-Nankai Earthquakes. Preparedness and mitigation from earthquake is the most important issue in Japan.