

# THE 11 MARCH TRIPLE DISASTER IN JAPAN

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The earthquake, tsunami and nuclear accident that occurred in Japan on March 11, 2011 induced important population movements that can be qualified as “environmental migration”, according to the definition set by the International Organization for Migration (IOM). The Japanese government had to organize and manage population displacements that were of unprecedented scale in the country. The displaced populations faced three major challenges: long-term relocation in the wait for decontamination and reconstruction; the vulnerability of the territory which makes it vulnerable to other natural risks in the near future, and the multi-faceted risk of nuclear radiation. The triple disaster also raised the question of the confidence in public authorities, which is crucial for the implementation of the recovery program and the cohesion of society.

For this paper, we chose a chronological approach to describe the population movements caused by the March 11 events, as well as their management: we begin with the description of the evacuation, then proceed to its aftermath, and conclude with the long-term policies for reconstruction, return and recovery.

## 1. AN UNPREPARED CATASTROPHIC SCENARIO

### 1.1. A country prone to natural disasters

Because of its geographical position, as an archipelago situated on the Ring of Fire, Japan has always been subject to natural risks such as earthquakes, tsunamis, typhoons and volcano eruptions. For the Japanese people, nature is inherently risky and they have to coexist with that risk – this is called the “saigai” conception (Augendre, 2012).

When natural disasters happen, they reflect an unbalanced relation to nature or the result of inadequate preventive measures. Humans can prepare themselves to respond to those risks. The term *zeijaku*, meaning vulnerability, is very little used by Japanese people—they consider it derivative of a Western point of view (Ibid).

The awareness to natural risks, and the need to prepare for them, are part of Japanese education and legislation. People receive training, beginning in childhood, which includes safety instructions in the case of an earthquake or a tsunami. On September 1st, every year since 1960, the country celebrates the National Day of Disaster Reduction. In 1981, the New Building Standard Act was adopted; requiring buildings to be designed to sustain slight cracks in case of a medium-scale earthquake, and to avoid collapse when a major earthquake occurs (United Disaster International Strategy for Risk Reduction, 2005). After the traumatic *Great Hanshin (Kobe) Earthquake* of 1995, systematic inspection of buildings, as well as the improvement of standards to strengthen their resistance, was implemented by law in 1995 and 2006 (Augendre, 2012). More recently, Japan adopted, in 2005, the 10-year Hyogo Framework for Action, to reduce disaster losses and increase resilience.

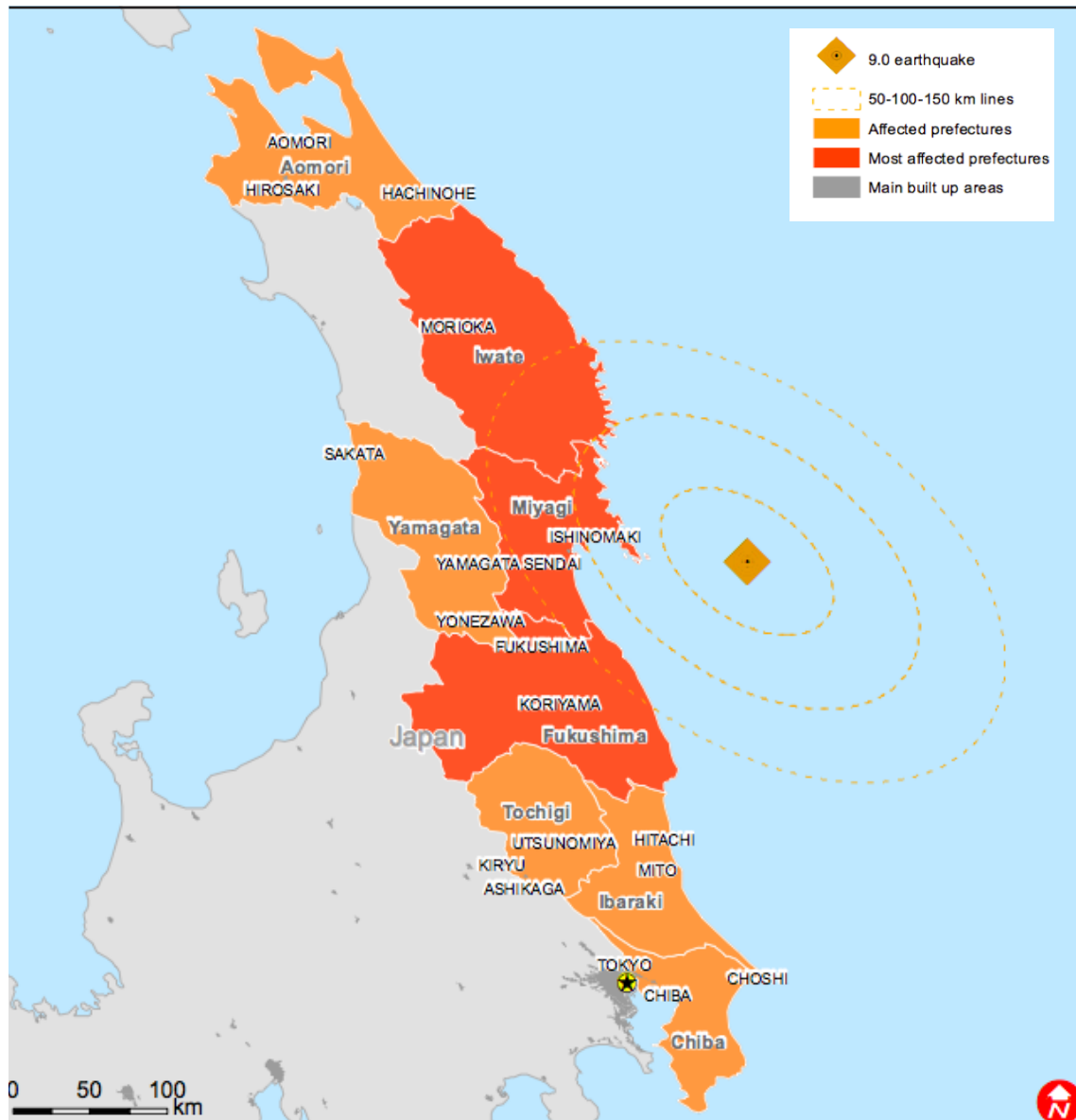
Though Japan is prone to earthquakes and tsunamis, the prevention measures proved largely inadequate and could not prevent the March 11 earthquake and tsunami from causing massive damage, nor could prevent the Fukushima nuclear accident.

### 1.2. Miscalculation of the risks induced by the March 11 events

#### 1.2.1. The triple disaster

The March 11 events refer to the succession of three major disasters: two natural disasters that induced a third one – an industrial disaster.

Map 1. The March 11 earthquake and tsunami.



Source: International Federation of Red Cross and Red Crescent Societies, March 2011.

At 2.46 pm, on March 11<sup>th</sup>, 2011, the fourth largest earthquake in history hit the Sanriku coast in Japan. The quake, of a magnitude 9 on the Richter scale, was followed by a tsunami spreading from Hokkaidô to Tôhoku, and then to the Kantô region. The waves reached 40.4 meters at their highest point, and they travelled as fast as 15 km/hour inland. The most affected prefectures were those of Iwate, Miyagi and Fukushima.

The earthquake damaged the Fukushima Daiichi I Nuclear Power Plant, one of the 25 largest nuclear power stations in the world, entirely built and run by the Tokyo Electric Power Company (TEPCO). The earthquake resulted in the loss of the offsite power which is the normal

power supply to the plant; reactors shut down automatically and emergency diesel generators started and powered the station's emergency cooling systems.

Approximately one hour later, the station was struck by the tsunami, which inundated the fuel tanks. This disabled the emergency diesel generators needed for backup power. Consequently, the site lost all emergency power supply. The off-site power could not be restored and the pumps that circulate to cool water in the reactors ceased to work, and hydrogen was produced from metal-water reactions in the reactor. As workers struggled to cool the reactors, several hydrogen explosions occurred.

Japanese authorities initially assessed the accident as Level four on the International Nuclear Event Scale (INES). The level was successively raised to five and eventually to seven, the highest, causing widespread contamination with serious health and environmental effects (Japanese Ministry of Economy, Trade and Industry, April 12th 2011). The Fukushima accident is registered as the second largest nuclear accident after the Chernobyl disaster, which occurred in Ukraine on 26 April 1986. It was the only level-seven accident on record before March 2011.

### 1.2.2. Inadequacy of the safety and emergency procedures

The preventive measures to mitigate the effects of the earthquake and the tsunami were insufficient, showing a lack of anticipation by the Japanese authorities.

The reduction of the tsunami's impact was planned via the construction of dykes 10m high and 2.5m long in Miyagi city, called the Great Wall, and the world's biggest breakwater - 63m deep in the sea and 8m above in Kamaishi. The breakwater collapsed after the 2011 tsunami hit.

The earthquake alarms operated properly in the targeted region; the tsunami warnings began three minutes after the first main shock from the earthquake and were disseminated through media, sirens and wireless system. However, as the earthquake hit Tōhoku, electric power was cut off. Consequently, individual radios did not work and sirens at the top of electric poles fell down. According to surveys conducted by Reiko Hasegawa, researcher for the DEVAST project<sup>1</sup>, "residents could not hear the second evacuations alerts. When they could, they were told to flee in a very polite, Japanese way, with a calm voice saying things like 'Please, evacuate'." People did not understand the urgency of the situation and the survivors have complained that the evacuation orders were not transmitted appropriately for the gravity of the situation. Furthermore, people did not expect a second wave to hit, nor that it would be higher than six meters – which was thought as the maximum possible height from previous experiences of tsunami in the region. Ten minutes after the earthquake came the first wave. It gave time for people to escape, to keep themselves safe while the wave entered the city and then to come back home. Forty minutes after came the second wave, the "real" tsunami, taking people by surprise. As Hasegawa notes, "their experience became their vulnerability".

1. See <http://www.devast-project.org>

With regard to the Fukushima accident, the Japanese authorities admitted that the nuclear disaster found them unprepared. In this case, the lack of preparation was caused, in part, by a public myth of "absolute safety" that nuclear power proponents had nurtured over decades (Behr, 2012). Japan's Prime Minister, Yoshihiko Noda, declared in March 2012 that the Japanese government shares the blame for the Fukushima accident since officials had been blinded by a false belief in the country's "technological infallibility" (Tabuchi, 2012).

Although nuclear regulators and plant operators had been thoroughly trained on security measures, the accident was seriously worsened by an overall underestimation of the possibility of significant natural disasters and serious accidents, an inadequate design basis of the nuclear power plant taking into account a massive tsunami event, and poor coordination between the Fukushima nuclear operators and the Japanese government. Plant workers had no clear instructions on how to respond to such a disaster, especially after the loss of all energy supply. They did not understand immediately what was going on and did not know how to follow the emergency procedure and therefore made significant mistakes.

### 1.2.3. The concept of environmental catastrophes redefined.

The conjunction of the three disasters was surprising and unexpected. It found the Japanese authorities unprepared to face the tsunami and even less the consequences of the nuclear accident. The March 11 disasters represent a new category of "environmental disaster" and a major shift in the way of thinking about risk. They frame a global conception of "environment" which does not refer only to nature and in which one specific risk unleash a chain impact on other components of the environment. In this case, the earthquake and the tsunami damaged the nuclear power plant, affecting in turn the natural environment through nuclear contamination. The nuclear contamination becomes a polymorphic risk that is present in the sea, in the soil and in the food, involving environmental and health issues. Moreover, the risk scales up as it can have consequences worldwide.

## 1.3. Public confidence and trust toward the authorities

The disasters caused huge damage across the affected region. Fires following the earthquake and the tsunami destroyed around 90,000 houses and 128,651 buildings (Japan Centre for International Exchange, 2011). The fishing industry,

which is a cornerstone of Tohoku's economy and provides a significant share of Japan's seafood, was completely wiped out. The agricultural and manufacturing sectors were also deeply affected. The earthquake damaged the transportation network, transmission lines, and power plants were forced offline, causing continuous blackouts. The Japanese government estimated the total costs to be \$216 billion (¥17 trillion). Collapses of buildings also caused debris to fall in the sea and on the ground. The debris has now to be stocked, sorted and treated – which will take time. In Miyagi prefecture alone, the debris is estimated between 15 to 18 million tons (Asian Disaster Reduction Center, 2011). The disaster took place in an impoverished region suffering from a chronic loss of population. The remaining population was mostly made up of fishermen living by the sea and therefore exposed to tsunami.

Figures about human loss and displacement should be carefully considered. They vary according to official governmental and prefectural reports. The Japanese National Police Agency, in May 2011, stated that 15,129 people died during the tsunami. Among those, 13% were unidentified and 9,034 people were counted as missing people (The Yomiuri Shimbun, 2011). Senior citizens over the age of 60 formed the largest proportion of victims, accounting for 65% of deaths. Before the disasters, 30% of Tōhoku's population were 60 years old or above (Japan Centre for International Exchange, 2011). These figures reflect the fact that the evacuation measures were not adapted for a vulnerable population such as the elderly, who need assistance in emergency situations. Crossing information coming from different reliable sources, it is estimated that two days after the disasters there were more than 450,000 evacuees from the tsunami and 170,000 related to the nuclear accident. On top of these numbers, one needs to add the number people who decided to leave by themselves, though this number is unclear at the time of writing.

Following the March 11 events, public distrust and hostility over the government's response to the disasters have arisen and the level of confidence of the victims toward national and local authorities has declined steadily. A distinction can however be made between two categories. Evacuees from the tsunami-hit areas, who used to have a close relationship with municipalities before the disaster, tend to blame the latter, saying that it is a human-based disaster rather than a natural one. They blame the municipalities for carelessness in the placing of evacuation centres for earthquakes in coastal areas, located on the lower grounds of the cities that were swept away by the tsunami. However, it may be understood as a way to vent

their frustration at somebody (Hasegawa, 2012). On the other hand, evacuees of the nuclear disaster tend to blame more heavily the central government. Trust in the government has considerably faded, and this undermines the governmental management of the population as well as the society's cohesion.

## 2. PEOPLE DISPLACEMENTS

### 2.1. The confusing organization of people's evacuation and housing

The Japanese response to the crisis was impeded by delays in issuing evacuation orders, and delays in releasing data about dangerous radiation leaks, difficulties in keeping records and documentation about the key meetings held during the early and crucial days of the crisis. All of these factors contributed to the disaster worsening, and to the loss of confidence of the Japanese population towards the central government, which has been highly criticized by the evacuees for its handling of the emergency and lack of transparency.

According to Reiko Hasegawa, local municipalities and the population basically shared the “same destiny” and “feeling of abandonment; they were both in the dark as to what should be done with regard to evacuation, because of a lack of communication from national officers. Municipalities had to decide by themselves, and most declared the evacuation of the whole population without waiting for the evacuation orders from the central government). Such orders would often fail to reach the municipalities because of flooded or broken communication systems.

Evacuation orders succeeded day after day. After the official declaration of a nuclear emergency at 19:03 on March 11, the Fukushima prefecture ordered the evacuation of 1,864 people within a distance of two kilometres from the nuclear power station. This zone was extended to three kilometres during the evening by a directive from Prime Minister Naoto Kan, which affected 5,800 people, together with instructions for residents living within ten kilometres of the plant to take shelter.

In the following days, residents living within twenty kilometres from the plant were obliged to evacuate. Over 50,000 people were evacuated on 12 March. The Prime Minister also advised residents of the Fukushima area to take shelter, stay inside, close doors and windows and turn off air conditioning. They were also advised to cover their mouths with masks, towels or handkerchiefs as



Displaced persons camp, Tohoku area, March 2012.



Photo credits: © 2012. François Gemenne (IDDRI)

well as not to drink tap water. Air traffic was restricted in a twenty kilometres radius around the Fukushima Daiichi site (Weisenthal, 2011).

After officials admitted the possibility of a meltdown, on 13 March, some 170,000 people were evacuated, joining more than 450,000 evacuees from other regions affected by the earthquake and the tsunami (Harlan, Mufson, 2011). On the morning of 15 March, the Prime Minister issued instructions that any remaining people within a twenty-kilometre zone around the nuclear plant had to leave, and advised those living between twenty and thirty kilometres from the site to stay in their houses and shut windows and doors. The evacuation area was further extended during April. Residents in the thirty-kilometre circle were urged to leave their houses as well (Makinen, 2011) and the Japanese government created a “no-go zone” for the 20 km radius zone. This order affected more than 80,000 residents.

The International Atomic Energy Agency (IAEA) recommended expanding the evacuation area further, having found contaminated soil

samples in the village of Iitate, about forty kilometres northwest from Fukushima, but the Chief Cabinet Secretary Yukio Edano stated that the government would wait to see if the high radiation continued before widening again the evacuation zone (Takahara, Nagata, 2011).

In May, the Japanese government began the evacuation of people from the area that had an air radiation dose of 20 mSv/year. As of September 2011, more than 100,000 Fukushima Prefecture residents were reported to be still subject to several kinds of evacuation measures, forcing them to live outside and sometimes far away from their home cities and towns.

Right after the disaster, people were evacuated to shelters such as municipal buildings, schools, and gymnasiums. The second step was to move to transitional shelters, also known as temporary housing, provided by public authorities. Transitional shelters were made available by the prefectural governments; the municipality made the selection of the sites for housing, and the funds came from the central government. The final step

of the process is permanent housing: either people build their own houses, or they live in rented public housing with a discount on the rent (International Recovery Platform and Kobe University, 2012).

There are different types of transitional shelters. Temporary houses are pre-fabricated houses whose size is around 29 square meters. People can also rent private houses as temporary housing, and the local government pays the rent. This solution is mostly found in urban areas, and is cheaper, more comfortable than temporary houses. Finally, there are also public housing and government-owned accommodation, for which the rent is also paid for by the government.

Criticism has been raised regarding the system of temporary housing. Housing is allocated to evacuees on a lottery basis. Information was not circulated properly and some people were not able to be present at the place where the lottery was drawn. The houses are small, conceived of as single-family homes. They are located far from the places people used to live in and are built on inland areas, much colder than coastal areas. In the coastal areas, where the tsunami hit, temporary houses had to be built quickly and without some special materials, as manufactures were destroyed: this raises questions about the durability and quality of those buildings (Brice-Asanuma, 2011). To counterbalance those issues, the government and non-profit organizations have emphasized the support for residents of the temporary houses. They provided improvements to the houses (insulation and soundproofing, interior furniture) and a transportation network, and they manage projects for people to earn some income by selling their handmade products.

Continuous attention needs to be paid to the displacement of evacuees, since their life condition is unstable: they do not know how long they will have to wait before they can come back to their houses, and they still wonder whether such a return will be possible or not. Some locations close to the nuclear power plant are estimated to be contaminated with accumulated radiation that diminishes the residents' hopes to return home any time soon. Those zones have to be decontaminated to reduce radiation levels, and there is no certainty about the length of the decontamination process. The situation of families and farmers in the region remains delicate. Some of them had to leave their houses, their lands, their animals, kill their cattle and destroy their harvests. The suicide rate among evacuees, especially among those in temporary housing, is not negligible (Hasegawa, 2012).

## 2.2. Voluntary evacuation

### 2.2.1. Leaving abroad

The nuclear threat provoked departures from the country, despite reverse recommendations from the Japanese government to foreigners as well as local population.

The departure abroad of foreign nationals can be understood as a strategy of precaution rather than a forced migration. In Japan, the three largest foreign communities are the Chinese, the South Koreans and the Brazilians of Japanese descent. In the four weeks following the disasters, 531,000 foreigners left with or without their country's governmental assistance: amongst them were 185,000 Chinese, 107,000 South Koreans and 39,000 Americans (Richard, 2012). Pressure from family, instructions given by the head offices of foreign firms, and recommendations from embassies and consulates played a role in the decision of foreigners to leave Japan. American nuclear experts recommended an evacuation of a much larger perimeter than that recommended by Japanese officials (Sanger, Wald, Tabuchi, 2011). Also Spain, Germany and South Korea advised their citizens to stay much farther away (at least 80 kilometres) from the nuclear plant (Ibid).

On the other hand, Japanese nationals left the country by their own means, with no governmental assistance—official figures about those departures have not been released. Foreign countries showed their interest in attracting Japanese talents and offered them to settle down. As an example, the official communication from the Hong Kong Immigration Department (April 4th, 2011) states: "Countries all around the world are fighting over talent exiting Japan because of the earthquake. We hope that they consider long-term settlement in Hong Kong." A visa done in 48 hours was made available for executives working in banks or multinational companies of finance, earning between \$150,000 and \$300,000 a year (The Wall Street Journal, 2011).

**Table 1.** Departures outside Japan in the weeks following the tsunami, according to figures from the Japanese Ministry of Justice

Period relative to Tōhoku earthquake	Arrivals	Departures	Net
Week minus 1	157,000	140,000	+ 17,000
Week 1	58,000	244,000	- 186,000
Week 2-4	244,000	287,000	- 43,000
Total weeks 1-4	302,000	531,000	- 229,000

Source: Richard J.L. 2012.

### 2.2.2. Internal migration

At the internal level, if most of the population in the evacuation areas were forced to leave their homes, many more, especially those who lived in the zones affected by the instructions to remain indoors, decided to evacuate voluntarily as the provision of supplies in the region was not always assured and they suffered from a severe lack of resources (Isoda, 2011a). Residents evacuated with the institutional evacuation scheme left their communities with buses provided by the local government. Others, who wanted to leave on their own because they feared the radioactive leak, decided to travel with their own car and sought shelter with relatives and friends (Isoda, 2011a).

The regions directly affected by the natural disaster and the nuclear accident are the Hamadori region along the coast, separated by Abukuma Mountains from the central and more populated Nakadori region, and the western Aizu region.

It is difficult to analyse the geographical spread of the population after the earthquake, the tsunami and the nuclear disaster, since voluntary migrants have no legal obligation to report to the authorities their whereabouts and those who take shelter with relatives or friends do not necessarily report their change of address to the municipal government. Although the exact number of evacuees has not been captured and no reliable statistics on the evacuations are collected, some data are available and can help to grasp an overall picture of the Fukushima Hamadori diaspora. These are presented below.

**Table 2.** List of evacuees and destination of relocation

Cities within the Fukushima Prefecture	Number of evacuees
Fukushima City	4,773
Tamura City	4,621
Koriyama City	3,713
Iwaki City	2,657
Cities outside the Fukushima Prefecture	Number of evacuees
Katashina-mura (Gunma Prefecture)	1,959
Yuzawa-cho (Nigata Prefecture)	935
Nagaoka City (Nigata Prefecture)	877
Nigata City (Nigata Prefecture)	869

Source: Fukushima Prefecture, April 15th 2011.

The majority of evacuees from the regions under evacuation orders were evacuated outside their own municipality. Most of these evacuations are registered in surrounding municipalities including the largest cities of the Fukushima Prefecture. The remainder evacuated to the Ibaragi, Saitama, Akita and Tochigi Prefectures. Further to the west the number of evacuees decreases as the distance from Fukushima Prefecture increases.

Families coming from the regions affected by the tsunami and the nuclear disaster coped with the crisis through different strategies and solutions. In April, 2011, Yuzuru Isoda conducted a study in which he examined the situation of the institutional evacuees hosted within evacuation facilities.<sup>2</sup> According to the author, there has been a general tendency to use family separation as a strategy to handle the trade-off between maintaining a link to the original community in order to better access announcements and opportunities in the native municipality and having safe and sound living conditions in other municipalities (Isoda, 2011a).

Indeed, he found that young children and their mothers, as well as young adults, evacuated more frequently to distant locations outside Fukushima Prefecture while older male workers and their parents<sup>3</sup> usually stayed in Hamadori region near their home towns (Isoda, 2011a). However, family separation does not always reflect a precise strategy but sometimes is the result of tension between husbands (who usually preferred not to leave) and wives (who were worried for their children's health and see the displacement as a necessary solution). Many self-evacuees mentioned that separations may result in divorces (Hasegawa, 2012).

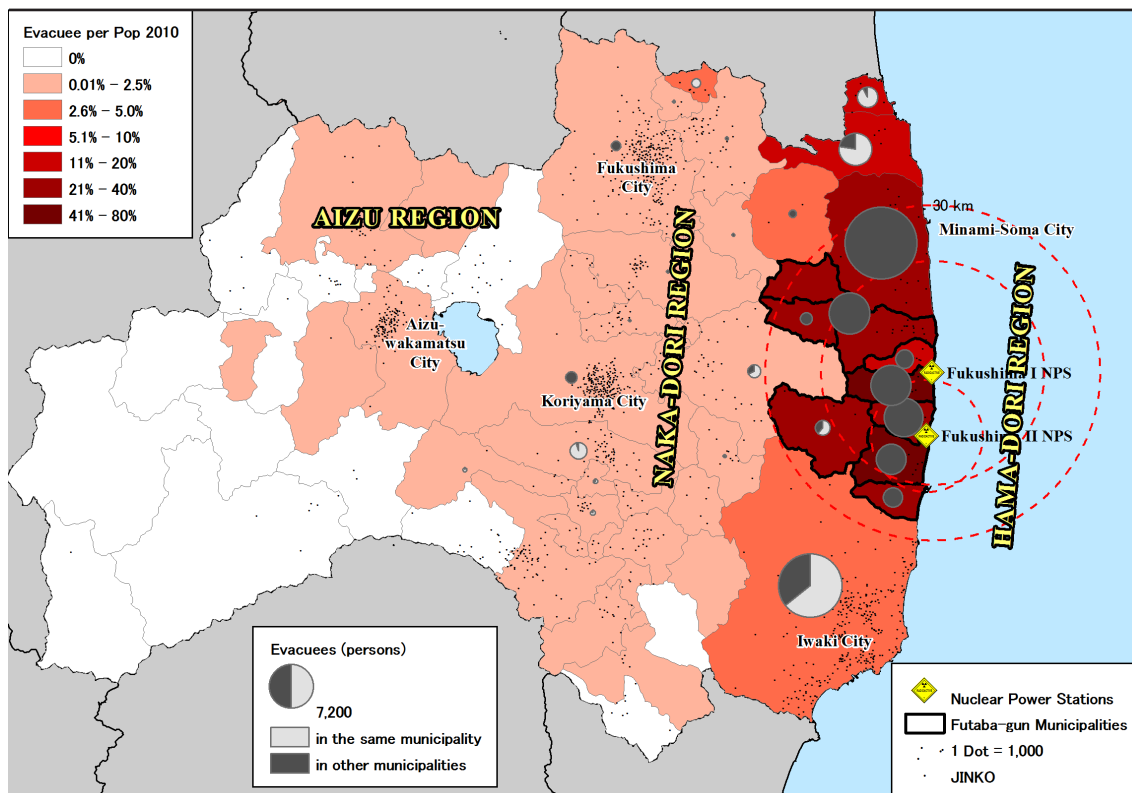
According to a survey conducted in June 2011 by the municipality of Okuma, which hosted the Fukushima Daiichi Nuclear Station, soon after the nuclear disaster, some sort of stratification occurred among the evacuees from Fukushima Prefecture, especially depending on individual or family connection to regions outside the affected area (Isoda, 2011b). People who worked for a company based outside the region affected by the disaster or people who had part of their family in a different Japanese prefecture were better off, while evacuees who worked for a local company, who had all their relatives in the region or who were owning a house within or in the proximity of the evacuation areas were highly disadvantaged. Among the former, more than 50% of the full-time workers were still employed full-time after the disaster (Isoda, 2011b). They usually continued to work for the same company and had the chance to be transferred to a different branch. The fact that they had a full-time job enabled this category of workers to rent private housing while full-time self-employed workers found it much more difficult to be

2. His study takes into account the age and sex of evacuees. The author warns that his analysis could include some bias since there can be double counts of evacuees who moved to different facilities, came back home, were hospitalized or were host by families and relatives in private evacuation location.

3. aged 75 or more.



Map 2. Evacuees by municipalities in Fukushima.



Source: The 2011 East Japan Earthquake Bulletin of the Tohoku Geographical Association, April 2011.

employed and rent accommodation after the nuclear accident. A significant number of male workers in their 30s and 40s were evacuated to Niigata Prefecture. This is probably associated with the transfer of personnel working in nuclear related activities to the Kariwa Nuclear Power Station.

### 2.3. Tensions within the local community

A disparity exists between those who left their municipalities and those who could not leave and were obliged to remain in their home prefectures because of their jobs, family obligations or possessions in those regions. This is particularly true for those regions that were not declared under the evacuation orders. Indeed, in the Hamadori region, the easternmost of the three regions of Fukushima Prefecture in Japan, many were forced to leave because of government decisions and the population showed great solidarity. On the contrary, in those regions that were not under evacuation orders, but were significantly contaminated, tensions between those who left and those who stayed arose.

In addition, people who decided to leave voluntarily were considered as cowards, betrayers, traitors, “anti-Fukushima” and “anti-Japan”

(Hasegawa 2012). Those people knew that, once they left, they would not be welcomed back. The psychological suffering of both groups, those who left and those who stayed, cannot be ignored.

Compensation is also an important element to understand the jealousy of people who could not leave, and therefore do not receive any assistance from the central government, as well as a crucial element to analyse the decisions made by evacuees. Compensation may encourage evacuees to start a new life, but also deter citizens from doing so, allowing them to rely only on payments from TEPCO.

Because of the long-term consequences of the disaster, in February 2012 the government's centre for settling disputes over compensation for nuclear accidents set new restitution standards for the on-going Fukushima nuclear crisis. These new standards are very specific and call on TEPCO to pay to every person that has left their home \$1,246 per month as well as a compensation for the psychological pain. This amount will not be halved after 7 months,<sup>4</sup> as was initially planned. In addition, TEPCO should pay to all voluntary migrants the cost of transportation and accommodation

4. The duration of these compensations has not been defined clearly.



expenses in excess of the amounts listed by the interim guidelines set by the government's Dispute Reconciliation Committee for Nuclear Damage (\$5,037 for children and expecting mothers, and \$1,000 for all others persons). However, this is a one-time payment that applies only to the voluntary evacuation that occurred before December 2011. The operator of the Fukushima Daiichi Nuclear Power Plant is also required to pay compensation for any damage caused by the nuclear accident to properties in evacuation areas on the basis of residents' demands.

If some restitution standards have been gradually set, there are some important elements that are very difficult to evaluate and quantify such as the loss of value of houses and properties in the region affected by the nuclear accident, the right to 'life-time' employment, personal and professional network and membership to a community. The prolonged evacuation has important mental, physical and economic consequences on evacuees, but it remains difficult to determine the appropriate level of compensation.

### 3. CONCLUSION: IS A RETURN POSSIBLE?

The government has been actively promoting the revitalization of the disaster-hit zones through a reconstruction policy and the attraction of migrants, whether internal or foreigners.

Special measures have been taken to enhance reconstruction projects proposed by municipalities, and approved by the state: flexibility regarding regulations and financial or monetary aid, allowing deregulation for medical services, agriculture industry and manufacture in the affected zones. For instance, the Iwate prefecture has launched a "special zone for health, care and welfare" project since February 2012. It benefits from flexibility regarding the repartition of medical personnel in disaster-hit zones for them all to have access to sanitary services. Another example is that of Miyagi prefecture's project to promote private investment: it plans to create 389 industrial poles in 34 municipalities, including automobile and food industries, renewable energies, aeronautics, etc. The firms recently settled in the region will benefit from tax exoneration for five years and, for those already present, tax deductions for the same period.

Employment is key for the sustainable development of the region and the population. The Ministry of Health, Labour and Welfare defined in October 2011 the third phase of the "Japan as One Work Project", launched in April 2011. Its aim is to

support job creation through the reconstruction of local industries. Through subsidies, it provides support for enterprises that establish themselves in the zone and for the creation of small-and-medium firms. Emphasis is upon agriculture, forestry and fishing industries. The creation of companies hiring disaster victims is also encouraged. The third phase of the project is expected to generate around 500,000 jobs and support 70,000 already existing. The previous phases have resulted in the job placement of 64,000 people in Iwate, Miyagi and Fukushima prefectures (Japanese Ministry of Health, Labour and Welfare, 2011).

The Japanese government has also called on foreign countries to take part in the "Open Reconstruction Plan" organized by the Ministry of Foreign Affairs, the Cabinet Office and the Ministry of Economy, Trade and Industry. It consists in attracting tourists, talented students, highly qualified professionals and foreign investment.

From November 2011 to March 2016, foreigners who wish to stay in the affected prefectures will benefit from flexible administrative arrangements, including an exemption of visa fees. Foreign companies established in Special Zones for Reconstruction will be exempted of corporate tax as well as receive financial support for research and development. So far, the presence of foreign firms in North of Japan has not been significant (Hasegawa, 2012).

In interviews reported by the national and international press, the elderly Japanese have expressed their willingness to rebuild the villages where they and their ancestors were born. They want to rebuild the community as it existed before the tsunami. A 76-year old man, living with his wife and disabled son, said, "If we leave Nagahara (in Miyagi prefecture) we'll have no friends. I want to die where I know everyone's face" (The Mainichi, 7 April 2012). This feeling is called "kizuna", which means connections with people, and local authorities place it at the core of their reconstruction projects. However, it does not take into account the young generation's preference for safety, since they form a demographic minority and are used to deferring to their older relatives. As a consequence, young people tend to leave the coastal areas and the fishing villages for higher grounds, and to find jobs in other big cities. As Yoshiaki Suda, mayor of the affected town of Onagawa, put it, "For whom are we rebuilding?" (The New York Times, 12 February 2012). The issue of villages becoming depopulated is an important issue when considering long-term reconstruction (Hasegawa, 2012).

The situation of the people displaced by the nuclear accident is very specific. In order to prepare the return of displaced people, the government

reorganised in April 2012 the evacuation zones into three categories in the Fukushima prefecture: a forbidden zone, where radioactivity levels are equal or superior to 50 millisieverts (mSv) per year, a “no-residence” zone where radioactivity levels are between 20 and 50 mSv/year, and one where return will be possible with radioactivity levels between 1 and 20 mSv/year. The two latter zones will be decontaminated: whereas the “no-residence” zone will remain uninhabitable for several years, the zone for return will benefit from the reconstruction of its infrastructures (Le Monde, February 24th 2012) and the progressive lift of entry ban, town after town. Nonetheless, big challenges may prevent a massive return: unachieved decontamination, unrestored infrastructures and public facilities.

The issue of return is highly sensitive and politicized. The tsunami survivors keep on paying housing loans for houses that disappeared. When they attempt to buy other land to build their

house, they end up paying double loans. Hasegawa has noticed a difference in the assistance offered by different cities: “in Sendai, land is offered for free whereas in other cities, you have to pay for it. This will delay considerably the reconstruction process” (Hasegawa, 2012). In addition to that, psychological suffering often prevents people from resettling in places where they lost relatives and friends.

More than one year after the 3/11 events, both people who left voluntarily and people who have been displaced are still in a very vulnerable position, as they are still, for most, unable to go back home. The study of the population movements highlights the necessity for Japan to reinforce its risk prevention and its assistance policies for the displaced population. This is an urgent issue, since the country expects greater natural catastrophes to hit in the coming years – such as the “Big One” (earthquake) in Tokyo. ■

## BIBLIOGRAPHY

### BOOKS

Augendre Marie. 2012. "Risques et catastrophes volcaniques au Japon : enseignements pour la géographie des risques" in *Habiter les territoires à risques*. Presses polytechniques et universitaires romandes. 185-207.

### INTERNATIONAL ORGANISATIONS' REPORTS

- Asian Disaster Reduction Center, International Recovery Platform (IRP), 2011. « Great East Japan Earthquake, Japan ». ADRC-IRP. [http://www.adrc.asia/documents/disaster\\_info/Great\\_East\\_Tokyo\\_Earthquake\\_ver.2.pdf](http://www.adrc.asia/documents/disaster_info/Great_East_Tokyo_Earthquake_ver.2.pdf)
- Disaster Risk Reduction Division (IDD) of UNESCAP (United Nations for Economical and Social Commission for Asia and the Pacific). Geneva: UNESCAP
- Sawai Mari (date unreleased) "Who is vulnerable during tsunamis? Experiences from the Great East Japan Earthquake 2011 and the Indian Ocean Tsunami 2004", Geneva: UNESCAP.
- International Federation Red Cross and Red Crescent, 2011. "Japan: Earthquake and Tsunami, Information Bulletin n°4. <http://www.ifrc.org/docs/appeals/rpts11/JPeq22031104.pdf>
- International Organization for Migration (IOM), 2004. "Glossary on Migration", Geneva: IOM. [http://publications.iom.int/bookstore/free/IML\\_1\\_EN.pdf](http://publications.iom.int/bookstore/free/IML_1_EN.pdf)
- Takeuchi Kuniyoshi, 2011. "Chain Reactions Happened in Great East Japan Earthquake and Tsunami".
- Asian Disaster Reduction Center (ADRC), International Recovery Platform (IRP), 2011. "Great East Japan Earthquake, Preliminary Observations". Geneva: UNISDR. <http://www.unisdr.org/we/inform/publications/20537>
- UNISDR, 2012. "Japan's success in risk reduction highlighted on March 11 anniversary", Geneva: UNISDR News Archive. <http://www.unisdr.org/archive/25578>
- Government of Japan, 2005. « National Report of Japan on Disaster Reduction for the World Conference on Disaster Reduction », Kobe-Hyogo. <http://www.unisdr.org/2005/mdgs-drr/national-reports/Japan-report.pdf>

### JAPANESE OFFICIAL REPORTS (PREFECTURES AND GOVERNMENTAL ORGANIZATIONS)

Ministry of Foreign Affairs of Japan, Meiji University, and the International Organization for Migration (IOM), 2012. "FY2011 International Workshop on the Acceptance of Foreign Nationals and Their Integration into Japan", Tokyo.: Ministry of Foreign Affairs of Japan. [http://www.mofa.go.jp/announce/event/2012/2/0220\\_01.html](http://www.mofa.go.jp/announce/event/2012/2/0220_01.html)

Japanese Ministry of Health, Labour and Welfare, 2011. "Japan as One Work Project", Japan: Japanese Ministry of Health, Labour and Welfare. <http://www.mhlw.go.jp/english/topics/2011eq/dl/emp04.pdf>

Japanese Government, Nuclear Emergency Response Headquarters, 2011. "Report of Japanese Government to the IAEA Ministerial Conference on Nuclear Safety - The Accident at TEPCO's Fukushima Nuclear Power Stations". Japan: Japanese Government. [http://fukushima.grs.de/sites/default/files/NISA-IAEA-Fukushima\\_2011-06-08.pdf](http://fukushima.grs.de/sites/default/files/NISA-IAEA-Fukushima_2011-06-08.pdf)

Nuclear and Industrial Safety Agency. Seismic Damage Information (the 19th Release), 2011. (unreleased paper since the Agency was closed in June 2012) <http://www.nisa.meti.go.jp/english/files/en20110313-3.pdf>

Iwate Prefecture, 2011. "Great East Japan Earthquake and Tsunami Reconstruction Plan. Basic Reconstruction Plan. To Protect Life, To Live Together with the Sea and Land, and To Create a Homeland Iwate and Sanriku". Japan: Iwate Prefecture. [http://www.pref.iwate.jp/~hp0212/fukkou\\_net/pdf\\_doc/kihonkeikaku\\_english.pdf](http://www.pref.iwate.jp/~hp0212/fukkou_net/pdf_doc/kihonkeikaku_english.pdf)

Japan Center for International Exchange (JCIE/USA) (date unreleased.). Earth Relief and Recovery Program. Background on the 3/11 disasters. New York: JCIE/USA. <http://www.jcie.org/311recovery/background.html>

International Recovery Platform (IRP) & Y. Shiozaki, Y. Tanaka, and A. Hokugo (Kobe University), 2012. Transitional Shelters. Japan: Tokyo Development Learning Center (TDLC) [http://www.jointokyo.org/files/cms/news/pdf/Session\\_4\\_Presentation\\_Transitional\\_Shelters.pdf](http://www.jointokyo.org/files/cms/news/pdf/Session_4_Presentation_Transitional_Shelters.pdf)

### ARTICLES

- Asanuma-Brice, Cécile. 2011. « Logement social nippon : un bilan après la catastrophe du 11 mars 2011 », in *Informations sociales*, vol. 6 n° 168, 34-44.
- Chegaray, Olivier. 2011. « Récit et réflexion sur le séisme japonais », *Études*, vol. 7, Tome 415, 19-29.
- Koike, Katsunori. 2011. "Forgotten and unattended: refugees in post-earthquake Japan" in *Forced Migration Review*, University of Oxford, n°38.
- Pelletier, Philippe. 2011. « La géographie bafouée au Japon », *L'Espace géographique*, vol.2 Tome 40. 189-189.
- Pigeon, Patrick. 2011. « Après les forts séismes en Haïti et au Japon - Les catastrophes sont-elles "naturelles"? », *Population & Avenir*, vol. 3 n° 703. 14-17.
- Richard, J.L. 2012. "Migrations et environnement : le Japon et les migrations après les catastrophes sismiques et environnementales de mars 2011". University of South Africa, Pretoria, 23 May 2012.

### PRESS ARTICLES

- Behr, Peter. March 2<sup>nd</sup>, 2012. "Fukushima disaster compounded by 'public myth of absolute safety,' investigators say". Washington D.C.: ClimateWire. <http://www.eenews.net/public/climatewire/2012/03/02/1>
- Caracappa, Peter. June 28<sup>th</sup>, 2011. "Fukushima Accident: Radioactive Releases and Potential Dose Consequences - ANS Annual Meeting Special Session: The Accident at Fukushima Daiichi— Preliminary Investigations".

La Grange Park, USA : Fukushima Daiichi – American Nuclear Society. <http://fukushima.ans.org/inc/docs/FukushimaSpecialSession-Caracappa.pdf>

Harlan, Chico and Mufson, Steven, March 13<sup>th</sup>, 2011. “Japanese nuclear plants operator scrambles to avert meltdowns”, Washington D.C.: The Washington Post Sunday. <http://www.washingtonpost.com/wp-dyn/content/article/2011/03/12/AR2011031205493.html>

Isoda, Yuzuru. 2011a. “Fukushima Hamadori Diaspora age and sex of evacuees from the nuclear crisis” - The 2011 East Japan Earthquake Bulletin of the Tohoku Geographical Association. Japan: Tohoku Geographical Association. <http://tohokugeo.jp/disaster/articles/e-contents12.html>

Isoda, Yuzuru. April 26<sup>th</sup>, 2011b. “Refugee life of evacuees from the Fukushima nuclear accident. Analysis of Okuma Town Survey based on human capital theory” – The 2011 East Japan Earthquake Bulletin of the Tohoku Geographical Association. Japan: Tohoku Geographical Association. <http://tohokugeo.jp/disaster/articles/e-contents26.html>

Makinen, Julie. March 25<sup>th</sup>, 2011. “Japan steps up nuclear plant precautions; Kan apologizes”, Los Angeles: Los Angeles Times. <http://articles.latimes.com/2011/mar/25/world/la-fgw-japan-nuclear-plant-20110326>

Oda, Takashi. Aug 11<sup>th</sup>, 2011a. “Grasping the Fukushima Displacement and diaspora”, 2011 East Japan Earthquake Bulletin of Tohoku Geographical Association. Japan: Tohoku Geographical Association. <http://tohokugeo.jp/disaster/articles/e-contents24.pdf>

Oda, Takashi. March 9<sup>th</sup>, 2012b. “A snapshot of the displacement of Fukushima residents as of the first anniversary of Japan’s 3.11 disasters”- The 2011 East Japan Earthquake Bulletin of Tohoku Geographical Association. Japan: Tohoku Geographical Association. <http://tohokugeo.jp/disaster/articles/e-contents28.pdf>

Onishi, Norimitsu. 2012. “As Japan Works to Patch Itself Up, a Rift Between Generations Opens”, New York: The New York Times. <http://www.nytimes.com/2012/02/13/world/asia/amid-japan-reconstruction-generational-rift-opens.html?pagewanted=all>

Sanger, David; Wald, Matthew and Tabuchi, Hiroko. March 17<sup>th</sup>, 2011. “U.S.: Reactors may spew radiation”, U.S. State of North Carolina: The News & Observer. <http://www.newsobserver.com/2011/03/17/1059140/japan-races-to-get-power-to-reactors.html>

Shears, Richard. April 12<sup>th</sup>, 2011. “Fires still raging at stricken Fukushima nuclear reactor one month after it was destroyed by tsunami”. London: Daily Mail. <http://www.dailymail.co.uk/news/article-1375981/Japan-nuclear-crisis-Radiation-bad-Chernobyl-level-7-reached-2nd-time-history.html>

Tabuchi, Hiroko. March 3<sup>rd</sup>, 2012. “Japanese Prime Minister says government shares blame for nuclear disaster”, New York: The New York Times. <http://www.nytimes.com/2012/03/04/world/asia/japans-premier-says-government-shares-blame-for-fukushima-disaster.html>

Takahara, Kanako and Nagata, Kazuaki. 2011. “High radiation found outside no-go zone”, Tokyo: The Japan Times. <http://www.japantimes.co.jp/text/nn20110401a1.html>

Vergano, Dan. Sept 22<sup>th</sup>, 2011. “U.S. learns nuclear plant lessons”. McLean, Virginia: USA Today. <http://usatoday30.usatoday.com/news/world/story/2011-09-21/us-learns-from-fukushima-nuclear-plant/50501582/1>

Weisenthal, Joe. March 19<sup>th</sup>, 2011. “Fukushima Nuclear Plant”, New York City: Businessinsider.com. <http://www.businessinsider.com/fukushima-nuclear-plant-2011-3>

Willacy, Mark. May 25<sup>th</sup>, 2011. “Japan evacuates villages outside nuclear zone”, New York City: ABC News. <http://www.abc.net.au/news/2011-05-16/japan-evacuates-villages-outside-nuclear-zone/2694950>

Yan Cathy. April 4<sup>th</sup>, 2011. “Hong Kong Expedites Visas for Expats in Japan”, New York City: The Wall Street Journal. <http://online.wsj.com/article/SB10001424052748704587004576240542791917326.html>

#### NON-SIGNED ARTICLES

Courrier International. April 4<sup>th</sup>, 2011. “Hong Kong, visa pour les réfugiés du Japon”, Paris : Courrier International.

Le Monde. February 24<sup>th</sup>, 2012. “Fukushima: niveaux très élevés de radioactivité dans des municipalités de la zone évacuée”. Paris : Le Monde,

The Economist. March 10<sup>th</sup>, 2012. “Blow-ups happen. Nuclear plants can be kept safe only by constantly worrying about their dangers”. The Economist,

The Mainichi Shimbun. February 2012. “TEPCO must be proactive in nuke crisis compensation negotiations”. Japan: The Mainichi Shimbun,

The Mainichi Shimbun. April 7<sup>th</sup>, 2012. “Relocation threatens to scatter, destroy bonds of tsunami-hit community”. Japan: The Mainichi Shimbun,

The Mainichi Shimbun. April 25<sup>th</sup>, 2012. “Temporary housing land owners have mixed feelings on refugees’ prolonged stays”. Japan: The Mainichi Shimbun,

The Japan Times. April 22<sup>th</sup>, 2011. “No-go zone trespassers face fines, arrest”. Tokyo: The Japan Times.

The Yomiuri Online. June 12<sup>th</sup>, 2011. “90,000 in shelters; most debris still uncleared months on”. Japan: The Yomiuri Online.

The Yomiuri Online. April 19<sup>th</sup>, 2012. “Owners want back lands used by evacuees”. Japan: The Yomiuri Online.

#### INTERVIEWS

Reiko Hasegawa by telephone, May 16<sup>th</sup>, 2012.