



INSTITUT  
DE RADIOPROTECTION  
ET DE SÛRETÉ NUCLÉAIRE

*Faire avancer la sûreté nucléaire*

# *Societal Issues Following Disaster Evacuation*

International Experts Meeting on Radiation Protection  
after the Fukushima Daiichi Nuclear Power Plant Accident

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IRSN

# Summary

- *Global context*
- *Evacuations*
- *Compensations*
- *Psychological and societal issues*
- *The dilemma for return*
- *Conclusion*

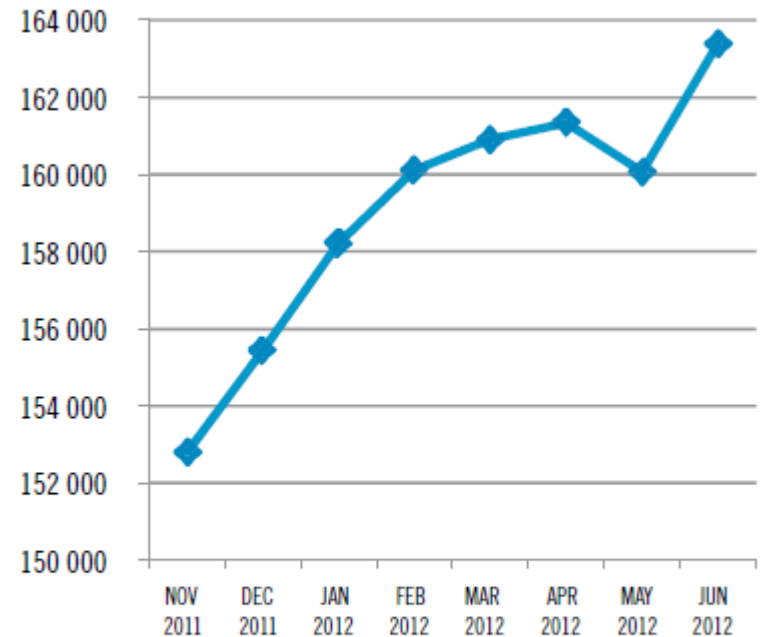
# Never forget the global context

The triple disaster with multiple consequences to be managed

- 15,871 people lost their lives, 2,778 people are missing and 6,114 people injured (National Police Agency, 10 October 2012)
- More than 400,000 people evacuated (one week after the disaster) in 2200 temporary shelters
- 400,000 houses are totally or severely destroyed
- Very important financial damage
- Break of the "lifeline": break of all means of communication and subsistence; electricity, gas, drinking water, public transportation, internet, etc.
- Weather: it was cold and it snowed
- Water and electricity were quickly restored

# Evacuations after Fukushima Daiichi accident

- One year after the disaster, more than 160,000 nuclear evacuees, from the Fukushima Prefecture
- 113,000 from 11 municipalities were forced to evacuate following the government's evacuation orders (manu military)
- Voluntary evacuation: 50,327 persons from outside of official zones (this number was estimated by the Fukushima Prefecture in September 2011)



Source: Japanese Reconstruction Agency.

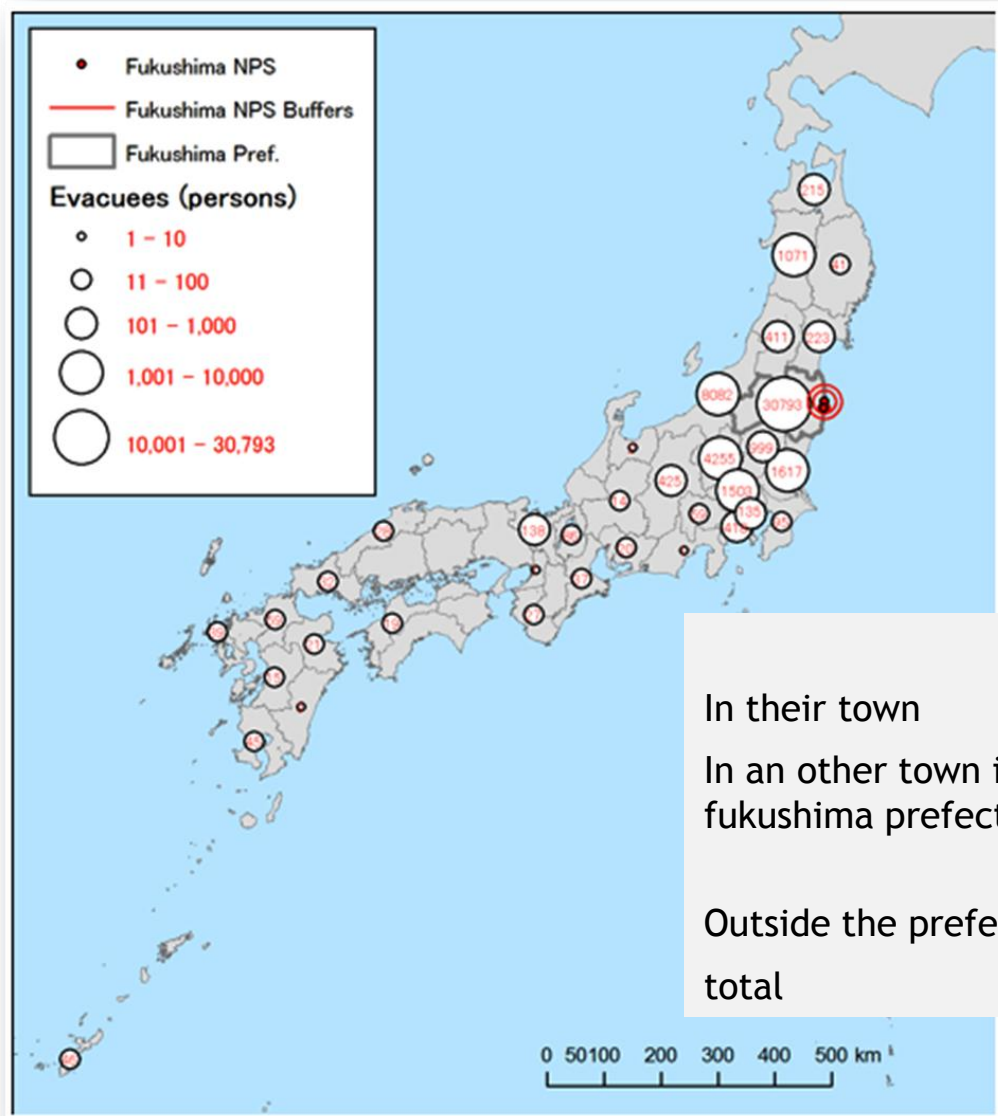
Before the accident, evacuees and municipalities believed that the nuclear power station was extremely safe and that a severe accident was almost impossible.

# Nuclear Evacuations characteristics

- A severe accident or large-scale evacuation had never been envisaged before the disaster: various evacuation orders with vastly differing instructions and timing were given
- Many people self-evacuated, used their own cars, creating an enormous traffic jam on the escape route and delayed the evacuation
- The evacuation occurred with little warning, preparation or knowledge: many residents left without any extra clothes, food or money
- People were forced to flee with little information on the gravity of the accident or radiation risk
- Nuclear evacuees suffer from uncertainty to their prospect of return.

2011	Target
11 March	2 km radius from the station
	3 km radius
12 March	10 km radius
	20 km radius
15 March	Between 20–30 km
22 April	Between 20–30 km
	Areas with air radiation dose more than 20 mSv/year
16 June	Spots with air radiation dose of over 20 mSv/year
30 Sept.	Between 20–30 km

# Where the evacuees have they fled ?



These figures of the evacuees in refuges come from the list established on March 15<sup>TH</sup> 2011 by the prefecture of Fukushima

	number	percentage
In their town	16012	23,9%
In an other town in the fukushima prefecture	30793	45,9%
Outside the prefecture	20182	30%
total	66987	100%

# Temporary shelter situations / the tremendous effort to build houses

## Current situations of evacuees in the aftermath of the Earthquake

1. Approximately 580 people live in evacuation centers (community hall, school, etc.) in 2 Prefectures.  
(Decreased more than 40,000 people compared to the first survey on June 2, 2011)
2. Approximately 325,000 people live in houses and other residential facilities
3. Total number of evacuees nationwide is 343,000
4. Evacuated people are currently living in more than 1,200 municipalities located in 47 Prefectures.

(Number of people)*1	June 2, 2011		Feb 9, 2012
Evacuation center	41,143	▶	584
Hotel and other similar facilities	28,014	▶	97
Others (Houses of relatives, friends, etc)	32,483	▶	16,901
Houses*2 (Temporary housings, public housings, hospitals, etc.)	22,954*3	▶	324,927

\*1: The above figures show the sum of evacuees as of February 9, 2012, with the cooperation of relevant local governments.

\*2: Houses for Miyagi and Fukushima Prefecture does not include hospitals.

\*3: The figure does not include evacuees in Miyagi, Fukushima and Iwate Prefectures.

Source: Reconstruction Agency

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National Policy Unit

11

# Decision factors in the dilemma to stay or to evacuate ?

	<b>factor for evacuation decision</b>	<b>factors to decide to stay</b>
<b>short term</b>	<p>pregnancy young child</p> <p>Age : 0-14 years</p> <p>Age : 14-29 years</p>	<p>Age : 50-70</p> <p>Poor people</p> <p>implanted for a long time in the region</p> <p>possess numerous close relations in the district</p> <p>possess an on-the-spot employment</p> <p>Trust in institutions</p>
<b>long term</b>	<p>service employee</p> <p>big company employee</p> <p>tenant</p>	<p>Owner; retired man</p> <p>Farmer</p> <p>In drafts to be paid</p>

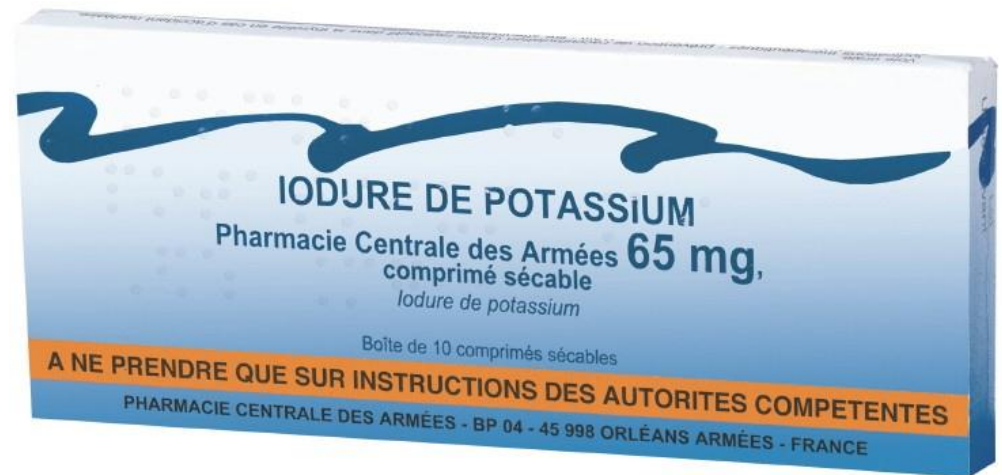
**several factors**

- the age,
- the profession,
- the emotional attachment to the town,
- the family structure,
- the maternity and the pregnancy
- the trust in institution.



# Measures against radiation exposure during the evacuation period

- Full-body decontamination procedures: removal of contaminated clothes, showers and administration of iodine tablets, were not systematically applied to people.
- These facts led the population to **lose trust** in the capacities of central and prefectural governments in effectively mitigating the effects of the accident and doing their best to protect their citizens.



# The government's Compensation scheme for nuclear evacuees July 2012 (1)

## Psychological damage caused by the evacuation

In addition to the reimbursement of transportation and accommodation cost related to the evacuation, TEPCO will pay 100,000 yen (€1,000) per person per month from the date of the accident until the date when the evacuation orders are lifted by the government.

## Damages to fixed-assets (houses and land)

As for private houses and lands located in the third zone (difficult to return to for 5 years), TEPCO will pay compensation equivalent to the pre-accident value of such assets. Those located in the first and the second zones will be compensated proportionally to the number of years that elapse until the lifting of evacuation orders for these zones.

# The government's Compensation scheme for nuclear evacuees July 2012 (2)

## Damages to household effects

The amount of compensation varies according to the size of families. For example, a family of two adults and two children will receive between €50,000–67,000 on the basis of the newly classified areas.

## Economic damages

TEPCO pays an amount equivalent to the salary that an evacuee was earning prior to the accident (for a period of two years) and compensates for loss of business earnings based on the average profits that business owners were making before the accident (calculated on the previous five years for agriculture and forestry businesses, and three years for other business activities).

Source: METI. : <http://www.meti.go.jp/earthquake/nuclear/pdf/institution.pdf>;  
<http://www.meti.go.jp/press/2012/07/20120720001/20120720001-1.pdf>

# Psychological and societal issues

# Stigmatization

The nuclear refugees undergo a number of discriminations, which establishes a powerful brake in the individual resilience.

"People in Japan are simply too worried and unfortunately it can lead to a discrimination".

The Japanese government and certain cities have to commit to an advertising campaign against the discrimination to the refugees.

The Ministry of Justice published a document explaining that any reaction of this type established a sprain in human rights, whereby an explanatory letter was sent to all the schools.

# Many psychological disorders appeared

The most common mental health consequences after disasters are depression, anxiety, post-traumatic stress disorder, medically unexplained somatic symptoms.

They have nightmares, suffer from high blood pressure, from depression, from insomnia, from headaches.

The fear of the radiation moved sometimes into real psychosis.

The number of suicides strongly increased.

The reasons :

- For some, members of their family died
- **for the refugees**, and in particular the oldest and the youngest, the violence of the evacuation, the difficult life in the centers of evacuation and the level of significant stress over a long period.
- **In farmers' families**, inheritance of several generations, the loss of the earth, the abandonment of the cattle and the destruction of the agricultural productions

# Stress of parents of children in contaminated zones

Numerous questions appear especially for parents of children: how long may I leave them outside? Do I have to give them vegetables? Do they need more medical examinations ?

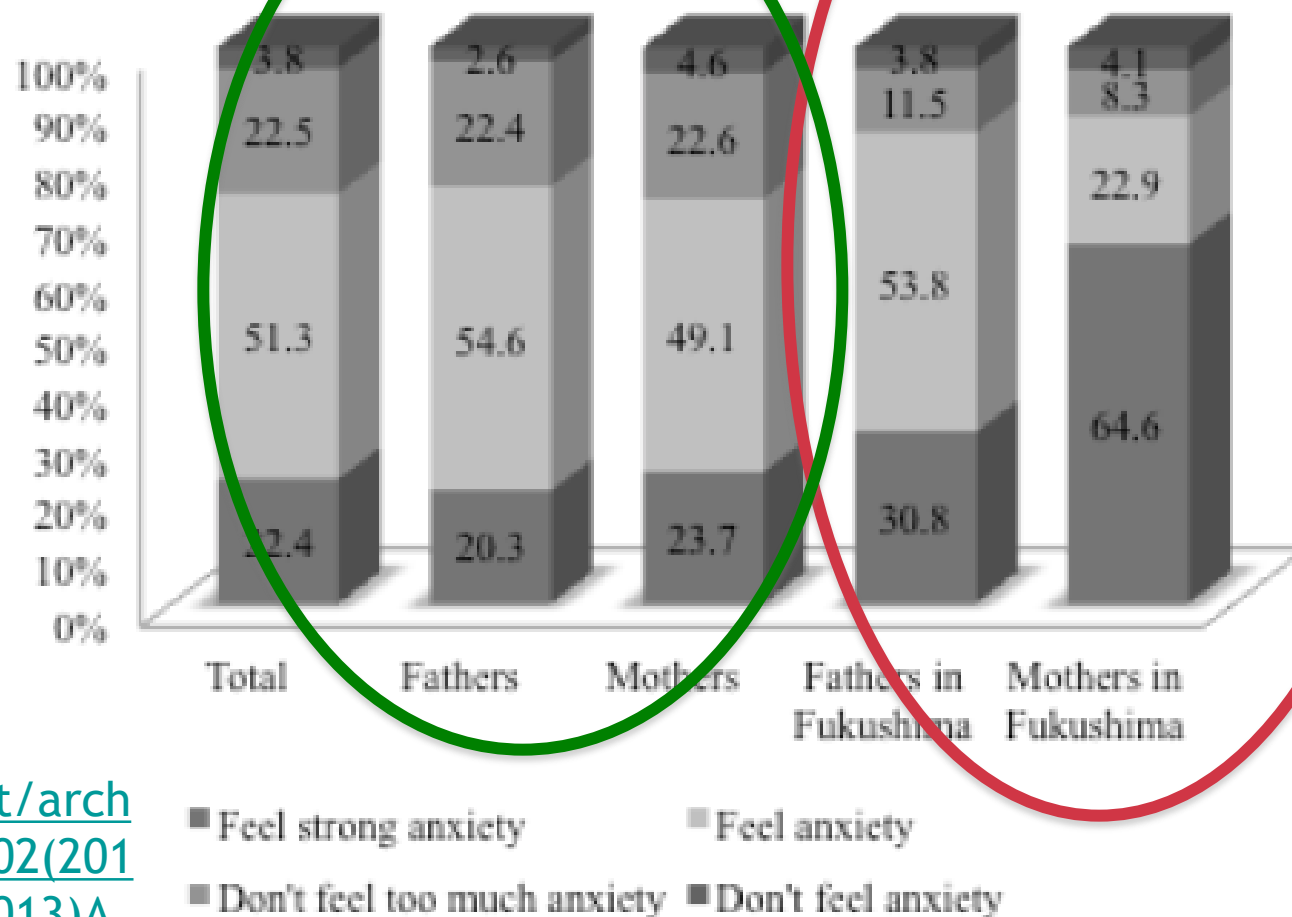
The women want to live in a zone not contaminated, the fathers have to stay where is their employment.

The mothers are more risk adverse.

The situation is also testing for the couples. Financial difficulties are added to the psychological shock, the families that must often pay the second rent. The remote life provokes tensions in the couples.

And the divorces are increasing.

## Comparison of level of anxiety Japan/fukushima



[http://jcom.sissa.it/archive/12/02/JCOM1202\(2013\)A03/JCOM1202\(2013\)A03.pdf](http://jcom.sissa.it/archive/12/02/JCOM1202(2013)A03/JCOM1202(2013)A03.pdf)

Saho Tateno and Hiromi  
M. Yokoyama

**Figure 3.** Comparison of anxiety levels by gender.



# Reason for feelings of anxiety

The predominant reason for feelings of anxiety seems to be

- First, the distrust of the government's position
- Second, uncertainty about scientific data disseminated in the past about low dose radiation and its invisible risks, such as hot spots and food that had not been monitored carefully for radiation.

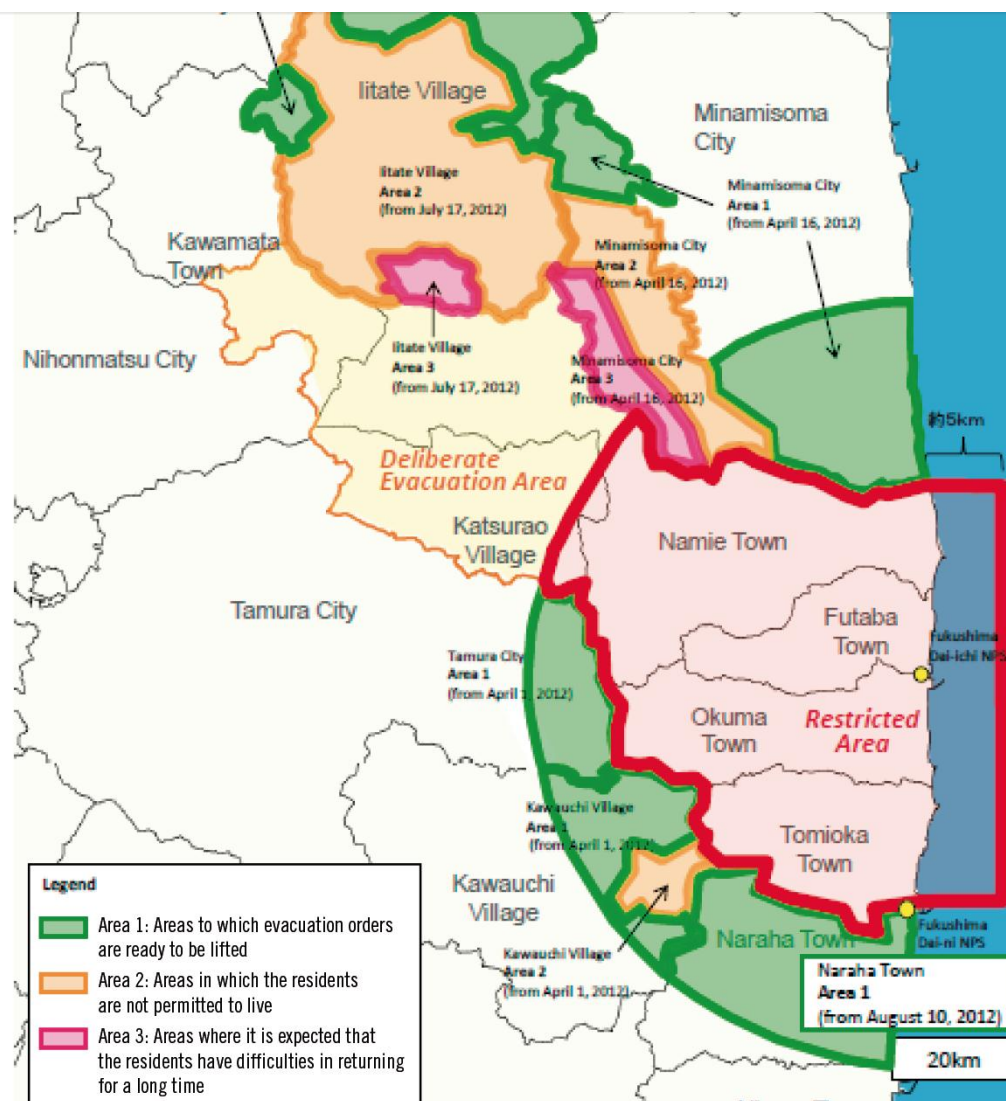
“Lack of scientific knowledge regarding low dose radiation” was selected less frequently than expected except in Fukushima prefecture

[http://jcom.sissa.it/archive/12/02/JCOM1202\(2013\)A03/JCOM1202\(2013\)A03.pdf](http://jcom.sissa.it/archive/12/02/JCOM1202(2013)A03/JCOM1202(2013)A03.pdf)

Saho Tateno and Hiromi M. Yokoyama

# The return of nuclear evacuees

In March 2012, the government proposed a new plan to reorganise the evacuation zone into three categories depending on the air radiation doses measured.



# The government proposal on the reorganisation of the evacuation zone

Area	Name	Threshold Radiation Dose (airborne)	Timing of Return
1	Areas for which evacuation orders are ready to be lifted	Less than 20 mSv/year	Intensive decontamination and early return
2	Areas in which the residents are not permitted to live	Between 20-50 mSv/year	Evacuees cannot return for at least 2-3 years
3	Areas where it is expected that the residents will find it difficult to return to for a long time	More than 50 mSv/year	Evacuees cannot return for at least 5 years

Source: Reconstruction Agency.

# Return after the nuclear evacuation

One year after the accident, the Japanese authorities ask to nuclear evacuees to return to the areas contaminated by radiation according to a newly established safety standard.

Consequences :

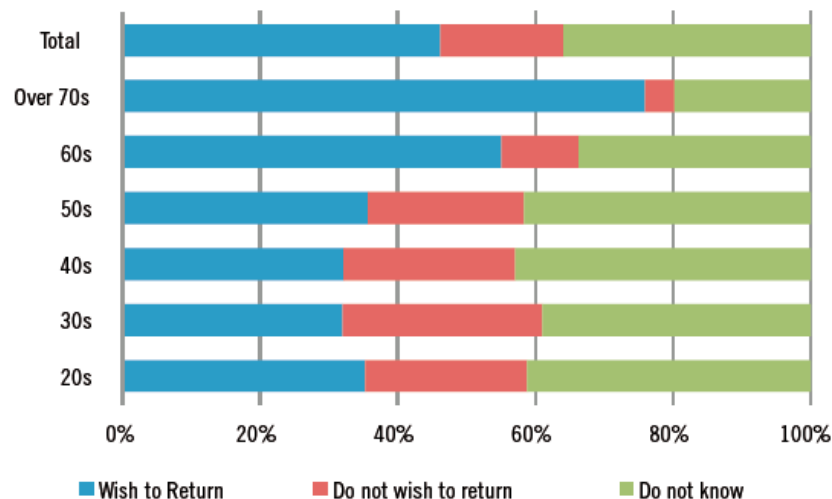
- vivid controversy within the affected communities,
- rift between those who trust the government's notion of safety and those who do not,
- division and weakening of the affected communities.

### Changes in willingness to return



Source: Akira Imai, The Third Resident Survey, 2012.

### Willingness to return according to age



Source: Naraha town's resident survey in February 2012.

« the **uncertainty of job opportunities** complicates the evacuees' decision to return ».  
 « The municipalities are confronted with the extremely difficult task of making the right choice for a future that both ensures the **evacuees' best interests** and maintains their **community's cohesiveness and identity** »...  
 « The issue of return, therefore, has become an almost **taboo subject** and a fault line dividing the evacuee communities ».

[http://www.iddri.org/Publications/Collections/Analyses/STUDY0513\\_RH\\_DEVAST%20report.pdf](http://www.iddri.org/Publications/Collections/Analyses/STUDY0513_RH_DEVAST%20report.pdf)

# Conclusion

Tremendous efforts were done to help evacuees in a very difficult context.

But the controversies can weaken communities and reduce their resilience.

For individuals

- The loss of the land of ancestors is heavy to carry
- Bad memory can be at the origin of deep traumas
- Unpreparedness and communication deficiencies created distrusts

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**Thank you for your attention !**