Chapter 1

How the Great East Japan Earthquake revealed the reality of Japan's food system

At the moment of the earthquake, through that night, and in the days that followed

How long will we keep on turning a blind eye to reality?

It was in Sendai City, Miyagi Prefecture at 2:46 p.m. on March 11, 2011. When I felt the earthquake, I was sitting at my desk in the research laboratory at my university. Almost all the books fell from their shelves and were scattered over the floor. Water from the detached cooling tube of the air conditioner leaked onto the books and swamped the room. After the very long period of shaking during the earthquake itself, we hurriedly made sure that everyone among our colleagues was fine. Then we tidied the room with the help of the students who happened to be around so that the room could be used for classes the next day. I finally went down the university hill in the early evening and walked home.

Fortunately I bumped into a graduate student of my university who was heading to his home and kindly offered me a ride. As soon as the car started, though, we were stuck in such heavy traffic that it took us almost an hour to go just 50 meters. Meanwhile, I was trying over and over to contact my family by cell phone, but in vain.

There was a shopping mall where fashionable young people at normal times would enjoy hanging around, but after the earthquake, we saw the paved pathways were warped and cracked everywhere, with broken glass scattered, and people were standing listlessly just with a blanket wrapped around them.

Other people were wearing nothing more than the casual clothes they wear at home, and they were just standing there with their mouths open.

Finally when I arrived home, it was already completely dark, but there were lots of people on the roads. My apartment is on the 10th floor of an 11-story building. I climbed the emergency stairs to the 10th floor in complete darkness. When I entered my apartment, I found all the furniture and fixtures had fallen and scattered, and there was no clear space to put my food down.

What was the most surprising to me was that the glass door of a cupboard had flown across the room and landed at the far end of the living room away from the kitchen. I wondered, “Why on earth is this lying here?” and “What if we had been here at the time of the earthquake?” All the various answers I imagined made me horrified once again.

At the moment of the earthquake, my family happened to be out of the house. My wife and daughter were on the second floor of a nearby bookstore. The ceiling of the bookstore fell in – right after they evacuated the building, and they barely escaped disaster. My son, a junior high school student, usually takes the subway and bus for his commute, but he walked the whole way home and arrived late at night.

Neither electricity nor water services were available, so most of my neighbors took shelter at a nearby elementary school, which soon became filled with evacuees. I think quite a number of people were turned away from the crowded school and ended up returning to their damaged homes. Those who had cars snuggled into their cars in a parking lot and tried to keep themselves warm. My wife and daughter were lucky enough to be invited to stay warm in one of our neighbor's cars.

I heard that most of the residents in our apartment building, especially those living on the higher floors, spent that night in their cars. I didn't have a car, so I spent the night in my apartment in pitch darkness. Ironically, the stars shone so brightly in the sky over the darkened Sendai City that their contrast was deeply etched into my memory.

Our apartment building had one almost empty room where my family and I ate some canned food, which we managed to find in the totally messed up kitchen. After the simple meal, we lay there and talked about various things feeling shaken the whole time. That feeling of being shaken remained with us for days.

Don't close your eyes to reality

Since I am a professional researcher of food issues, I have always kept a stock of food at home, but I still felt uneasy and worried about the food supply for the days to come. I was also worried about electricity, gas and water. To be honest, I had no idea about the whole picture of the Great East Japan Earthquake that first night. However, I realized this must be something really bad, just by looking around at the nearly unrecognizable scenery that used be my familiar town neighborhood, and I told my family, "I will go to the shelter first thing in the morning and gather as much information as I can in order to make sense of this chaos." Then the four of us slept together like in the days long ago when my children were very young. There we slept, feeling the continuing after shocks.

Not only had the scenery of the town changed, but people's behavior as well. Several hundred people were lining up in front of the supermarket even before 7 a.m. even though nobody was sure the supermarket would open for business at all. Such a long line of people is never seen except on the rare occasions of pop music concerts or something. But after the earthquake, such a line of people stood patiently hoping for food, and this became a common sight.

My neighborhood was not one of those areas washed away by the tsunami, so my knowledge about the disaster-stricken area was very limited. Perhaps no one who was not there personally could ever really know exactly what happened in those devastated areas. Still, I had seen the behavioral pattern of the people seeking food from very early in the morning, and I was actually one of them, waiting in line for food day after day. This convinced me very strongly that we have to review the problems of Japan's food system from the

ground up, and we must review this food system that we have taken for granted up to now. We shouldn't turn a blind eye to the problems. Our food system might become a disaster if we don't take a serous look at these problems.

We have been taking it for granted

I joined the National Federation of Agricultural Cooperative Associations (Zen-Noh) in 1984 and had worked for this organization for 21 years and 11 months, mostly in overseas operations, including an assignment in the U.S. Ordinary people may think it strange that Zen-Noh is engaged in overseas businesses. You may assume Zen-Noh is an organization exclusively for Japanese farmers, but Zen-Noh actually has been deeply involved with agriculture outside of Japan, and its involvement is one of the supporting factors of our food system, which we have been taking for granted.

The Great East Japan Earthquake gave us an opportunity to realize that there are problems with this food system in Japan. I was deeply convinced and wanted to present these problems visually through my own experiences, including experiences abroad. This was one motivation for me to write this book. In order to recover from the devastation after the earthquake, Japan must be determined to be reborn. And for that, we need to acknowledge and thoroughly investigate the problems in this agricultural system, which we have been taking for granted, and find the best way for a new Japan to thrive.

I think most Japanese have been aware that we rely heavily on foreign countries for our food supply, although we don't think about the detailed facts. We more or less acknowledge that the ratio of food self-sufficiency in Japan is 40 percent, and that 60 percent of our food is imported from overseas.

On the other hand, Japanese people tend to avoid thinking calmly based on reality, such as the possibility of the sudden stoppage of food imports, which are essential and taken for granted. We don't seem to be good at preparing for the possible disruption of food imports by such unexpected factors as the

Great East Japan Earthquake, even though we rely on foreign countries for 60 percent of our food supply. Maybe this is because of our national tendency to avoid ill omens, or perhaps it is due to a lack of training to prepare for the worst. It is true that no one in the world likes thinking about unpleasant things.

If we were planning the future management strategies of a company or organization, and if we avoided facing unpleasant facts, then the plan we would come up with would surely be pretty biased.

No matter how tough and painful the reality is, we need to face up to it in order to see what is proper to aim at, or to set specific strategies and measures for accomplishing our goal.

Perhaps Japanese people have made mistakes over and over in discussing food and agricultural strategies, even before deciding on their most basic goals.

We must feed a population of 120 million

Now let's take a look at some basic facts related directly to food-production. According to data provided by the Ministry of Agriculture, Forestry and Fisheries, Japan's total farm land totaled 4.61 million hectares in 2009. That is divided into 2.51 million hectares of rice paddies and 2.1 million hectares of dry fields.

Can this much farm land feed the entire population of 120 billion people in Japan? We may unconsciously assume that there is enough farm land in Japan to grow enough farm products to feed us all. This question is extremely important and basic in considering the ratio of food self-sufficiency and the future of food and agriculture in Japan.

Nonetheless, not much discussion has taken place to address Japan's agricultural and food problems squarely. We have a long history in agriculture and food studies, so the accumulated research and numerous talented researchers are assets we can be proud of. Yet many have warned

about Japan's food and the future of agriculture for many years. It is also true that such dire writings have been distributed among those who know the subject very well.

On the other hand, our living standards have risen so high that our concerns surrounding food are no longer about a shortage of food, but how we can eat more delicious and tasty food and how we should eat without getting fat. Therefore, many of us had such a decadent mindset before the March 11, 2011 earthquake that it was simply “beyond the scope of our imagination” that all the food might completely disappear from our sight.

Now I take the example of meat, as I have often talked on this topic for my lectures and seminars. Many of us eat meat for many occasions, but do we realize what farm animals, our source of beef, pork and poultry, are fed with? The answer is that the feed grains for our animals are mostly imported from abroad. In other words, Japan's livestock industry has been sustained by huge amounts of imported grains. This is the reality that we need to know. Whether we like it or not, we need to face up to this reality, in the first place, and then consider the issues carefully. If we see various social phenomena from this viewpoint, we will see very different aspects than what we see merely based on our impressions or emotions.

For example, Japan imports about 1 million tons of corn for livestock feed every month. Then in which form and by which route is the corn brought to Japan? (The amount of imported corn per year varies slightly year by year, but it amounts to approximately 16 million tons per year, some 12 million tons of which is used for livestock feed. The remainder of some 4 million tons of corn goes into human food and industrial products. But to make it easier to understand, I only talk about corn for animal feed.) Furthermore, who is supporting the system to facilitate this import traffic of 1 million tons of corn every month, and what benefits are we receiving from that? Or what sort of risks are there?

For most of us, it must be hard to imagine the volume of 100 tons of corn, let alone 1 million tons of corn, because none of us have seen the actual volume of 1 million tons of corn in our daily life. To tell you the truth, we are

surrounded by very many products made from corn in our daily life, but of course their appearance is not like the familiar yellow corn grains. Corn products take many different forms: animal feed of course, but also ingredients of soft drinks, glues for industrial uses, biodegradable plastics, and in recent years automobile fuels. None of these products remind us of the yellow grains. Therefore, we often see them in our daily life without realizing they are made from corn.

You may think that ordinary people living in the cities have very little to do with animal feed grains, but actually there is a very close relationship, and feed grains mean a lot to city dwellers. There are a lot of invisible systems that we generally take for granted, and a detailed description will follow later in this book. The Great East Japan Earthquake directly struck the systems that support these very things that we take for granted.

Invisible infrastructure

These systems that support what we have taken for granted are what I call invisible infrastructure. They are a vital part of our daily life, but totally invisible, so I call them invisible infrastructure. Our usual transportation systems such as roads and railroads are quite visible infrastructure, whereas the transport systems that deliver gigantic amounts of grain and crude oil punctually and without trouble are only possible thanks to invisible infrastructure. Our life is supported by many kinds of such invisible infrastructure.

When I was stationed in the U.S. several years ago, I heard a top executive of a world-leading company say, “The biggest and the last competitive edge that the U.S. has today is its logistical capability to transport huge amounts of grain consistently and reliably.”

I think his comment is very thought-provoking because he meant that the smooth operation of industry and social life in the importer's country depends on the food and grain transport systems of the U.S. On the other hand, we usually don't think deeply about these things.

The question of whether agricultural products are imported or domestically grown often becomes the focus of discussions about food issues, and it is an important point both notionally and substantially. Today, however, many of our industries can only remain viable with the cooperation of their overseas partners, and this is true even of what we regard as traditional domestic industries. If we fail to see this fact, we will also miss out on the essence of it. There are many Japanese traditional foods made of foreign-grown ingredients, and soba is one of the best known examples. Now is the time, I think, that we Japanese must face up to reality and accept the situation fairly and squarely.

In Miyagi Prefecture where I live, there are the very famous traditional Shiraishi Umen noodles, which are simply made of water, salt and flour. These noodles, with some 400 years of history behind them, are among Miyagi's signature traditional local foods. The most suitable flour for this noodle is ASW, Australian Standard White, the flour produced in Australia. This is just one good example among many others where we acknowledge Japan's involvement with foreign producers, in terms of our daily food.

The earthquake blatantly exposed Japan's food system bottleneck

From this viewpoint, I cannot help thinking that the Great East Japan Earthquake gave us an opportunity to face up to the cold-blooded reality that we have various problems not only in our food systems, but also in many other blind spots that we have been refusing to think about or procrastinating in our response to, even after becoming aware of them.

In other words, this Great East Japan Earthquake not only revealed the most basic factors of our social life – including people, goods, money and information – but it also exposed what was “the unspoken precondition with no grounds” in the existing social systems that we have built up over the past decades.

And as for the individual supply chains, such as in the food systems, the earthquake shone the light of day on the most vulnerable parts and revealed the bottlenecks in production, processing, distribution and consumption in

the market.

Let's take a closer look at this matter.

Blind faith in security

The Japanese archipelago is located in a pretty complex spot on the earth from the point of view of the earth's crust. Japan is said to be "located in the collision zone of four plates among the dozen or so that cover the earth's surface, and is the epicenter of 10 percent of the earthquakes greater than magnitude 7.0 that have occurred in the past 90 years, some 900 in total."[1] Furthermore, according to the Japan Meteorological Agency, there are 108 active volcanoes in Japan out of around 800 worldwide, and 18 of them, nearly 20 percent of all the active volcanoes in Japan, are located in the northeastern region.

All of this drives home a simple fact, that despite Japan's affluence, pleasant climate and natural beauty, it is also vulnerable to frequent earthquakes and is situated in a very volcanically active area of the earth.

As we have been experiencing frequent aftershocks of the Great East Japan Earthquake, we all know that there is no place in Japan that is immune to earthquakes. Not only those who are engaged in the food and agriculture industries, but also managers and employees in every industry as well as consumers should acknowledge this reality with a cool head.

Torahiko Terada, Ph.D. was a physicist who lived in the late Meiji era and early Showa era. He clearly referred to this fact in 1934, nearly 80 years ago.[2]

He pointed out, "… since Japan is at the mercy of very special environment in meteorological terms as well as geophysical nature. Therefore, we should never forget even for a moment that we are fated to live under constant

[1]URL: http://www.zenchiren.or.jp/tikei/index.htm (the website of the national geo survey Association accessed on July 3, 2011)
[2]"Tensai to Kokubo (Natural Disasters and National Defense)" by Torahiko Terada. Chikuma Shobo, the 2010 version, pages 440-441

threat of some special convulsion of nature." In addition, he also said, "It is so obvious that there is no need for me to remind you that we should prepare for the worst while things are going well, and very sadly, only a few facts in the world can be forgotten so utterly as this one." It is worth paying sincere attention to the lessons gained through history and the wisdom of our ancestors.

Bottlenecks in our Food System

One of the biggest problems revealed after the Great East Japan Earthquake was that the scale of interdependency built up between Japanese industries and their partners all over the world, through the progress of globalization, was way beyond our assumption.

It was rather symbolic that the disaster in northern Japan also hit the automobile production plants in the U.S., and the scale of such interdependency was also beyond our assumption, if not beyond the awareness of industry insiders. Let me digress a little bit here. The northern Japan region is not only the final production base for manufacturing Japan's flagship products, such as automobiles, electric appliances, semiconductors and digital cameras, but it is also a concentrated area of leading mid-size manufacturers of essential parts for those major products.

The region also is producing materials used for manufacturing steel surface processors and circuit boards, as well as publishing and printing, so the impact of the devastation in this region spilled over to many fields including plywood panels, newspapers, printed flyers, automobiles, home electric appliances and construction materials. The damage here was again beyond our expectations. According to an article in the Asahi Shimbun on March 29, 2011, the production of zinc, the material for galvanizing steel sheet used for automobiles and roofs, was reduced by 70 percent compared to the pre-earthquake level, since the top three manufacturers stopped their operations, and the production of copper dropped to a level that could fulfill only 60 percent of domestic demand.

In the next section, I will pick three characteristic bottlenecks in Japan's

food system that was exposed after the earthquake. Each of them has a lot in common with many other industries, but these three bottlenecks present typically important components for the food system in Japan.

Wrong preconditions – business models designed only for normal operations

I dare say this despite a possible misunderstanding – I think those engaged in farming and fishing have been better prepared mentally for the disasters to a certain extent, than others working with other food systems, because farmers and fishermen have long been exposed to various unusual situations such as cyclical heat waves and cold weather damage. It is true of course that the scale of the disastrous March 11 earthquake hugely exceeded the mental preparedness of ordinary people both in size and impact. Nonetheless, those primary agricultural producers have known the cruelty of natural disasters through their real-life experiences much better than people working in general manufacturing or service industries.

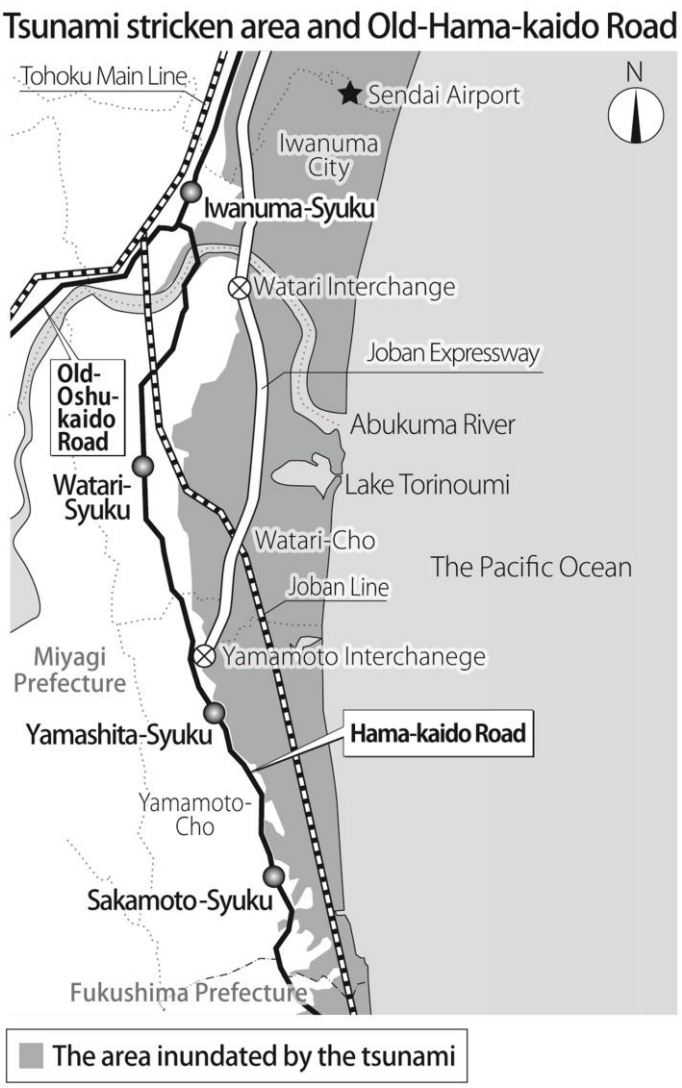
The problem here is that in each later stage of the food system beyond farming, such as production, processing, distribution and retailing of agricultural products, people have given little thought to those possible situations where everything gets wiped out in the blink of an eye.

The fact is that, except for those who have actually experienced a tsunami or great earthquake in the past, or those who have regular contact with such experienced people, everyone in both the public and private sectors has continued to pursue economic development focused only on productivity, streamlining, convenience and investment efficiency. These goals for firms and institutions are only possible on a normal basis. We cannot deny the possibility that this mindset made the damage much worse.

Torahiko Terada, the previously mentioned physicist, also pointed out in his book, "… as civilization advances, this comes with an increased degree of violence in the devastation that natural disaster's tyrannical power brings about," and his point is more worth listening to now than at any other time.

I would like to show you another intriguing example of the excellence of

ancient wisdom.



The Kahoku Shimpo article can be viewed at:
http://www.kahoku.co.jp/spe/spe_sys1062/20110425_17.htm

The map above appeared in the April 25, 2011 issue of the Kahoku Shimpo, the local newspaper distributed mainly around Sendai City, Miyagi Prefecture, and its headline was, “Ancient wisdom prevented inundation; Hama-kaido in Southern Miyagi Prefecture.” The map is based on research by Professor Arata Hirakawa of Tokoku University. As the map shows, the

old Hama-kaido road extends around the Abukuma River just west of the inundated area (dark shadowed part) where the tsunami after the Great East Japan Earthquake struck. This old road was spared not by accident, but by the ancient wisdom gained through our ancestors' experiences. We may have forgotten the valuable lessons of history and built too much on landfill recovered from the sea, in the pursuit of economic growth and enhanced living standards.

Just as the familiar coastal line on the map, the food system that we have built worked quite effectively during normal times, and it was actually working before March 11, but it was suddenly reduced or shut off in our time of emergency.

Right after the earthquake, national restaurant chains, fast food restaurants and convenience stores in the affected areas had to halt their business. These chains have become the symbols of our dietary habits. Thus, if we understand who helps and supports the diets of the victims in the devastated areas, we will take a step forward toward figuring out a new food system.

Supply and demand for food in an emergency

Now I would like to point out some very important facts that we may easily overlook due to the huge number of victims (15,824 deaths, 3,824 missing persons, 5,942 injured as of October 18, 2011, according to Cabinet Office data).

Needless to say, food is something to eat. As long as the beneficiaries of the food are living humans and animals, we must thoroughly examine how the food was provided to the surviving evacuees, and we must clearly remember that.

The Cabinet Office published a report as of May 13 on the amounts of major relief supplies delivered during the 41 days from the day of the Great East Japan Earthquake through April 20. According to that data, the total stable supply, including bread, instant noodles, rice products such as onigiri rice balls, rice cakes and packed cooked rice, polished rice and other canned food,

amounted 26.21 million servings.

Emergency relief supplies (Cabinet Office data May 13, 2011)

Category	Item		Amount
Staple food, water		Bread	9,391,373
		Instant noodles	2,557,730
		Onigiri rice balls, rice cakes, packed cooked rice	3,501,074
		Milled rice	3,357,313
		Other (canned food)	7,401,744
		Sub total (Unit: serving)	26,209,234
		Drinking water (Unit: bottle)	7,937,171
Daily necessities		Toilet paper rolls	379,695
		Blankets	409,672
		Diapers	395,521
		Non-prescription drugs	240,314
		Surgical masks	4,380,442
Fuel		Fuel (liters)	16,031,000

*The results shown above were procured and delivered by the Japanese government, and the relief supplies were continually provided by the prefectural governments.
*These figures are for relief provisions for disaster victims from March 11 through April 20 implemented by the relief team. From April 21, the relief effort was taken over by the prefectural governments.

In addition, 7.94 million bottles of drinking water were provided as relief supplies. (These are the figures for state-provided supplies. Supplies provided by municipal bodies were counted separately.)

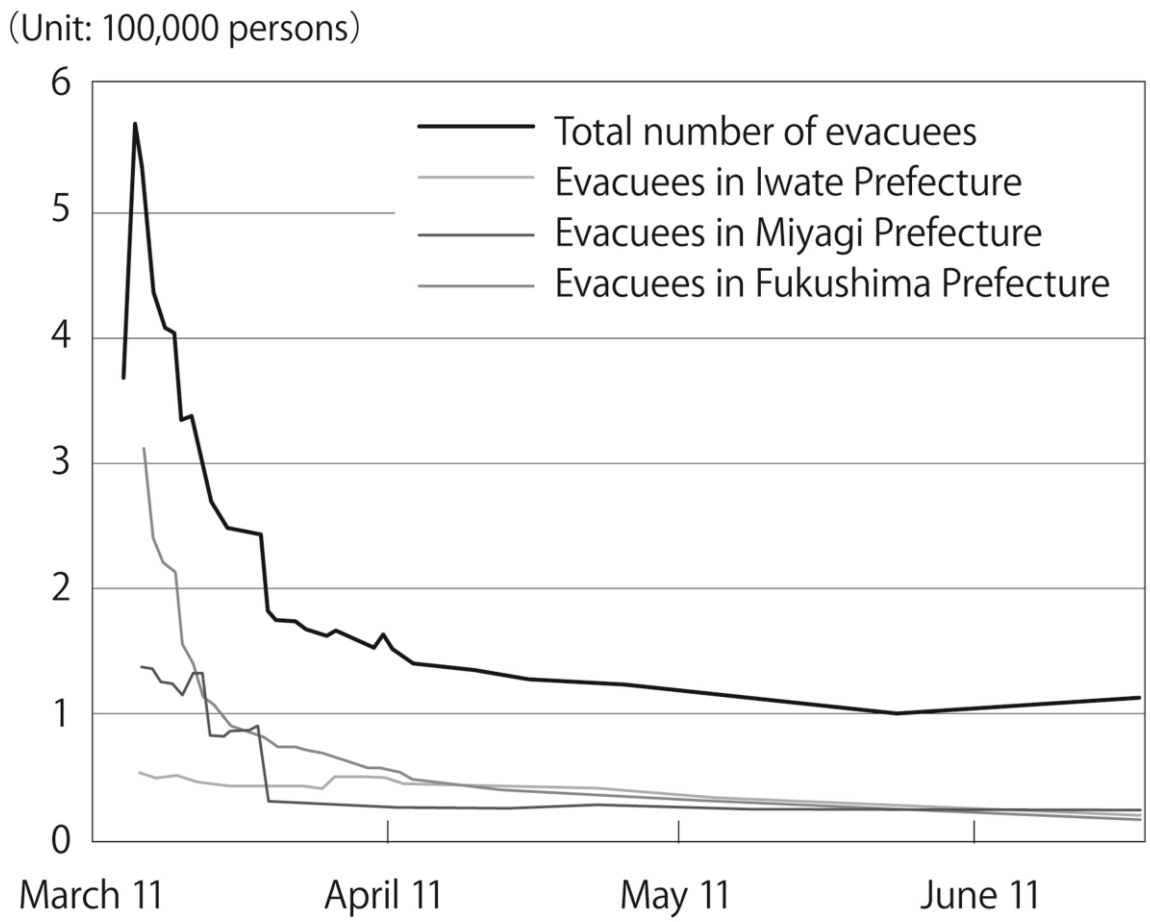
If one person ate three times per day, then 26.21 million servings would feed 8.74 million people for one day. Now let's figure out how many evacuees there were during the above mentioned period.

The line chart below shows the change in the number of evacuees based on

data from the Asahi Shimbun newspaper, but details were omitted due to limited space. It was reported that about 570,000 people in total took shelter in evacuation centers on March 15, soon after the earthquake. That was the peak number, and the number of evacuees gradually decreased, to about 400,000 one week after that, then to some 250,000 after two weeks, to 170,000 by April 1, three weeks after the earthquake, and to some 130,000 by May 2. There were still about 100,000 people in shelters on June 2 and some 110,000 in early July.

As food is a daily necessity, what matters is the cumulative total of evacuees. The total cumulative number of evacuees for the 38 days from March 11 through April 18 is about 8.48 million. Interestingly enough, this number almost matches the previously calculated number of total supplied servings (enough for 8.74 million people).

Number of evacuees after the Great East Japan Earthquake



＊ The figures for March 14 and 15 are only the total numbers. The figures from March 16 through April 18 are numbers announced by the Asahi Shimbun newspaper's morning edition. After that, the graph was created by the author based on numbers from April 23, May 2 and June 2 and 28 provided by the Asahi Shimbun newspaper.

For the 40-day period after the earthquake, it is safe to say that the supply and demand for food was almost balanced as far as the total number is concerned. Again, supplies provided by individual municipalities are counted separately.

Logistics

On the other hand, predicaments at the disaster-hit areas started to spill over through the newspaper headlines, starting right after the earthquake. One headline read,"No water, no milk, no food - why not delivered?" Other headlines declared, "Everything is desperately scarce, disruption from damaged roads" and "Food piles up in front of municipal offices, no manpower to deliver" (The Asahi Shimbun, March 17, 2011). Apparently relief supplies were abundant, but the roads and transport infrastructure were cut into pieces and blocked delivery to the disaster-affected areas.

In fact, it seemed that the demand met supply as a whole in the medium run, but supply shortfalls were extreme in the short term or in particular local areas. Those who were engaged in delivery or transport of relief supplies immediately after the disaster must remember very clearly how messed up things were. Sometimes the demand and supply meet on paper, but in practice there is a huge imbalance in certain areas and times. I hope you will remember that such a situation in the food supply is repeated everywhere in the world almost every year.

The main agencies responding with food assistance and rescue activities in the areas most severely struck by the earthquake, tsunami and nuclear power plant accidents were the Self-Defense Forces (SDF), the Fire and Disaster Management Agency, the Japan Coast Guard, the U.S. Military in Japan as well as other assistance forces from abroad. In particular, the SDF deployed more than 100,000 members at maximum and dedicated themselves selflessly to the relief, rescue and assistance activities literary all day and all night.

To put it more precisely, in the face of national crisis, private corporations and food companies with nationwide supply chains had to devote their

resources to confirming the safety of their facilities and employees, as well as recovery efforts. They could not operate their normal business in the disaster areas. In the areas spared from disaster, these private companies made special efforts to meet increased demand via intensified production to meet both the usual and the additional emergency demand. But the transport infrastructure to the disaster areas was disrupted, so the goods weren't delivered any further than the companies' undamaged major distribution bases. Therefore, the bottleneck I mention here is logistics.

Before the Great East Japan Earthquake, the food industry, including food manufacturers, had been promoting streamlining and rationalization at the maximum level nationwide, even throughout the world, for the sake of a more efficient supply chain, whereas restaurants, takeout food chains, convenience stores and fast food restaurants could offer a uniform menu only because their suppliers provided a certain standard of ingredients from around the country. But the earthquake drastically changed the circumstances of the food industry and forced these retail food companies to review their business model, which was designed in principle only for normal progress and efficient supply chains.

Foodservice Industry Research Institute issued a report in 2005 showing that 43 percent of what we eat is cooked outside of our home. This means the ratio of home-prepared food is getting less, whereas eating out or taking out cooked food is increasing. Thus, if food industries shut down completely for some reason, many of us would certainly suffer.

Reviving mom and pop shops

Right after the earthquake, when a number of leading food companies were completely dysfunctional, was it really true that many disaster victims could eat only the emergency relief food supplies delivered by the SDF and other rescuing agencies? This time, the disaster-affected area extended over a very large space of some 500 km north-south and 200 km east-west. Some places like Minami Sanriku-Cho in Miyagi Prefecture suffered a catastrophic damage, and many other places suffered overwhelming damage even though they were not as severely damaged as Minami Sanriku-Cho. In such

circumstances where supermarkets, restaurants and convenience stores were not open at all, how could those people get their food if they did not get SDF assistance or were not staying at the evacuation center?

It is risky to lump all disaster-struck areas together and call them quake-hit areas in one simplified way, because the impact on the food system depends on the degree of the disaster's severity. Interestingly, systems in general are more apt to expose their problems when halfway destroyed rather than completely destroyed. If a system is completely destroyed or if everything is lost, the system can be rebuilt from scratch, but in the case of halfway destruction, people work most effectively in their efforts to make the best use of the remaining parts of the damaged system and to minimize the loss, as well as the costs. One example that gave us a useful hint was presented by conventional shopping streets in the central zone of Sendai City and in Taihaku-Ku of Sendai City, where I live. These areas were struck by the earthquake but not the tsunami. Nevertheless, most big supermarkets, convenience stores and fast-food restaurants were completely dysfunctional right after the earthquake. Thus, people in these areas had to take actions on their own to secure their food supply.

There were exceptional cases where certain firms with their nationwide networks procured materials and processed them outside of the disaster-hit areas to concentrate products in specific stores in the specific regions of the disaster zone so that the most devastated victims could be served. One firm (Company A) concentrated its product supplies in stores in central Sendai, whereas another (Company B) concentrated its products at stores in the most damaged areas.

However, these results are related to the corporate policy of individual firms, so it is not our subject matter here. Instead, I would like to mention what actually happened in the halfway damaged parts of the existing food system.

With such devastation, many people who didn't rely directly on SDF relief supplies (including myself) were provided by the old-fashioned small shops that tend to be marginalized under ordinary circumstances by leading large-scale operations. The local small firms, so-called mom and pop shops,

had a chance to shine, temporarily.

Re-evaluation of the role of complementary players

As familiar supermarkets and convenience stores were all closed, local small shops with a short supply chain but with a long history of face-to-face customer relationships, attracted long lines of shoppers who were in desperate need for food day after day. Among such small shops, many drinking places that usually don't offer daytime service sold packed snacks at make-shift setups in front of their shops.

Many people who went out in search of food in Sendai City a few days after the earthquake witnessed such flexibly responding services, but this valuable fact was apparently forgotten once the big operations resumed their business.[3] And such phenomena can positively affect the conventional win-or-lose competition between nationwide big-scale chain stores and local small shops in the future. In strategic management theory, there is a concept of "complementary producers that provide complementary goods/services to customers, or sellers who provide complementary resources to suppliers."

It is possible to regard the actions of local small shops as purely humanitarian or altruistic in nature, or it could be the result of opportunistic ambition in the absence of powerful rivals. But I think there is lots of potential in that case, and both major chain stores and local small shops can learn from this experience of disaster in order to rebuild the local food system. If big-name stores don't forget the fact that their customers were supported by local small shops when they were incapable of continuing their business, they can seek a way to coexist rather than continue relentless win-or-lose competition. That must be what is most required now and in the future.

Important viewpoints to include in reconstruction plans

[3]Professor of Miyagi University, Dr. Tamotsu Kawamura, a colleague of the author made a presentation titled, "The role of mom & pop shops in supplying food after the Great East Japan Earthquake in Sendai City," at the Food System Research Association of Japan Convention in 2011.

What food system should we construct now that we have experienced the Great East Japan Earthquake? This issue is closely tied up with Japan's future food system, too.

I summarize my conclusion briefly below.

Now it is getting to the time when we should face up to the reality surrounding food and discuss the issues openly. For that, there are at least three essential points.

First, we should earnestly discuss, based on reliable numbers and tested scientific technologies, whether Japan's 4.61 million hectares of farmland is truly enough to grow agricultural produce to feed the entire population. It is important for all of us as a nation to understand the true situation, not based on hopes and delusions but on the actual facts.

This step is like a health check-up for us so that we can understand the status quo. It may be pointless to discuss the potential of 100 years or even 200 years in the future and to weigh their positive and negative sides without discussing the solid facts based on actual human and corporate behavior.

Second, based on the first step, we have to construct a mid-term to long-term grand design for which policies to implement and how long it should take in order to enhance our domestic agricultural production as well as to sustain essential imports.

In this stage, we should thoroughly review not only what Japan's has experienced, but also foreign examples of disaster recovery in nations that suffered the same type of disaster as Japan. It is also important to ensure that our restoration scheme and its specific implementation measures should be coherent with international trends. I think the Great East Japan Earthquake involved three major disasters: earthquake, tsunami and the nuclear power plant accident. At present we face many issues, but the strongest impact on our life is the probability of the recurrence of earthquakes and the ways of handling nuclear power plant accidents. It

wasn't our choice to get in this bind, but it is true that Japan has to be responsible for cleaning up the damaged nuclear power plants for quite a long time in the years to come.

If a well-designed plan is carried out for the coming decades, it will inevitably be closely intertwined with Japan's food and agricultural development as well as environmental issues. The effects of radioactive substances scattered in the atmosphere and ocean cannot be handled only by the Japanese government domestically. Neighboring countries and the entire world are stakeholders in this issue now.

Given the rise of interdependency, the following things are needed to make arrangements and agreements with multiple stakeholders: Strong scientific knowledge and technologies, as well as procedures and decision-making governed by mutually agreed rules. On top of that, we need negotiation skills developed based on knowledge, technologies and rules. Japan has to make a grand design that will take every element into account.

Urgent action is needed, but thorough investigation of the food system is also needed

Third and last: The lessons are very clear for individual corporate management and government officials. They must thoroughly investigate the precedents both within Japan and overseas, and they must track down which parts of the food system are most fragile, especially the supply chain. They must address these bottlenecks very urgently.

When carrying out their investigations, officials must figure out not only what to do, but also what not to do, by reflecting on the lessons of the past.

It is not wise to restore systems that had evident shortcomings and fragility without fixing them. Therefore, scholars and researchers, including myself, bear social responsibility to clarify the problems that arose from the way food systems developed in the past. We must view these issues as a whole and then come up with viable solutions most urgently. I make this suggestion partly out of my own soul-searching.