

Damage Report

Asian Rural Institute

Tochigi, Japan

Report of damage sustained in the Magnitude 9.0 Earthquake, March 11, 2011 and subsequent aftershocks

Updated April 19, 2011

Overview of Disaster

On March 11, 2011 a magnitude 9.0 earthquake occurred in the coastal waters of Northern Japan triggering a massive tsunami. Both the earthquake and tsunami caused extensive destruction and it is estimated that as many as 25,000 people were killed. The tsunami also knocked out the power to the cooling systems at a nuclear power plant located on the coast in Fukushima Prefecture. Even though the plant had shut down, the fuel rods in four reactors overheated due to the lack of functioning cooling systems. This caused extensive damage, including several explosions, and radiation was released into the atmosphere. Efforts to stabilize the reactors and stop the radiation leaks are ongoing. Presently the reactors are still emitting radiation.

Affect on ARI

Earthquake - The earthquake shook the ARI campus violently. Buildings shook, windows broke, books and bookcases tumbled down, dishes shattered; there was damage and utter mess everywhere. However, we are deeply thankful that no one was injured. Everyone was able to get outside or under a desk or table for cover. It was a traumatic experience, however, especially for those who were not able to get outside. The following day, cleanup efforts began, though we often had to evacuate when aftershocks hit. Later in the day, news of the nuclear power plant damage caused cleanup efforts to stop until we could reassess the situation.

Radiation - ARI is located about 110km from the nuclear power plant. The government issued an evacuation order for people living within 20 km of the plant and advised people living within 30km to stay inside. While ARI is far outside these perimeters we fully understood that we too would be affected by the radiation from this nuclear plant. We began to keep an hourly report of radiation levels in the air. The radiation in our area peaked at 1.7 microsieverts on March 15, but has been steadily decreasing. It currently stands at about 0.20 microsieverts. We have been told that these levels are not dangerous, but we try to limit our exposure outside nevertheless. Volunteers, children, and spouses of staff evacuated immediately after the accident, from the beginning of April they have begun to return.

About one week after the accident the government started to detect higher than usual levels of radiation in the water in Northern Japan and even in Tokyo. In our area tests have showed levels as high as 13 Becquerels of iodine 131 per liter, which is considered safe according to Japanese government standards. We need to continually monitor the radiation in the air and water as weather conditions such as wind direction and rain can cause this to fluctuate. We are also concerned about the soil. The regional government to declared that the soil in Northern Tochigi is safe for planting. We are also making efforts to have our soil checked independently.

Emergency shelter, food, water

Shelter – the day after the earthquake ARI set up a temporary office in the Nasu Seminar House. This facility is owned by the Student Christian Fellowship and is located about 300m from ARI. It was not damaged in the quake. The building has a kitchen, dining hall, and sleeping and bathroom facilities. It has served as our center of operations and community life since the day of the quake. We are extremely grateful to SCF for allowing us to use this building. Without it we would have faced much greater hardship.

Water – due to the loss of power after the earthquake there was no water available on the ARI campus. ARI gets its water from a well located on campus and without power the pump does not operate. However, the supply of water from the city was not interrupted and the nearest tap to city water is located just across the street at the house of Dr. Takami. He allowed us to use his water for our needs – most critical of which was getting water to the livestock. The Nasu Seminar House also gets its water from the city so we had no problem with water. When power was restored we again had access to water on the campus (though there was much damage to the water systems).

Food – Since ARI practices the philosophy of self-sufficiency we have plenty of food on hand. We have rice stores to last several months. We also had eggs, milk, and fresh vegetables in the field which we harvested right away. We did not have any interruption in our food supply and, in fact, we were in a position to help others. We checked on our immediate neighbors and shared our food with them. We also provided food to evacuation centers that opened in our area. The nearest one is housing about 150 people. We also serve as a reception point for food donations which are then distributed to evacuation centers. On weekends we have been going to visit neighbor farmers in Fukushima. We always carry food supplies along with us to give to them or others who may need it.

Physical Damage to ARI and Cost Estimates for Repair

Other losses or expected losses

(details for each item are included below the chart and photos are attached)

\$1 = ¥80

| Immediate Critical Repairs to be completed by May 2 – these are the minimum repairs necessary for the campus to be safe and operational | Rough estimate | Written estimate |
|---|-----------------------|--------------------------|
| Koinonia Dining Hall – Minimum Repair (total replacement necessary within one year) | | ¥3,800,000 (US \$47,500) |
| Water System – immediate minor repairs | | ¥336,064 (\$4,200) |
| Water System – major repairs (will require more time than May 2 target) | ¥4,000,000 (\$50,000) | |
| Women’s Dormitory (electricity, water, gas details check and repair) | ¥1,500,000 (\$18,750) | |
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| Men’s Dormitory – boiler for hot water | ¥700,000 (\$8,750) | |
| Main Building wiring repair, floor reinforcement, and shelving for library (total replacement of Main Building necessary within one year) | | ¥300,000 (\$3,750) |
| Main Building - prefab for library storage | | ¥300,000 (\$3,750) |
| Main Building – prefab for temporary office | | Donations offered |
| Pigpen temporary housing w/ water and electrical hookup (total replacement necessary within 6 months) | ¥200,000 (\$2,500) | |
| Equipment damage – rice storage containers | | ¥428,000 (\$5,350) |
| Equipment damage – computers | | Donations offered |
| | | |
| Total Immediate Critical Repairs (estimation) | | ¥13,064,064 (\$163,300) |

| Critical Rebuilding (within one year) The following major projects are necessary for future operation of the campus in terms of safety and regulatory requirement | Rough estimate | Written estimate |
|---|----------------------------|----------------------------|
| Koinonia Dining Hall – total replacement | ¥200,000,000 (\$2,500,000) | |
| Main Building – total replacement | ¥150,000,000 (\$1,875,000) | |
| Pigpen – total replacement | ¥2,000,000 (\$25,000) | |
| | | |
| Total Critical Rebuilding (estimation) | | ¥352,000,000 (\$4,400,000) |

| Food distribution for evacuees | | |
|---------------------------------------|--|-----------------------|
| Food donations (eggs, meat) | | ¥125,000 (\$1,562) |

| Other losses and expenses | | |
|--------------------------------------|--|----------------------------|
| Product loss for products in storage | | ¥153,000 (\$1,913) |
| Possible income loss for 2011 | | ¥24,443,000 (\$305,537) |
| Temporary relocation | | Estimating |

| Other damage (not critical to training program) | | |
|--|--------------------|--|
| Manna House (minor damage) | \$0 | |
| Farm Shop (not damaged) | \$0 | |
| Outdoor Stage and Seating (not essential) | ¥50,000 (\$625) | |
| Souvenir Shop (not essential) | ¥100,000 (\$1,250) | |

Immediate Critical Repairs

Repairs need to be completed in order to carry out our 2011 training program. We hope to have these completed by the beginning of May

The 2011 training program was due to begin the first week of April. We have decided to postpone the start by one month and have set a date of May 2. The following repairs need to be completed before we can start the program. We have already called in a building inspector and construction company, and they began working on repairs last week. They estimate that they can complete critical repairs within one month, however this will partially depend on the availability of building materials since there will be a huge demand for materials in the whole of Northern Japan. ARI has a previous working relationship with this company. They know our facilities well and we trust their judgment.

- 1) **Koinonia** – Two story building. Top story is kitchen and dining hall (for about 90 people). Bottom story contains chapel, computer room, conference room and recreation area. This building sustained the heaviest damage. The building inspector has recommended that only minimal temporary repairs are made to the building in order to use it for the 2011 training program and that the whole building should be replaced within one year. He suggests these temporary repairs be made only to the dining hall and kitchen, and the whole bottom story be closed off. He believes that a thorough repair would be costly and a waste of money because the frame itself has been compromised and subsequent aftershocks continue to weaken it.

Minimal repair necessary for use in 2011 ¥3,800,000 (US\$47,500)

Written estimate from the construction company (translated from Japanese)

| |
|---|
| This quote is for the minimum repair work in order for ARI to do be able to use the building for its training program in 2011 |
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- | |
|---|
| <p>1) Breaking-down of the dangerously affected areas in the interior of Koinonia Removal of the ceiling and walls in the dining hall Dismantling the downstairs rooms. (Chapel is off limits.) ¥1,500,000 (US\$18,750)</p> <p>2) Repair & reform work of interior (Minimum work in order to assure safety) ¥840,000 (US\$10,500)</p> <p>3) Glass window panes (for all broken windows on the campus) ¥810,000 (US\$10,125) We may not be able find replacement for the glass panes by the staircase since it is very large. We may have to fit a plywood board in there instead. We have ordered the sash, but it may not come. In such case we will substitute it with something else.</p> <p>4) Electric wiring ¥650,000 (US\$8,125)</p> |
|---|

2) **Water System** – ARI draws its water from a well situated on the upper part of the mountainside. The earthquake caused numerous ruptures to pipes throughout the campus and all minor repairs have been made. The main line from the pump station to the main building and Koinonia dining hall is not in good condition, however, and it is recommended to replace the whole line.

Immediate minor repairs ¥336,064 (\$4,200)

Major repairs ¥4,000,000 (\$50,000)

3) **Women’s Dormitory** – Two story structure with capacity for 30 people. Damage to this building was minimal. The west end wall separated slightly from the adjacent walls. Cracks can be seen in the end rooms on the first and second story (rooms 105 and 205). Detailed safety checks and repairs need to be made to the electrical, water, and gas systems. Estimated cost ¥1,500,000 (\$18,750).

4) **Men’s Dormitory** – Two story structure with capacity for 40 people. This building remained largely undamaged. Detailed safety checks and repairs need to be made to the electrical, water, and gas systems. Estimated cost ¥1,500,000 (\$18,750).

Boiler - Additionally the boiler for the hot water heater was damaged and needs to be replaced. Replacement boiler costs ¥700,000 (\$8,750).

5) **Main Building** - Two story building: administration offices, reception, library, classroom. In order to continue using the main building for this year’s program the building inspector suggested we reorganize how the rooms are used. Primarily he recommended moving the library from the second floor to the first floor. We also need to arrange for the classroom to have two exits instead of one. We are in the process of moving the library but first we need to reinforce the flooring and make some electrical repairs. We also have to be sure our bookshelves are strongly braced. Cost ¥300,000 (\$3,750)

- 6) **Temporary prefab buildings** – Three small prefabs have been set up near the main building. One was a donation, one was a temporary donation, and one was purchased. These are being used to store our stock of sales products (carrot juice, soy sauce, handicrafts, etc.), books and materials from the library, and one building is serving as a temporary office for the farm staff. The cost of the purchased prefab was ¥300,000 (\$3,750)
- 7) **Temporary Pig Pen** – We need a place to keep our pigs until the new pigpen can be built. The idea is to purchase a greenhouse frame and modify it to hold pigs. This can be done relatively cheaply and easily. In the future this frame can be used as a regular greenhouse for growing vegetables. The cost for the greenhouse and connecting water and electricity is roughly ¥200,000 (\$2,500)

Equipment Damage

- 8) **Rice Storage Containers** – containers for long term rice storage
10 containers were knocked down and damaged.
Cost for replacement containers ¥42,800 (\$535) each / Total ¥428,000 (\$5,350)
- 9) **Computers** – several computers in the offices and in the computer lab were knocked to the floor. The extent of the damage to these machines is not yet known. However, the American School in Japan has offered to donate several computers that are used but in good condition.

Critical Rebuilding (within one year)

The building inspector has suggested that we replace the following three structures on campus. With the minimal repairs mentioned about he said that we would be able to continue to use them for the remainder of this year, but it is best to rebuild them as soon as possible. It would be a waste of money to invest in renovating them because the frames and foundations are weak. All three buildings are critical to our operations.

10) Koinonia Dining Hall

The inspector stated that the frame of the Koinonia House was twisted during the earthquake which weakened it. Particularly troubling to him was that the anchors at the base of the frame have become loose. (To get a picture of this situation, imagine sticking a pencil upright into a mound of clay, then wiggle the pencil around a little and you will see that it no longer stays upright and sturdy). Another problem is that the land beneath the building has subsided. Large cracks can be seen where the floor is separating from the walls. The inspector does not believe the building is in a state of imminent collapse, but he recommends to minimize the use of it and to replace it as soon as possible, as it would be especially unsafe in the event of another earthquake.

The cost of a new building of similar capacity he roughly estimated at ¥200,000,000 (\$2,500,000)

11) **Main Building** – The initial quake created numerous cracks in the walls in many different areas. The frame was not contorted in the same way as the frame of the Koinonia House, but it was weakened. Aftershocks have caused the cracks to grow larger and new ones to appear. With some repairs we should be able to use the building for the rest of the year, but the inspector recommends that it be replaced as soon as possible. As a precaution he suggested we move the library off the second floor of this building. We have moved our products and farm staff offices out of the main building into temporary prefabs and we are now in the process of moving the library to the first floor.

Estimated cost ¥150,000,000 (\$1,875,000)

Note: Capital Campaign from 2008 ARI has been carrying out a 5 year capital campaign to raise money to rebuild the farm shop at a cost of ¥50,000,000 (\$825,000) and the main building at a cost of ¥150,000,000 (\$1,875,000). Do date we have raised roughly ¥45,000,000, almost enough to build the farm shop. Construction was already started on a new farm shop due to safety concerns of continuing to use the old building.

Note: 2 buildings into 1 The building inspector raised the point that it would probably be more cost effective to build a single building that would house all the functions currently fulfilled by the Koinonia House and the Main Building. We are also looking in to this option.

12) **Pig Pen** – concrete pig pen connected to biogas system.

Water – The water pipe system is broken internally and water is not getting to the pigs. For a time we had to carry water by hand, but that has now been repaired (the costs are included under water systems repair).

Structure – The whole pigpen is in a slow state of collapse and must be torn down. Most of the pigs have been removed, but we are having trouble finding a place to keep the sows and newly born piglets. The building was rather old and after the first quake large cracks could be seen in the walls. Subsequent aftershocks have enlarged the cracks and dislodged some pillars. We would like to build a new pigpen together with a new biogas system which is somewhat smaller than our current system. We can do the construction ourselves but will need to purchase the materials. We hope to accomplish this within the year. Estimated costs ¥2,000,000 (\$25,000)

Food Distribution

13) **Food Distribution** – ARI has been distributing food to evacuation centers in the area and also to people in Fukushima who are close to the power plant. These foods were not purchased by us, but came from our own stores – our own farm products and items we had in storage.

As of April 9, 2011 the following items had been distributed.

From ARI Farm – eggs, pork, chicken, carrots, taro, sweet potatoes, onions. Rough value ¥124,800 (\$1,560)

Transportation – We have been using ARI vehicles and purchasing our own gas. Travel so far has reached about 1,000 km at a cost of roughly ¥50,000 (\$625)

Stored items – almonds, rice, oil, sugar, coffee, tea, chocolate

Note: From April 9th some churches in Tokyo began to buy ARI farm products and arrange to have them shipped to needed places in Tohoku. The churches are happy to buy from us rather than from stores in Tokyo because they feel they are helping both ARI and the tsunami affected people (and this is true!)

Note: As of April 19, 2011 ARI has received 112 packages of food and other needed materials which have been redistributed to local evacuation centers as well as to Fukushima.

Product Loss

14) Soy Sauce and Carrot Juice – These agricultural products are sold to generate income for the school. **Several cases of bottles were broken**

Estimated loss:

Soy sauce: 120 bottles ¥84,000 (\$1,050)

Carrot juice: 30 bottles ¥9000 (\$112)

Cookies: ¥60,000 (\$750)

15) Possible income loss for 2011

Soybean and wheat production – plans to increase soybean and wheat production for soy sauce may not be carried out due to the fact that more energy and human resources will have to be put into rebuilding. **Estimated loss to be calculated**

Loss of consumer confidence – even if our products are tested and guaranteed safe, consumers may not be willing to buy them for fear of radiation contamination. Products include pork, rice, cookies, jams, carrot juice, and soy sauce. **2011 budget estimate: ¥18,613,000 (\$232,662)**

Fee based short training programs and work camp groups – we may have to cancel or decrease the number of fee based short term training programs and work camp groups that we accept. **2011 budget estimate: ¥5,830,000 (\$72,875)**

Temporary Relocation

16) Temporary Relocation – the starting date for the 2011 training program has been set for May 2. However, work is still being carried out to stabilize the nuclear power plant and this will take time. There is great concern on the part of ARI about guaranteeing the safety of our invited overseas students. As a contingency measure we have decided to hold the initial part of our training program at the Theological

Seminary for Rural Mission in a suburb of Tokyo. They have kindly allowed us to use their facilities and we are now making arrangements to set up our training there.

Cost estimates for temporary relocation are being drawn up. Categories would include food, lodging, facility use fees, transportation.

Other Damage

Report of other facilities that were damaged. Repairs to these facilities are not essential to carry out the training program

- 17) **Manna House** – two story structure used primarily for food processing and food storage. Constructed in 2003.
Crack found between overhang on second story and main part of structure. No immediate repair is recommended.

- 18) **Farm Shop** – ARI's farm shop was a two story 38 year old used prefab building in very poor condition. Fortunately it had been torn down prior to the earthquake. Construction had already begun on the replacement farm shop, but fortunately, only the base had been laid. It can be said the earthquake was perfectly timed so that no one was hurt in the old farm shop and the yet-to-be-built new farm shop was not around to be damaged.

- 19) **Outdoor Stage and Seating** - The outdoor stage and seating was constructed by the ARI community of concrete block. Several areas have broken apart. This can be repaired by ARI in the future. Estimated cost for materials (cement and concrete blocks) ¥50,000 (\$625)

- 20) **Souvenir Shop** – a small souvenir shop that was constructed by ARI was dislodged from the foundation and critically damaged. For safety reasons it has already been dismantled. Replacement is not urgent. Estimated cost for materials ¥100,000 (\$1,250)