# WaQuAC-NET Newsletter

Water Quality Asian Cooperation Network

*http://www.waquac.net/english/*

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***For Safe Water, Do Network.***


**WaQuAC-NET Newsletter vol.20**

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## 1. Technical Q & A

**Q: Is EM (Effective Microorganisms) effective in order to reduce the water pollution of the river ?** (Ms. L.K. Thailand)

Effective Microorganisms (EM) was developed by Professor Teruo HIGA of Ryukyu University for improving the soil of agriculture in 1982. It is a name of microorganism material. Groups for promoting EM with Professor HIGA say that EM consist of lactobacillus, yeast fungus and photosynthetic bacteria mainly and it is used for fertilizer, purification of environmental pollution health promotion and so on. There are, however, arguments both for and against the effect of EM in Japan. This time, Mr. AKAISHI has answered based on his experience for a question from Thailand.

(Notes by Ms. YAMAMOTO)

***A:*** No, it is almost none effective. Many environmental groups tried to purify the river using EM-ball ten years ago. However, I have never heard that EM had effect for purifying the river water. Japanese government side makes a clear distinction from these groups.

In general, there are a lot of existing creatures in the river and lake. And they compete with each other. After you put on EM in this kind of environment, EM will compete with other creatures as long as it does not increase significantly under the circumstances.

For example, the doubling rate of E. coli which is growth rate is faster generally, is 20 minutes in an optimum culturing condition.

Therefore, it is unlikely that EM will be dominant species unless a lot of EM is sprayed in the environment which is isolated from the river such as river purification facility. In other word, I think it is difficult to purify the river even if you spayed a slight amount of EM in the public water area such as river which there is a lot of creatures.

Actually, local elementary school students sprayed EM in Fukuoka`s urban river, but it was not effective. Since citizens demanded improving water quality of this river, public administration decided to install the river purification facility and I made the basic design.

I have heard that EM was effective for water-purifier tank, because it was an isolated tank from natural water body and could be injected more than environmental capacity.

(***Mr. Korehiro AKAISHI***
***Akaishi Professional Engineer Office***)

## 2. Information of Oversea Member

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### *Ms. Soursdey from Cambodia joined WaQuAC-NET Year-end Party, 2013*

♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪ ♪

*Ms. Soursdey,* **from Cambodia**

Ms. Soursdey who is a laboratory staff of PPWSA, Cambodia, visited Yokohama Waterworks Bureau (YWWB) for observing and discussing recent activity of the laboratory on December 25. She had studied analysis method of water quality at YWWB for one month as JICA trainee in 2006. It was a visit in seven years. Now, she lives in Higashi Hiroshima City where located in the west of Japan for studying in master course of Hiroshima University. She is researching arsenic pollution of Cambodia. She will stay in Japan until next September.

Next day, on 26, she joined WaQuAC-NET year-end party which was held in Shinagawa, Tokyo. 12 members participated in the party. We talked and drank with Ms. Soursdey. It was a lively party and last activity of WaQuAC-NET in 2013.
(by Yamamoto)

## *Greeting card and mail*


Dear WaQuAC-Net members,
Thank for the wonderful wishes, and now is my turn to wish all of you a happy & prosperous year 2014.
*EK SONN CHAN*
*Secretary of State, MIME, CAMBODIA*

Dear Friend,
***Akemashite Omedetogozaimasu!!!!***
I am always afraid to enjoy the New Year, because we will be old and old and still not distribute enough of our knowledge, experiences and idea to the world in the field of water supply. However, for the New Year of 2014, I would like to wish you with success in your business, more and more money and especially good health.
*Long Naro, PPWSA, Cambodia*

Dear Waquac.net,
Thanks for wonderful wish.
Happy new year to all members.
*Pheng Ty, PPWSA , Cambodia*


Wishing Happy New Year to Every One.
*Dr. Chea Visoth, PPWSA, Cambodia*

Dear Waquac net,
Thanks a lot and I wish that Waquac-net will progress well and bring many benefits to all members of water family.
Happy new year!
*Tam HueWACO, Vietnam*

Sawasdee ka,
Bangkok is very cold today. It reminds me to a cold day with warm welcome from you all. Hope you all have a happy holiday, happy life, happy moment for good.
Always your Poo,
*Nisapas, MWA, Thailand*

Dear WaQuAC-NET Members,
Greeting Season !
Happy New Year
*Sochettra TANG MIME, Cambodia*

## 3. Activity in the world

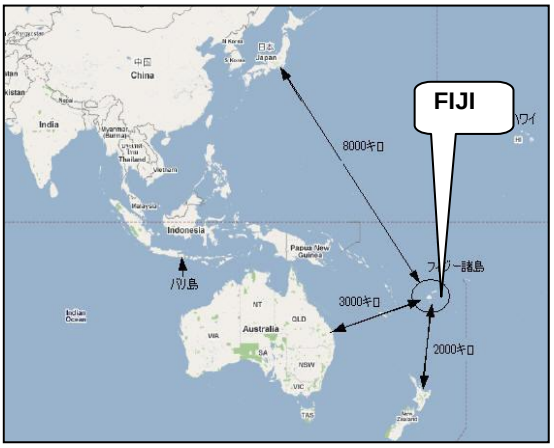
### Water Supply in Fiji & JICA Senior Volunteer Activities

*Mr. Hiroto ODA*
*(Former Director,*
*Fukuoka City Waterworks Bureau)*

**Preface**

I have worked and assisted for Nadi/Lautoka Region in Fiji as a JICA senior volunteer on water leakage prevention for two years from September 2010 to September 2012 after being retired from Fukuoka City Waterworks Bureau. So, I'd like to introduce the outline of Fiji, the water supply situation in Fiji, my volunteer's activities in Fiji and related matters.

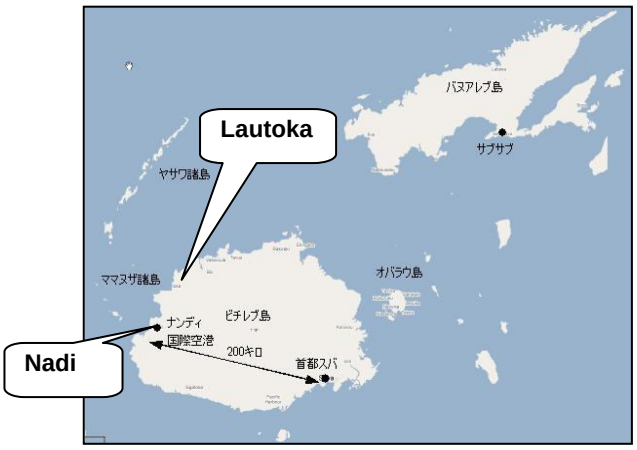
**1. The Outline of Fiji**




The Republic of Fiji is located 8,000 km away to the south-east of Japan, in the east of Australia, north of New-Zealand and west of the International Date Line. There is a time difference of 3 hours between Japan and Fiji. There are over 3 hundreds islands of various sizes in Fiji. The area of Fiji is the same as the Shikoku Island in Japan. The population of Fiji is 837,000 (2007), and 600,000 people live in the Vitilevu Island. Fiji is comprised of 57% indigenous Fijian, 37% Indian and 6% others.
Suva is the capital of Fiji and the biggest city. There are many 7 to 8-story buildings, government offices and business offices in the center of the town, and there are many upper-class residential areas in the suburbs of Suva.
Nadi is a tourist city, in which there are many hotels and business institutions. Denaurau which is a reclaimed land in the corner of Nadi, is the biggest resort area in Fiji. There are over 10 high-grade hotels, a golf course, tennis courts, marina and other tourist facilities. It looks far more affluent than other areas in Fiji.
Lautoka, in which I worked for two years, is an industrial city. There are the biggest sugarcane mill plant, a pine sawmill plant, flour mill plant, feed mill plant and a brewery.

**2. The Outline of the Water Supply in Fiji**

The water supply and sewerage in Fiji had been under the direct control of the Fiji government until 2009. But the Water Authority of Fiji (WAF) was set up in order to gain more efficient management for the water and sewerage along the plan of the Fiji government in 2010. Under the headquarters of the WAF, there are three regional offices, which are the Central & Eastern Regional office, the Western Regional one and the Northern Regional one. There are water supply systems in town,




but the people living in the villages use groundwater, stream water and rain water. People living in some high-grade resort islands are using water which is sent from Vitilevu island by submarine transmission pipe, or the seawater desalination system. There are some public sewerage systems in the big towns in Fiji. And the rain water drainage system is under the Fiji government's control. Water tariff is charged every 3 months.

Water tariff

| Domestic use/three months | |
|---|---|
| 0~50m$^3$ | 7.5 yen/m$^3$ |
| 51~100m$^3$ | 22 yen/m$^3$ |
| 101m$^3$~ | 42 yen/m$^3$ |
| Commercial use/three months | 26 yen/m$^3$ |

*It was converted as 1 fiji-dollar = 50 yen

The sewerage uniform rate is 7.5 yen/m$^3$ in the basis of water consumption.

The WAF has adopted the latest WHO Drinking Water Guidelines for the water quality standards in Fiji. The standard of free residual chlorine is 0.5 mg/L in Fiji although it is over 0.1 mg/L in Japanese water quality standards for drinking water. Therefore, chlorine of 1.3 mg/L is injected into the treated water in the water treatment plants (WTP) in Fiji. (The chlorination is used only in the WTP.

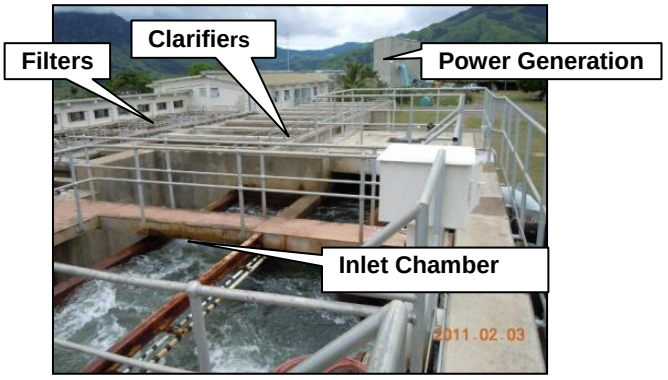
### 3. Nadi/Lautoka Regional Water Supply

The Nadi/Lautoka regional water supply utility, which was the place of my volunteer activities, had taken13,000 $m^3$/day from three small scale intake dams and 45,000 $m^3$/day from Vaturu dam until 2004. (Vaturu dam is constructed in 1982. The storage capacity is 23,500,000 $m^3$)

***Vaturu Dam***

*Capacity: 23,500,000 $m^3$,*
*Catchment area: 40 $km^2$*
*Dam type: Rock-fill Type,*
*Crest length: 297m*
*High Water Level: + 527m*
*The building in the upper left is water intake tower.*

From 1998 to 2004, Nadi/Lautoka water supply project was funded by Japanese government loans (¥2.2 billion) and Fijian government loans (¥1.9 billion). As a result, the quantity of water intake from Vaturu dam has been doubled (90,000 $m^3$/day) by the expansion of the raw water pipeline. Also, the total capacity of 3 WTP which are Nagado WTP (90,000 $m^3$/day: expansion), Saru WTP (4,000 $m^3$/day: renewal) and Buabua WTP (9,000 $m^3$/day: new construction) became about 103,000m3/d. They are supplying water to Nadi/Lautoka Region.




***Nagado WTP***

*・Designed Capacity: 90,000 $m^3$/day*
*・Chamber Water Level: + 175m*
*・Clarifiers: Lamellar Plates*
*・Filtration: Open Rapid Sand*
*・Hydraulic Power Generation:*
*By harnessing the water head from Vaturu dam ( +527m) to Nagado WTP (+175m), Station Capacity: Max. 2,600 KW*

The Japanese audit team has made an audit of the loan projects in the middle of March, 2011. Before the audit, I explained the outline of Nadi/Lautoka water supply situation to the Secretary of Japan Embassy, official of the Ministry of Foreign Affairs of Japan and staff of the JICA Fiji Office and showed them the facilities for their pre-inspection.

### 4. The Water Supply Situation in Nadi/Lautoka Region

Although there is a very big difference in elevation (up and down) in Nadi/Lautoka area,
the water is supplied by gravity through the many reservoirs from the three WTP. This caused the poor water pressure in the high elevation areas and excessive high pressure in the low elevation areas. Sometimes, overflow occurs from the reservoirs. Distribution pipes that had been adopted were the asbestos cement pipes (ACP). Although the polyvinyl chloride pipes have been adopted for distribution pipes (less than 375mm diameter) recently, the old pipes (ACP) are still used without scrapping these pipes. Therefore, there are many areas of water leakage and of intermittent supply or insufficient supply. According to the statistical data in Nadi/Lautoka, the accounted-for water rate is 50 % around.
There are many insufficient supply areas by low pressure at high elevation in rural areas of the northern Lautoka. The local staff and I worked energetically to settle normal supply in these areas. The problems of insufficient supply or low pressure supply were improved by controlling the outflow of the reservoir in the Buabua WTP, by controlling the

inflow and outflow of the downstream reservoir, by controlling the valves in the supply area, by confirming the water pressure at the main points and by repairing the water leakage points quickly. Thus, these areas were settled into the normal supply from past ten-year insufficient supply.
Incidentally, when we worked at the intermittent or low pressure supply area, some people were happy to get water at last. Then, they gave us hot and sweet tea with milk and ginger and cookies. Also, they picked and gave us fruit such as oranges and mangos from the trees in their gardens.

Happy family getting stable water supply
(My counterpart is standing behind the family.)

## 5. Overview of the Volunteer's Activities in Fiji

I'd like to sum up my volunteer activities in Fiji for 2 years. After I was assigned to the Lautoka western regional office, WAF in October 2010, I made a survey around and inspected at the water supply system in not only Nadi/Lautoka, but also, the other western areas. And, I arranged a work plan for the volunteer activities for two years. Then, I have continued working for two years along the work plan with the consent and understanding of the Regional Manager West and General Manager Productions in WAF.
As a result, the un-accounted for water loss in Nadi/Lautoka had decreased in 2011. ( 59 % ⇒ 39 % ) However, the un-accounted for water loss and leakage water in Nadi/Lautoka rose drastically due to the disasters in January and March, 2012. In this condition, all leakage repair teams in the western region gathered in the Nadi area, and concentrated on leakage repair. Thus, the awareness of the leakage control program has taken place in this region.

After these disasters, I also visited and inspected the sites of the damaged water supply facilities. Then, I informed the WAF staff about the damage situation. Furthermore, I suggested the measures for the early repair and restoration of the damaged water facilities. Especially, the emergent and temporary stream intake work at Ba (the neighboring town of Lautoka ) was carried out by my suggestion based on my experience of the droughts in Fukuoka city, Japan. This work brought high effectiveness, impact and motivation to the inhabitants in Ba and the staff of WAF.
Also, I arranged the teaching material of the water supply awareness for school children. Then I made presentations at some schools.
In this way, the staffs of WAF have understood and have gone ahead with learning how to start the leakage control program and the un-accounted for water loss control program.

*The emergency & temporary intake from the stream on the way to the raw water pipeline at Ba. (There is the generator in the left & upper part of the picture.)*

## 6. Conclusion

The Nadi/Lautoka Region is a very important area, which has two key industries, tourism and the sugarcane mill plant. So, the stable water supply in Nadi/Lautoka is most important for the development of Fiji. Therefore, I considered the needs of the project for technical cooperation to WAF to improve such a water supply situation in Nadi/Lautoka. So, I requested the JICA Partnership Project for WAF to Fukuoka City Waterworks Bureau. By the request, the budget for the project was given to Fukuoka City by JICA on October 2013. Now, consultation on a memorandum of understanding for the project is being carried out between the JICA Fiji Office and WAF in Fiji. (☆)

## 4. Activity in Japan

### East Japan Great Earthquake Three years will have passed on March 11, 2014

*Three years will have passed in March, 2014 since Great East Japan Earthquake occurred. WaQuAC-NET has monitored the restoration of damaged areas in the East Japan.*

*Restoration work at fishing port*

### Visit Ishinomaki Again

From November 8 to 10, we visited Mr. Tate who was dispatched to Ishinomaki District Water Supply Authority for assisting the rehabilitation work of damaged facilities. It was the second visit since we went there with 2 MWA staffs for observing the suffered areas in April, 2012.
( http://www.waquac.net/english/pdf/newsletter201206_en.pdf )
The purpose was to interview Mr. Tate and see the situation of restoration in damaged areas. Members of visiting were Mr. Sasaki, Ms Yariuchi and Ms. Yamamoto from Tokyo and Mr. Watanabe and Ms. Kawamura from Sendai.

Interview at Aeon Ishinomaki

Schedule was following

| | |
|---|---|
| 11/8 (Fri.) | Go to Sendai. Have a friendship party at near Sendai station |
| 11/9(Sat.) | One-hour trip to Ishinomaki by Mr. Watanabe car, Interview, observe the suffered area ; Center of city, Hiyori-yama, Kadowaki elementary school, Fishing port, Onagawa town, Hebita WTP<br>Ms. Yariuchi, Mr. Watanabe and Ms. Kawamura leave Ishinomai |
| 11/10(Sun.) | Continue visiting the suffered area ; Ogatsu town, Okawa elementary school, Mr. Sasaki and Ms. Yamamoto go back to Tokyo |

*(by Yamamoto)*

### Dispatch to Ishinomaki District Water Supply Authority

*Mr. Hirotaka TATE,*
*Kanagawa Water Supply Authority*

I have been dispatched to Ishinomaki District Water Supply Authority (IDWSA) from Kanagawa Water Supply Authority (KWSA) for 2 years From April 4, 2012 to March 31, 2014. IDWSA had requested the dispatch of supporting engineers for restoration to the countrywide water supply utilities through Japan Waterworks Association. I heard this request from my boss just after the night shift work on March 5, 2012. He said “Please answer to go or not by the evening of today”. Therefore, I accepted immediately. During the busy time of the end of the fiscal year, I moved to Ishinomaki on April 1, 2012 and then received the appointment letter on the

second day. I started my duties as a staff of IDWSA. Seven persons including me received the appointment letter on 2 April, 2012. After that, several short term and long term dispatched staffs were added, and total number of dispatched staffs became 14 persons at the fiscal year of 2012.

My duty in IDWSA is to implement a design and cost estimation of machinery works regarding transfer and restoration works of Hebita water treatment plant which is one of the disaster restoration works, and to implement a supervision of its implementation. Detail of machinery works are installation of new machineries (machinery of sedimentation and filtration, chemical injection, waste water treatment and pumps) and rehabilitation of existing machineries of water treatment plant (such as sedimentation and filtration machinery) and existing pumps of water intake facility, etc.

Regarding the design of machinery works, when I started to work at IDWSA, the basic design had been completed already and the detail design works were under implementation. Therefore I conducted the field survey and joined the discussion for the detail design. After the completion of the detail design, I started the cost estimation based on the detail design. It was a very hard work because of the big scale of works, and also I had to confirm the computer bags because the new cost estimation system just had been introduced.

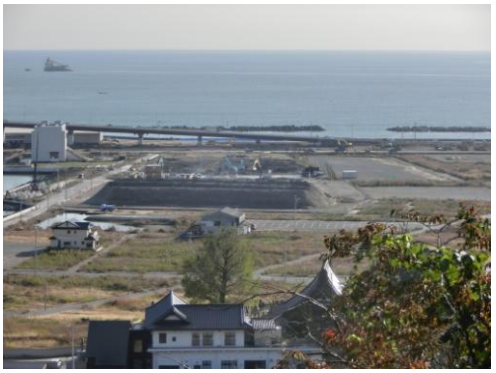
Tender and contract of machinery works and electrical equipment works (which were ordered together) were implemented on July 16, 2013, and then the construction of these works has started.

The transfer and restoration works of Hebita WTP are to transfer all functions of Hebita WTP which is a main WTP (rapid sand filtration system with 55,000m3/day) to Sueyama WTP (rapid sand filtration with 25,000m3/day), because Hebita WTP has damaged by the Tsunami and liquefaction due to the earthquake. Sueyama WTP is located on a hill and the ground is strong. And there are enough land where is prepared for the second expansion. The transfer and restoration works consists of construction works (civil and architecture), machinery work, electrical equipment work for the new treatment plant, and transmission pipeline work between Sueyama WTP and Minato distribution reservoir .

Through the dispatch to IDWSA, firstly I was so nervous to work as a temporary staff in the region where I did not know, and also I had never worked at the other water supply authorities such as by personal exchange. But, my worry disappeared immediately because people in Ishinomake accepted me warmly. However, at the beginning of the work, I had to learn the geography in the region, and to understand a regional dialect, therefore I felt as if I was hired newly for first time in years. And it was very fresh experience.

In addition, even though the same water supply authority, I had troubled to work in IDWSA because the way of works differed. These were difficult for me, as a dispatched staff, to grasp and understand the difference of interpretation
about quotation collection criteria and cost estimation (the standard unit price estimation table for sewerage design), and the difference of the views toward facilities, and then to proceed designs. Moreover, the supervision of construction works was also difficult when the construction had just started, because I had a lot of things to learn due to the difference of the supervision system and the way to deal with construction documents.

Finally, my dispatch period in IDWSA remains 3 months at the moment. Although the construction still needs 2 years and 6 months by the completion, my work period will finish on the halfway of the construction. Therefore I would like to handover my duties to a successor carefully in order not to affect the construction schedule due to insufficient handover.
I had very good experience in IDWSA. I could not have the experience such as the disaster subsidy application and the large scale new construction works in KWSA. I am thinking to use my experience effectively and contribute not only to KWSA but also many places through such as WaQuAC-NET activities. (☆)



# Reference Data

*By Mr. HIrotaka TATE*

**Brief summary of damage in the supply area of Ishinomaki District Water Supply Authority**

| | Ishinomaki city | Higashimatsuyama city |
|---|---|---|
| Wetted surface area | 73km$^2$（about 13.1% of whole city area） | 37km$^2$（about 36% of whole city area） |
| Maximum Tsunami height | no less than 8.6m（at Ayukawa, Ishinomaki city） | 10.35m (at Nobiru kaigan) |
| Completely-destroyed house | about 22,000 | about 5,400 |
| large scale half collapse house | - | about 3,000 |
| Half collapse house | about 11,000 | about 2,400 |
| Amount of rubble | about 6,160,000 t | - |
| Population before earthquake | 163,602 (Feb. 2011) | 43,142 (Mar. 2011) |
| Population after earthquake | 151,040 (Oct. 2013) | 40,330 (Oct. 2013) |
| deaths by earthquake | 3,266 | 1,042 |
| earthquake-related deaths | 246 | 65 |
| Missing person | 445 | 26 |

**Major Damages of Ishinomaki District Water Supply Authority**

Supply population：Before earthquake 203,841（2010） After earthquake 190,866（2013）

Supply households: 75,673

Households faced water outage：Soon after main quake 75，673(100%)

Recovered households：71,962（95.1%） Unrecovered households：3,711

**Damage of pipeline：**

Unrecovered households：3,711

| Type of pipe | Case/laying length | laying length |
|---|---|---|
| CIP | 0.48case/km | 41,873m |
| DIP (Earthquake resistant) | 0.00 case/km | 143,925m |
| DIP | 0.07 case/km | 739,042m |
| SP(welded) | 0.20 case/km | 24,851m |
| SP(others) | 1.99 case/km | 3,013m |
| VP | 0.21 case/km | 515,589m |
| others | 0.21 case/km | 93,074m |
| Total | 0.14 case/km | 1,561,367m |

**Damage of Sueyama water treatment plant**

Sueyama water treatment plan has started the supply since 14$^{th}$ March after earthquake because there was no damage on structural object.

**Emergency restoration of Hebita water treatment plant**

Hebita water treatment plant had received resumed power supply since 15$^{th}$ March, and partially started water supply on 17$^{th}$ March. The emergency restoration completed on 20$^{th}$ March, so the recovered supply capacity was 40,000 m$^3$/day from full capacity of 55,000 m$^3$/day. The repair of two sedimentation basins was completed on 21$^{st}$ July, then the capacity was recovered as 55,000 m$^3$/day.

## My Sentiment on Ishinomaki

***Kazuhiko Watanabe***
***Sendai City Waterworks Bureau***

There are two viewing spots around the top of Hiyoriyama hill. One is the view from Otorii that is the gate in front of Kashimamiko shrine. We see the Pacific Ocean spreading beyond the Hiyori Bridge across Kitakami River, a fishing port and many fish processing industries in front of Oshika Peninsula on the left hand, and the industrial areas including the large paper mill on the right hand. From a long distance, residential area that had spread at the foot of the hill has been totally cleared and the area turned into grasslands.

***View of the mouth of Kitakami River from Hiyoriyama***

Walking across the shrine and further into the hill, we arrive on the top of a cliff opening to northeast. It is another viewing spot overlooking Nakase island of Kitakami River. We can see the Comic Museum as a symbol of Nakase island, and a replica of the Statue of Liberty remaining in vain for some reasons.

In the spring of 2013, Ishinomaki Civic Center on the foot of Ishinomaki Bridge was dismantled. That is not the reason for damages by the earthquake, however it had been already decided closure of the Center in March 2011 because of aging. One oil painting named "Ishinomaki to develop" was decorated at the hall of the Center. The size of the painting is No.100 and it shows the view of Nakase island in Kitakami River looked down from Hiyoriyama hill. Nakase island is crammed with cranes of large and small shipyards and Kitakami River is bustling with many small fishing boats.

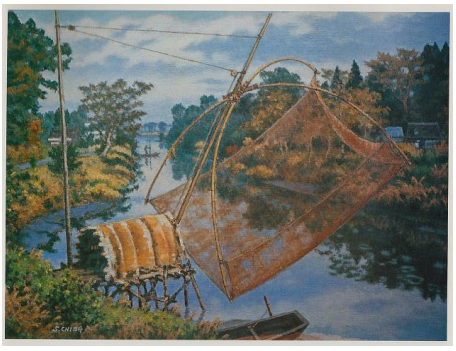
The painting was drawn in 1967 when the Center opened and also I was born. As the title shows, the painting tells us the elation during prosperity of 1960's.

***Nakase island with the Comic Museum***

It is confirmed that four paintings of the same artist were stored in Ishinomaki Culture Center which was devastated by Tsunami. Rescue team of the Japan Council of Art Museums collected the Tsunami affected arts and those are being restored by the support groups across the country right now. I, and especially my mother are looking forward to seeing the paintings again.

At Sue-yama, the construction for moving Hebita Water Treatment Plant from high risk area of tsunami is carried out at a rapid pace. The painter, Mr. Seizo Chiba was born in 1909 at Sue area where rural landscape was spread. Though he died in 1992, the images of the paintings by my maternal grandfather still remind me of living scenes of Ishinomaki vividly.

How would my grandfather paint Ishinomaki developed, if he could revive and take a paintbrush again someday?
I entrust the future to the reconstruction. **(☆)**



***"Yotsudeami (four hand net)" of my hometown"***
***painted by Mr. Seizo Chiba***

## Visiting Ishinomaki and Onagawa Seeing is Believing

***Ms. Kanae KAWAMURA***
***Sendai City Waterworks Bureau***

I'm very ashamed that it was my first visit to Ishinomaki and Onagawa in spite of living in same prefecture, Miyagi. I had heard damage situation in Ishinomaki and Onagawa many times, but it was difficult for me to imagine real damage because I wasn't familiar with these area. "Seeing is believing." is the exact word to describe my knowledge from this visit. In other words, I figured out the real situation in Ishinomaki and Onagawa for the first time.

Sendai, Ishinomaki and Onagawa are same "affected area", but they suffered different damage and they have each problem for the reconstruction. Particularly, in Ishinomaki, there is a few distance between a center of the city and the disaster hazardous area where people couldn't live because of large tsunami. So, there is little land for Ishinomaki people to reconstruct their livelihood in safety and convenience. I think I couldn't understand that situation without this visit. Additionally, in Onagawa, I looked over the city from the top of a low hill, but I didn't believe that tsunami had come here. Because I stood on the hill whose height was enough to look down three- storied buildings. How can we reconstruct the city to be able to fight against such a large tsunami? I didn't know the answer.

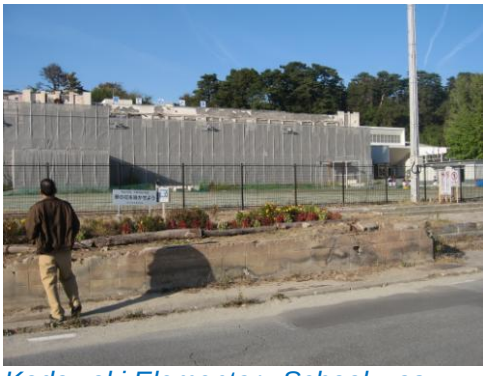
Furthermore, we could talk with local people there. At the bakery in Onagawa, whose "Sanma-Pan" (Brevoort Bread) was very tasty, shopkeeper told to us the situation of tsunami. We looked at the overturned building and listened to the talking at once, I felt real situation of impending tsunami in front of my eyes. It's going to be passed for 3 years; I realized that it is important to tell the experience to prevent the disintegration and to go, look and listen.**(☆)**

*Three-story building remains fallen down in sideways at Onagawa*

## Ishinomaki City, Ogatsu Town and Okawa Elementary School

***Mr. Shinichi SASAKI***
***Yokohama City Waterworks Bureau***

First time in a year, I came to Ishinomaki city and stood on the Hiyoriyama hill. I saw that a vacant land has spread out until the coastline. But I couldn't know clearly the situation of restoration because it was a distance view. There are buildings near the fishing port and I could see white smoke from the chimney of paper mill factory. I went down the hill by the car and went to Kadowaki elementary school. The building was covered by tent. In the ground, junior high school students had practiced the baseball.



*Kadowaki Elementary School was covered by tent*

Last year, there had been nothing in the port. But this year, there were many big squid-fishing vessels and seine fish boats. Around the port, there were many warehouses. And many people

carried boxes. The port seemed to have revived but the residential district did not start rebuilding.

***Ishinomaki fishing port is recovered liveliness***

After I had a dinner with Ms. Yamamoto and Mr. Tate, I went alone near Ishinomaki port. In Onodera-yokocho there were a lot of bars. The neon was shined. I went a second floor bar in a building which is “Tombo”. There were twenty seats and four or five customers. I guessed they were fishermen or construction workers.

Ms. Himeko was the name of owner and she said “Tsunami had come to this area. First floor was flooded and broken in a mess. And second floor bar could not open. She who was singing lost her relative by the Tsunami. Since many construct workers came to reconstruct the city, many bars increased in this area. So please drink for the assistance of reconstruction”. I thought that women were very strong and robust.

Next morning, Mr. Tate guided me to Ogatsu town. There was a port in the inner bay. Before the Tsunami occurrence, several festivals were held by the seafood restaurants there. For example, the scallop festival, echinus festival and so on. These were very bustling. But now the port and town was lost by the Tsunami. There was only some prefab shops and just new exhibition house. I heard the reconstruction was delay in this area. From the Ogatsu city, we drove to the north through national road 398 and Kamaya Tunnel for a while. And we arrived at Shin-kitakami Bridge on the Kitakami River. Near the bridge, there was Okawa elementary school. There, broken concrete structures had been remained in the vacant lot. I gazed and realized that these were the circle hall, classrooms and auditorium. I thought that the school had been modern and beautiful building. On the wall of the broken building, there were a drawing of Galaxy Railway of Kenji Miyazawa drawn by the pupils, and his poem.

When the Tsunami had come, seventy pupils out of one hundred eight were died. Still four pupils were missing. The ten teachers out of eleven were died. Now there is a big argument in the evacuation method. It was right or not.
I feel the parents’ deep sadness.

***The Destroyed building in Okawa Elementary School. A part of very famous poem “--- (Ame ) nimo makezu,----(Kaze)nimo makezu are written on the broken wall. It means “I will not give up my life by the rain. I will not give up my life by the wind.***

When we went back to the center of Ishinomaki, we had a farewell lunch in Sushi restaurant. Same as previous visit, I felt so sad to see the affected area of the Tsunami. But when I ate tasty Sushi, I felt better. “Mr. Tate, I really appreciated your guide.” **(☆)**

## *First visit to the damaged areas, after the heavy earthquake,*

***Ms. Mina YARIUCH***
***Japan International Cooperation Agency***

When East Japan Great Earthquake occurred, I have lived in Vietnam. And I have watched TV news of the damage by the tsunami and the restoration. I really wanted to visit the suffered areas. I could obtain the fragmentary information only from the news, because the suffered areas were so wide.
I came back to Japan in June, 2013 and had a chance. This time, I visited Sendai and Ishinomaki. I could talk to Mr. Watanabe and Ms. Kawamura who are working at water supply site

of Sendai City Waterworks Bureau, and Mr. Tate is dispatched from Kanagawa Water Supply Authority and supporting the restoration work at Ishimomaki. And also I could see the town of Ishinomaki city. It was very impressive and precious experience for me. Two and half years passed since the Great Earthquake occurred. Removal of the rubbles and collapsed houses has almost completed. From Hiyoriyama hill where we can look down the town, we could see a panoramic view of the coastal area. I heard that there were residential area and industrial area where many processed marine factories had stood before the disaster. But there were no buildings and deserted land has spread to the coast. I visited the area where traces of the damage caused by the huge tsunami were removed. When I stood in the quiet place where nothing remained, I felt strongly a contrast with the town that was bustling before the tsunami. Still now, there are many temporary houses for people who lost their houses here and there. And also some people are still repairing their houses

Most impressive story concerning the water supply I heard was that the staffs of waterworks bureaus made a great contribution to rehabilitate the facilities. Even though their houses and families were damaged, many staffs stayed in the office and they worked for restoring the water services as soon as possible. Furthermore, nationwide waterworks bureaus assisted the bureaus which suffered big damage to provide water trucks for emergency water supply or to implement the emergency repairing of the pipes. Still now, cooperation among the water supply utilities has been continued by supporting the

***Empty field are spread in Kadowaki area. "Tsunami reached up 6m here" was written in the 6m-high pole***

restoration of facilities and the plan and design of protection against disasters as like Mr. Tate.. I could hear that they worked for water supply service with high aspiration. It was the impressive story that we recognized the importance and necessity of water supply in emergency.

From view point of the protection against disaster, a prior preparation is important. This trip became an occasion for me to understand the effectiveness of the cooperation system between the waterworks bureaus each other in the emergency for sustaining the service. **(☆)**

## Introduction of New Members

- Ms. Ladda Keovara (Thailand)
- Mr. Yukio Tanaka (Japan)
- Ms.Chinatsu Maeda (Japan)

***◎ We welcome new members anytime ◎***
***Please contact us***

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