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Question & Answer Corner

We welcome any opinions, and questions to this Q & A Corner. Please contact us.

Q: We have a problem of Zebra Mussel growing in the water intake pipe. It will make the pipe diameter smaller and generate odor. We want to share your experience for our measures.
(by Mr. L.N, Cambodia)

A1: Answerer

Mr. Nagashio Daishi
(Hanshin water Supply Authority)



Hanshin water supply authority (HWSA) had huge outbreaks of golden mussel* (*Limnoperna fortunei*) in the intake pipe. HWSA has studied the countermeasures since 1995. Although the type of shellfish is slightly different from that of questioner, surveys and the countermeasures by HWSA are described below.

**Golden mussel has characteristics similar to the zebra mussel. It distributes widely from East Asia to Southeast Asia. (note by WaQuAC-Net)*

1. Problems caused by golden mussel

① Mussels adhering inside a pipe peeled off after their death, and shells were mainly removed out by screen cleaning machines. In

summer, when the amount of dead mussels removed was large, it was necessary to change the operating conditions of the screen cleaning machine. The mussels also accumulated in grit chamber and flocculation basin. It was necessary to dispose of 20 to 50 m³ shells a year.

② Both alive and dead mussels clogged in joints of small pipes (made of vinyl chloride) for water quality monitoring, resulting in decreasing the amount of water. HWSA has installed joint free pipe and strainer.

③ As mussels were adhered to water level gauges, and protective covers for a screen cleaning machine, the malfunction happened. Then, HWSA cleaned them regularly.

④ When the facility was shut down, the accumulated water had septic odor. But it was not appreciable in the water-flowing state.

2. Survey of adhesion state

There was concern about further obstructions

such as blockage of intake pipe and conveyance pipe by golden mussel. So, HWSA surveyed the living state of golden mussel from the intake to the water treatment plant.



Adhesion state of golden mussels in the pipe

- ① Although the amount of adhesion changed depending on location and year, mussels mainly adhered to the inside surface of pipes, and no individual mussels adhered each other.
- ② Golden mussels occur in summer and grow to about 18 mm in one year.
- ③ Most of golden mussels which have grown to about 18 mm die. Some grow further to about 30 mm, but they also die in about 2 years.
- ④ There is no need for manual removal because dead mussels peel off after a few months.
- ⑤ The adhesion density at the bend is higher than that of the straight pipeline, and the adhesion density is low at a flow velocity of 1 m/s or more.

3. Countermeasure

Based on the survey results, HWSA has judged that it was unlikely to cause serious problems such as conveyance pipe obstruction. HWSA did not take any special measures. In recent years, the adhesion of mussels and the accumulation of shells have decreased. No damage has been caused by the golden mussels.

However, as there are the regions with different circumstances, HWSA also cooperated the

research on adhesion prevention techniques for aquatic lifeforms such as golden mussel. As the result, a countermeasure technology adding silver to the seal coat and applying to the surface of the inner mortar lining, was developed.

HWSA adopts this technology at the rehabilitation of the intake pipe which has operated in 2005. Recent surveys have shown that even in the intake pipe where this measure has been taken, the adhesion of the golden mussel is observed, and although a certain effect can be seen, it has not reached a drastic measure.

A2: Answerer

Mr. Yayama Masashi
(Kitakyushu City Water and
Sewer Bureau,
JICA Cambodia Expert)



Mr. Yayama

Regarding the zebra mussel problem, I provided the questioner suggestions based on the experience of Kitakyushu City Water and Sewer Bureau in Hai Phong, Vietnam as follows:

➤ Short term measure:

Dose 1 mg/L chlorine for 2 days per 1 month

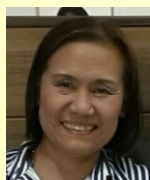
➤ Long term measure:

Change the pre-chlorine dosing point from the receiving tank to the intake point.

This suggestion is based on the result of measures in Hai Phong. Therefore, you use the above value as the initial value, and must determine effective values (frequency, amount of chlorine, etc.) in your case by repeated experiments.

A3: Answerer

Ms. Siwilai Kitpitak
(Metropolitan Waterworks
Authority, Thailand)



Ms. Siwilai

So far, we don't have this problem because our conveyance is open channel. I have heard many waterworks have that problems. Yes, they have to use chlorine routinely and they have to experiment how often to apply chlorine. For example, Singapore New Water doses chlorine once every two days routinely at the intake facilities. I found a report of US cases by AWWA, as follow.

https://www.awwa-ia.org/assets/Annual_Conference/2018annualconference/Presentations/pres-101718-AWWA-IA_Annual_Conf-ZebraMussel.pdf#search=%27Zebra+Mussel+Issue+in+AWWA%27/

A4: Excerpt from “*Guidebook on water treatment against biological problems*”,

Japan Water Works Association, 2006

(translated by WaQuAC-Net)

Chapter VIII: Problems by Small Animals and Measures, Case study 2.1 -1 Problems by the golden mussel

There were a clogging in piping of water quality monitoring equipment and strainers of sludge treatment facility at water treatment plant, whose water source is Yodo River, belonging to the waterworks department of Osaka prefectural government. The cause was shells of the golden mussel according to the result of surveillance. Chlorination and drying at sand washing basin were tried as countermeasures. By the experiments, 100% of golden mussel was died

by contact with 0.8 to 1.0mg/L of free chlorine for 9 days. 100% of golden mussel was also died by drying for 6 days.

Chapter IX: Measures against Biological Problems in Overseas

1. Excerpt from “*Problem Organism in Water: Identification and Treatment, Second Edition, AWWA, 1995*”

1.4 Zebra mussel

Chemical treatment: Larva and adult of zebra mussel can be killed by continuous or periodic chlorination. But for usual cases, residual chlorine in waste water must be eliminated before discharging into the environment. Higher concentration of chlorine restricts biological treatment in slow sand filtration and might cause troubles in odor and taste. Potassium permanganate is effective to raw water containing rich organic matter that can cause trihalomethanes production. Using polymer is also effective to control zebra mussel. Ozone and other oxidizing agents are considered as alternatives of chlorine.

With any method, removing dead mussel and cleaning facilities are necessary not to cause clogging by shells and rotten mussel.

Permission by federal, state, county or municipality government is necessary to use any chemical treatments.

The study on the coating materials to protect attaching or colony forming without any toxic substance is implemented.

Physical treatment: Heating treatment with higher than 40°C for hours, generally more than 1 hour, treatment of reducing dissolved oxygen with sealing the intake facility for several weeks, ultrasonic treatment, and etc. are effective, but extra facilities are needed.

Mechanical treatment: Strainer, screen or membrane can be attached to the intake facility.

Attached mussels are removed by manual work or high pressure washing.

Some methods should be combined for effective treatment because there is no method that can ensure any requirements by only itself.

Introduction of Overseas Member

Ms. Kounthy Thor, Cambodia
Studying at the University of Tokyo

Last year, “*Collaboration Program between the University of Tokyo and JICA for Long Term Training Program on Water Engineering and Utility Management which bring up future leaders*” was started. Ms. Kounthy Thor is one of four students who passed the sever selection in the first year. In May 31th, she was interviewed with WaQuAC-Net.



Ms. Kounthy

(Yamamoto, Waquac-Net Office)

Yamamoto : Thank you for cooperating the interview, today. Our meeting point was the Yaesu northern ticket exit in Tokyo Station. She appeared there just on time, 12:00. I was surprised because Tokyo Station is wide and has many exits. Even some Japanese people make mistake.

Kounthy : It was so hard to find the exit because Tokyo Station was so wide. But, in the train station, it usually has sign board that is convenient to find the ways. Japan is so safe that I can go to many places alone.

1. Career

K: I was graduated from the Department of Food Technology and Chemical Engineering, Institute of Technology of Cambodia in 2010. I had worked as Sales Representative in a private company for two months. And then I moved to NGO, “Teuk Saat 1001 which means clean water

supply in Khmer in Battambang for 5 years and 1 month. There, I was in charge of water quality. The NGO installed the water kiosk and use ultraviolet ray disinfection.

We also trained the staff recruited from people living in rural area for maintaining the facilities properly and sale safe water in 20 little bottles to people by home delivery. After that, I was employed in Department of Potable Water Supply (DPWS), MIH (Ministry of Industry and Handcraft). In November 2016, DPWS was promoted to the General Department which has 5 departments. I was assigned to the Department of Technical and Project Management. I worked for several projects including JICA capacity building project too.

Y: At that time, you have had the training by Mr. Kagata. He said there was a very good staff in MIH.

2. Family

Y: Could you tell me about your family?

K: I was born in 1988. I am oldest daughter and have younger brother and sister. My father and my grandfather were teachers. They want that children have higher education. My father wanted me to be a teacher. But I wanted to be an engineer. And finally, he agreed me. I received a support (subsidy) from “Enfants du Mekong” which is French NGO for my study at that time since I got the good result of the baccalaureate.

Y: In Cambodia, parents usually decide the marriage partner for their daughter/son. How about your case?

K: In my case, I decided myself. My husband

lived in the neighborhood. So, we knew well since we were small children each other. And we have same idea of how to live. I got marriage at 24 years old, 2011. Now, I have a 5 year- old son.

Y: It's wonderful! I think it was not so easy to come to Japan alone leaving your family in Cambodia.

K: Yes, it was. But since I wanted to learn more about water supply technology and management, I wanted to get the chance to study in Japan. Actually, my husband also studied for International Master in Rural Economics and Sociology at Hanoi University of Agriculture (Vietnam) in collaboration with University of Liege (Belgium) for his master degree and graduated in 2013. So, he understood my student life in Japan.

Y: Who take care of your son, now?

K: My parents live in Banteay Meanchey and take care of my son. I sometimes see and talk him through smart phone.

3. Study at the University of Tokyo

Y: Last September, you came to Japan for studying the water engineering and management at the University of Tokyo Master Degree through collaboration program between the University of Tokyo and JICA.

K: As the first year's students, there are 4 persons, from Cambodia 1, Myanmar 2, Laos 1. All are women. In Cambodia case, the candidates were 5 people, from, MIH 2, PPWSA 3. And then only I passed. The Process from application to acceptance was so hard. It took almost 1 year for it. I had to prepare variety of documents required and got an interview with Professor Takizawa via Skype.

Y: You decided the theme of your master's thesis earlier this year and returned to Cambodia. What is your theme?

K: It is "Management of private water service provider". There are many small private water companies out of provincial city in Cambodia, and most of owners are lack of knowledge in term of operation efficiency and management. I want to understand their situation and find the best solution for them to be able to supply more safe water within the service area.

Y: You will be going back to Cambodia for site survey soon.

K: I have to survey for 3 to 4 weeks at site from middle of August 2019.

K: Only 3 to 4 weeks! Well, you need careful preparation in Japan.

K: I have to narrow down the target areas and research companies and what and how I research. I have to take 30 credits to complete the master's degree, of which 16 credits are for writing a thesis, and the field survey is very important.

Y: Is it hard to study in class too?

K: I have to take some courses to get 14 credits. It's very hard.

4. Japanese life

Y: How is your life in Japan?

K: I live in a share house in Asakusa. All residents are from Cambodia. We live friendly. Owners have business in Cambodia. Therefore, they want to support Cambodian students by providing rooms with affordable price. They are very nice.

My impression of Japan is safe environment. I can walk alone even at night. Phnom Penh is not so safe to walk alone at night especially for women. Most of Japanese are so kind. I show an example. When I lost the way to go back to my accommodation, I showed my address to a young man passing by, he took me home. I was very happy. Most favorite Japanese food is Syabu syabu, but I cannot eat raw fish.

Y : Japan is basically safe. But, sometimes, criminal incidents happen. Please take care.

5. Plan after completing master's degree

Y : You will complete the master degree in September of next year. After that, what do you want to do in Cambodia?

K : Of course, I will use effectively what I learned in Japan for Cambodia. Cambodia government made the National Strategic Development Plan on Water Supply which stated that "100% of Cambodian can access to safe water supply by 2025; 90% comes from the piped water supply". I would like to contribute the achievement through improving my capacity and working efficiency.

Y : Thank you very much for long interview. I enjoyed a lot with you. I hope you study hard and also enjoy Japanese life.



Ms. Kounthy in front of Tokyo Station

Special article 1

Reconstruction of the East Japan Great Earthquake 2011-2019

Want to follow the reconstruction of Ishinomaki water supply

Mr. TATE Hirotaka (IDWSA)



Mr. TATE

Dear WaQuAC-NET members, my name is TATE Hirotaka working for Ishinomaki District Water Supply Authority (IDWSA). In the beginning of my career, I was employed in KANAGAWA Water Supply Authority (KWSA) in 2007, and was assigned to the Iizumi Intake Management Office, which directly manages and operates one of the few large intake weirs (river management facilities) by the water utility in Japan. At that time, I was engaged in maintenance work, design and supervision of various construction works, working in shifts.

On March 11, 2011, about four years after my joining KWSA, the Great East Japan Earthquake occurred. As watching significant damages in the Tohoku region, I had a strong desire to provide some kind of support. However, I finally could not join the emergency support operation because KWSA is a water supply utility to supply water to other waterworks, not to customer, which makes it too difficult for us to conduct emergency water supply and restoration alone. In addition, we also needed to work for restoration of our facilities including fixing large leakages on the main conveyance pipe which resulted in stopping conveying water for one month.

After that, in early March 2012, I heard from my supervisor about a request for a two-year reconstruction support (dispatch based on the local government law) by IDWSA. When I

showed my voluntary to go, I was smoothly accepted for a two-year support dispatch to Ishinomaki. After the end of the two-year dispatching period, I returned to Kanagawa and worked for construction inspections and staff training (technical), etc. But I wanted to go back to IDWSA again and has been working as a permanent staff member since April 1, 2015.

Now, I would like to write about the restoration of Ishinomaki, but since I am not currently involved in the disaster response and reconstruction operations, I will briefly explain the restoration work of Hebita Water Treatment Plant I was involved in.

First of all, I introduce IDWSA, which was established in 1980, and merged with other municipalities in 2005. At the present, the design population served is 180,000, maximum daily supply is 70,000 m³, coverage ratio is 99.69% as of 2017.

On April 1, 2012, I arrived at IDWSA as a dispatch staff member and was assigned to the reconstruction office of Hebita WTP which was the main WTP with a capacity of 55,000m³/day and damaged severely by the liquefaction caused by the Earthquake. For that, the relocation work of

the Hebita WTP to the Sueyama WTP (25,000 m³/day at that time) which located on a higher place and solid ground was carried out as the largest reconstruction project of IDWSA. And I was mainly in charge of design, procurement and construction supervision of its mechanical facilities. The Sueyama WTP, which is the relocation destination of the Hebita WTP, started its operation in 1988, but the site for future expansion had been prepared in advance there, which greatly contributed to shortening the project period, such as minimizing site preparation.

At the timing of my arrival in April 2012, the Project completed its basic design and disaster assessment, and was the detail design stage. It was very hard for me to understand quickly the detail design progress. After that, the ground-breaking ceremony was held in February 2013, and construction work began. Overcoming various difficulties, the existing Sueyama WTP resumed its operation after anti-seismic reinforcement and the old Hebita WTP was stopped operating in October 2017. The relocation and reconstruction project of Hebita WTP (55,000m³/d) completed in February 2018, and the commemorative ceremony was held in March. However, even now, many other disaster reconstruction projects are being implemented in relation with construction works such as embankment reinforcement and road relocation. I realize that the reconstruction is still in the process.

Next, I introduce the work I am currently engaged in. I work for the supervision of various outsourcing contracts and construction works related to maintenance of water supply facilities scattered throughout the city area. There are various and diverse kinds of facilities (looking so unique and strange!) in the area consisting of



Land subsidence in Hebita WTP in April 2012



Prepared land for sedimentation basin in Sueyama WTP in Apr 2012



Construction of new sedimentation basin (Sueyama WTP) in Oct 2013

previous 6 municipalities and town before the merger. The driving distance of our car often exceeds 100 km (up to 200 km) in a day. However, since I have to keep on studying those diverse facilities, I always feel stimulated, and sweet burden. In addition, while working for supplying water to a customer that I could not experience in my previous job, I realize the responsibilities for the stable water supply, and always feel the necessity to grow myself.

Finally, when I arrived as a support dispatch in 2012, about one year after the earthquake, damaged buildings and earthquake debris were still left, so I could imagine how big it damaged. In the current Ishinomaki City, about 8 years and 2 months after the earthquake, although you can still see some signs of the disaster, the reconstruction is steadily under progress; the damaged Ishinomaki fishing port (the longest quay length in Japan) was reconstructed, and new tourist facilities such as Ishinomaki fish market opened. I hope you will have a chance to visit Ishinomaki City.

In 16-17 June, we visited Ishinomaki to observe the situation of reconstruction, eight years after the Great Earthquake. Members from Tokyo were Mr. Shimomura, Mr. Igarashi and Yamamoto. Although it rained on June 16 unfortunately, we got in a car of Mr. Watanabe who drove from Sendai for us. As hearing explanation of Mr. Watanabe and Mr. Tate who lives in Ishinomaki, we visited suffered places such as old Okawa Primary School site, Ogatsu Town, Onagawa Town central and Hiyori-Yama. On the following June 17, cloudy day, Mr. Tate took us to the reconstruction around the city central. **The detail will be reported in the next newsletter. (Yama)**

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Report: Returns to Vietnam

Ms. Yariuchi Mina

(WaQuAC-NET Office,
JICA Myanmar Expert)



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I visited HueWACO*, a water supply utility in Thua Thien Hue Province in the central region of Vietnam in April 2019. Since I joined a technical cooperation of "the Project on Capacity Development for Urban Water Supply Utilities in the Central Region" supported by JICA, it is good chance for me to see my old friends there and update information on HueWACO.

[HueWACO; outline and recent development]

HueWACO celebrates its 110-year anniversary this year. HueWACO achieved safe water in the whole supply area in 2009, and now, manages water quality to secure even "tasty". HueWACO has 30 WTPs producing about 200,000CMD (including small-scale plants in rural areas) and supplying water to about one million people in 136 wards out of 152 in the Province; coverage ratio in urban area reaches to 97%. In present business plan targeting 2030, HueWACO has been implementing projects to ensure "water security" and improve the quality of service. For example, it includes a plan to cease temporarily some small WTPs located in the downstream, where they have concerns of contamination, build new treatment plants to the upstream area to avoid water security risk. In addition, the plan includes new WTP construction (Van Nien WTP: 120,000 CMD), and all transmission and distribution pipelines have been replaced to HDPE and DIP (ductile cast iron pipe). As to customer service, they plan to continue to carry out community activities to build the company which has developed sustainably.

My impression is that HueWACO has been

developing its water supply services smoothly till now, and almost completed the expanding its service area and the business scale. From now, the main challenges will be shifted to the maintenance and service improvement. As HueWACO has been supported by the Yokohama Waterworks Bureau of Japan for a long time, but in the future, they may have common issues including the maintenance and management of water supply in rural areas, the renewal of aging facilities, with which the many waterworks in Japan face presently. I think the time will come when HueWACO and Japanese waterworks learn their experiences each other.

[Meeting with Staff in Lab]

I made explanation about WaQuAC-NET to staff in charge of water quality analysis in HueWACO. I met them in the laboratory (Technical and Water Quality Department); Mr. Mai Xuan Tan (Vice Manager), Ms. Huynh Thi Mau Thin, Mr. Le Gia Thinh, and Mr. Vo Dai Duong. As I introduced the background, objectives and activities of WaQuAC-NET, they seemed to be all interested in. As WaQuAC-NET could have a few occasions to communicate with Vietnamese members recently, I really expect that this visit can enhance communication with them such as new members, information sharing, and Q&A contacts.

*HueWACO: Thua Thien Hue Construction and Water Supply State One Member Co., Ltd



From left; Mr. Thinh, Mr. Duong, Ms. Thin, Mr. Tan

11th MINI-TALK

GIS and Water Supply

At this meeting, we discussed the example of utilization of GIS and ICT in water supply, which was the first theme so far. Mr. Igarashi of Kokusai Kogyo who introduced himself in the previous newsletter was invited as a lecturer and explained ([See the Newsletter vol.33](#), 5p). Mr. Igarashi originally had experience as a system engineer. However, he was dispatched to Kenya as JOCV and was in charge of GIS at Narok Water and Sanitation Company. Currently he works as a consultant. He explained Rwanda case which is a project being engaged and JOCV's experiences in Kenya,

The meeting was held from 19:00 on April 26, 2019 in Ichigaya, Tokyo. The participants were Mr. Shimomura, Ms. Kamegai, Mr. Kagata, Mr. Kuroda, Mr. Kinno, Ms. Yamamoto and Horie. The explanation started from the Rwanda case and case in Kenya. After that, Mr. Shimomura, Ms. Kamegai, Mr. Kuroda, Mr. Kagada gave several comments and shared their experiences on non-revenue water and the attitude of mind as a water supply engineer etc. There was a lively discussion regarding the capacity building for operation and maintenance of the water supply facilities.

Mr. Igarashi will give the presentation on the case of Rwanda and Kenya at the open source GIS international conference "FOSS4G 2019" (<https://2019.foss4g.org>) to be held in Bucharest, Romania from August 26 to August 31, 2019

1. Case in Rwanda

(1) Project Outline

① Name: Project for strengthening operation and maintenance of rural water supply systems in Rwanda (RWASOM), ② Period: April 2015 to December 2019, ③ C/P: Department of Rural

Water and Sanitation Service (RWSS), ④
Outline: Development of guideline and manuals for O&M of water supply facilities modeled on the eastern four districts. Capacity building. Support activity for the district governments and WSPs. Mr. Igarashi is in charge of GIS.

(2) Outline of GIS system

There was no map of water supply facilities and no map data of public stand and pipe networks in the 4 districts of Rwanda. So, maps will be created by GIS. However, it was thought that the cost of software management and initial purchase costs would be high if using paid software. Then, sustainability would be lost after the project was completed. Mr. Igarashi is working on creating a map system database using free open source without the license. The outline is shown in Figure 1.

Using this method, it is possible to input local information from a smartphone and manage map information in a database. Originally, at the areas without maps, it is possible for a local administrator, etc., to download applications and input the information to the mobile phone possessed by the individual. There are Information on water supply facilities (location, installation year, pump specifications, maintenance history, etc.), pipe network information (location, diameter, installation year, etc.), information on water sources (location, water quality, water quantity, etc) and the public stand information (location, used water volume, proceeds, etc). In other words, each person can input all the information in his/her responsible area, and by managing the information in the server, it will be possible to centrally manage the

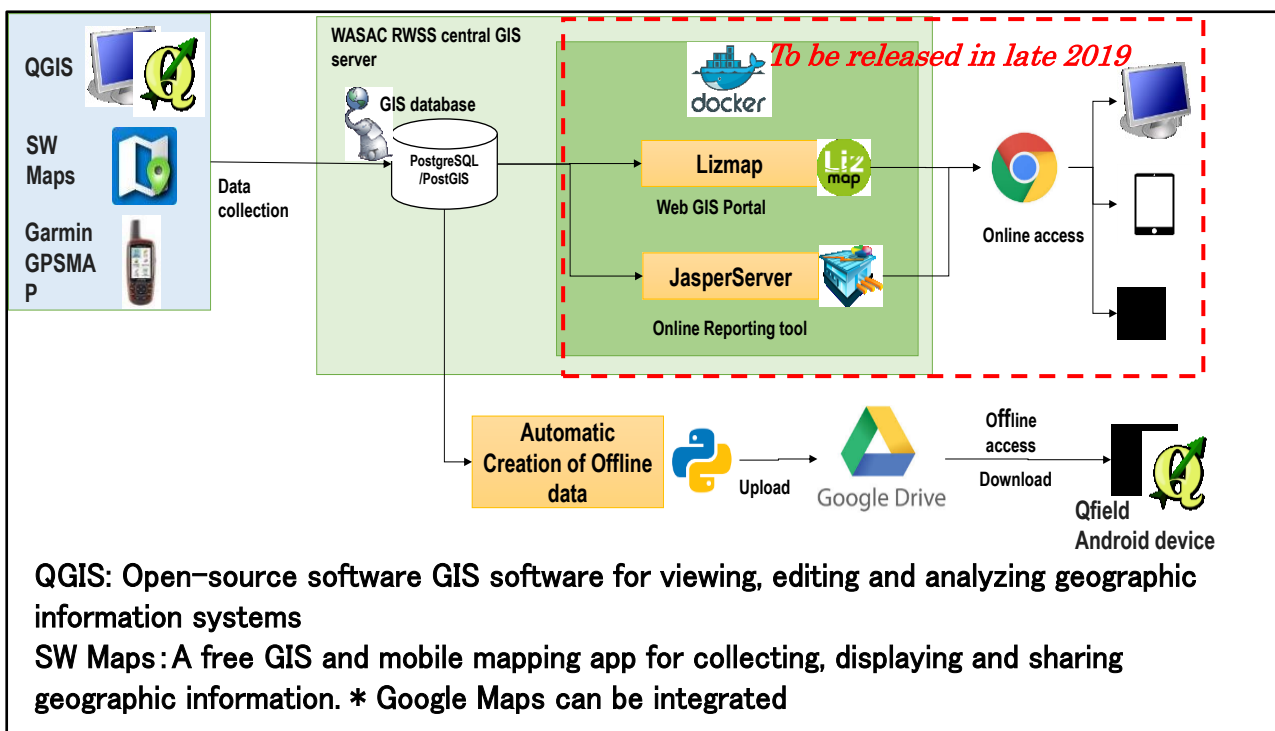


Fig. 1 Overview of GIS System for Rwandan Rural Water Supply

information of all the facilities. By regularly updating these, it is possible to carry out simple water facility asset management. In addition, these software are excellent in operability and can be used offline.

(3) Efficient facility planning by GIS

When building a public stand, it will be possible to analyze where the stand should be located efficiently for water users by using an area marketing method. It's a way to forecast customers when the convenience store opens

and forecast where they are selling more.

2. Case in Kenya

(1) Activity contents

As a JOCV in Kenya, he was assigned to Narok Water Services Provider (WSP), where he used open source software to build a GIS database for water facilities. At the moment, the created system has been updated firmly.

(2) How to reduce NRW with GIS / ICT

Non-revenue water has been an issue in WSP. So, we examined how to reduce NRW by using GIS. First of all, it is the fraudulent acts of the WSP staff in the collection of water tariff. Specifically, there is a task to adjust water tariff in response to complaints from water users. At that time, the meter reader unreasonably charged a high tariff, and the meter reader requested a bribe in the complaint from the water user and reduced the charge. Therefore, the billing system and the GIS database were linked together to create a function for uploading billing system data to GIS. As a result, even staff who are not familiar with the site are able to obtain and respond to customers with more accurate information, thereby reducing the burden on those in charge of billing systems. I also installed a function to download the amount of water tariff adjustment so that the manager can understand the details of the adjustment amount. However, even after the rotation of meter readers was changed, many of them were corrupt and it was difficult to improve.

Next, there was the problem of illegal connection and theft. In order to cope with these problems, it is necessary to register all new water supply pipes properly. Therefore, a function was created to compare the billing system with the GIS database and to extract service pipes that are not registered in the GIS. This makes it easier for person who is in charge of GIS to perform routine updates. I hope to establish a system that

continuously accumulate data and detect illegal connection



On the far left, Mr. Igarashi explains GIS.

(Editor's note)

In this meeting, we learned about the possibilities of GIS in water supply from a new perspective through a new theme, GIS/ICT. The case of Rwanda was particularly interesting because it was difficult to build a map database and collect information on rural water supply in developing countries. Normally, the location of public stand is decided at the request of residents, but I felt that Mr. Igarashi's idea of area marketing using GIS to raise profits more efficiently and logically could be used in the future.

Based on the case of Kenya, Mr. Shimomura, who has many experiences of water supply, mentioned that it is important to analyze the distribution amount in order to clarify the problem of non-revenue water measures. As such, the GIS database proved to be an effective tool for centralizing and accumulating collected information. Illegal meter reading and water theft can occur in other countries. I hope that Mr. Igarashi will develop a GIS database that anyone can use easily with his knowledge of SE to improve water supply management.

(Reported by Mr. HORIE Toshiki)

Later Talks of “GIS and Water Supply”

About utilizing GIS, we continued to discuss on e-mail basis after the study meeting on April 26th. The below is the summary of e-mail discussion.

Mr. Igarashi: I got the latest data of NRW from Narok Water Company. I told NRW of Narok was about average 25% in above meeting, but it is now average 20% of NRW according to the latest data. It was improved very much. Especially, NRW of February 2019 was 11% because of low water production during dry season. I realized that it might be the biggest effect in NRW reduction that Narok water completely renewed their distribution and service pipe and water treatment plant. But there are still fluctuations in NRW rate from 11% to 33%. It is because there is a lot of reading errors or cheating. I think NRW of Narok water could be more stable if they can improve meter readings and reduce corruptions.

Mr. Shimomura: It is not good to do detailed comment with looking data only. But I think they must keep the accuracy of data, that is the most important. Especially, it is necessary to establish the methods of meter reading for consumption of water meters. Meter readers must not input water consumption into the database without going to the site. It is also very important to read the meter on the same day every month, etc. Moreover, it can be considered as an issue to control water distribution to demand water volume. As a result, it can be seen that the volume of water distribution was increasing even if there is no demand of water or vice versa. If demands of water increase and volume of water distribution does not catch up with the increase, water pressure of pipes in the city tends to decrease and leakage reduces. It is necessary to evaluate whether a system whose NRW rate

goes up and down extremely in a year is not attributable to this kind of situation.

Anyway, no matter how the software is excellent and convenient, if values of existing data which you need to input are not accurate, the software can be meaningless. So, two management skills and know-how are needed and very important: 1) Management skills to improve the quality of data putting into the system; 2) Management skill for feeding back the data to field after analysis and evaluation of outputs data from the system.

Report “World Water Day 2019 Symposium” at UNU (Tokyo)

Ms. Yariuchi Mina,
(WaQuAC-NET Office)

On Mar 22, World Water Day, a symposium was held at the United Nations University in the presence of the Crown Prince (at that time) to commemorate the publication of "World Water Development Report 2019". Since the symposium organizer contact WaQuAC-NET to present a panelist, I took part in the panel discussion. The symposium was entitled "World's Water in the Era of the SDGs" and an overview of the report was presented. Then, toward 2030, the target year for the SDGs,



Keynot speech in the presence of the Crown Prince (at that time, right side)

knowledge and experiences were shared from various sectors on whether the concept of "Leaving no one behind." will have been achieved and what the challenges are in development in the water sector.

Firstly, UN High Commissioner for Human Rights Michelle Bachelet, stressed that the access to safe water is not just a development goal, but a basic human right. In the keynote speech that followed, Prof. Oki Taikan of the University of Tokyo, who is also the Vice President of the UNU, pointed out based on some scientific data that how "Access to water" has been changed in the amount of water available and accessibility, and SDGs related to water are linked closely with other goals, and that people without access to safe water and sanitation are "left behind" in all sectors.

In the followed panel discussion, four panelists described cases of rural areas, emergency relief for refugees, and urban areas.

As pointed out in the report, they explained, based on cases, disparities in development between urban and rural areas, and difficulties in accessing assistance to vulnerable groups such

as refugees, disaster victims, and women. In order to solve these hardships, it was confirmed that the partnership would be more important than before, in which various actors such as the UN, ODA, NGOs, and private companies work together, and coordinate each other.

I explained, as a panelist, the situation of water supply in urban areas in Asia, and proposed that in order to achieve the SDGs, there is not only a lack of financial and technical capabilities, but also the need to improve governance, including legal systems. In order to solve this problem, I emphasized coordination with various partners is necessary, and the network is important for learning from each other's experiences.



Panel discussion (Author; second from the right)
(Photos: UNU)

Introduction of new members

1. Ms. Kounthy Thor (Cambodia)
2. Mr. Hirowatari Hiroshi (Japan)
3. Mr. Huynh Thi Mau Thin (Vietnam)

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

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Next Activity

September 13	6 th Osaka meeting
September 15	Newsletter vol. 42 in Japanese
September 15	Kyushu branch meeting