



**The 15th WaQuAC-Net Webinar**

**“The life cycle cost assessment of sewerage system in Narok City, Republic of Kenya.”**

**Mr. Natsuki Iwao**  
**(Kyoto City Water and Sewage Bureau)**

At the 15th Webinar of WaQuAC-Net, we invited Mr. Igarashi, who is working for the United Nations Development Programme, as a lecturer to talk about the life cycle cost assessment of sewerage system in Narok City, Republic of Kenya.

**Date:** February 28, 2023

**Time:** 17:00 -18:30 Japan, 8:00-9:30 London

**Webinar:** ZOOM Seminar

**Lecturer:** Mr. Jin Igarashi

**Moderator:** Mr. Natsuki Iwao

**Participants**

[Rwanda] Ms. UMUHOZA Marie Grace

[Tanzania] Mr. Rajab Said Moh'd

[Malawi] Mr. Mphatso Mtambo

[Myanmar] Ms. Ei Khaing Mon, Ms. Nwe Nwe Zin

[Cambodia] Ms. Lao Chansayna,

Ms. Sreang Sreyrov, Mr. Por Kunnarith

[Thailand] Ms. Sirapat Khodseewong, Ph.

[Japan] Mr. Hiroshi Sasayama, Mr. Ken Tsuji,

Ms. Junko Uno, Ms. Taeko Miyashita,

Mr. Yoshinobu Ono, Ms. Keiko Yamamoto

**(1) Introduction of the presenter**

The presenter, Mr. Igarashi, has been working for the UNDP since 2021, and is engaged in GIS data management and software development. His other activities include the development of

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web GIS tools for water utilities in Kenya. His presentation was based on his master’s thesis, which he wrote when he graduated from the University of Leeds in the UK.

**(2) Outline of the presentation**

① Purpose

Estimation of the full lifecycle costs about multiple sanitation systems in Narok City, Republic of Kenya.

② Research Methodology

Data collection and analysis conducted in the CACTUS (Climate and Costs in Urban Sanitation) project.

③ Conclusion

- Narok City is highly dependent on the on-site systems (pit latrine and septic tanks) at 82%, with 2% of sewer connectivity for off-site systems.
- The full lifecycle cost of the off-site system in 2020 is 6,022 Int\$ per household, 623 Int\$ in design capacity.
- On the other hand, full lifecycle cost for the on-site system is 346-474 Int\$2020 per household.
- The following Option 1 and Option 2 are considered necessary to eliminate untreated sewage. Each of the lifecycle costs is Ksh 44.88 billion and Ksh 49.13 billion, with no significant difference.

**【Option 1】**

Continue installing sewer connections within the current sewer area, and serve FSM for those outside the sewer area. The current sewage plant only handle wastewater from sewer pipes, so construct new FSM plant.

**【Option 2】**

In addition to Option 1, expand trunk sewer and secondary sewer to cover the existing water supplied area. Moreover, expand the capacity of sewage treatment plant.

**(3) Questions and Answers**

Q. Each house in Narok City has toilet?

A. 16% of the households do not have toilets and use open defecation.

Q. Are People willing to pay for sanitation services in Narok City?

A. Yes, I think so. However, the sewer system has just been installed and the fees have not yet been updated. In the case of off-site, they are not being charged. In the case of on-site, there is the cost of pumping by vacuum trucks.

Q. Population of Narok is stable? If it is changing, it can affect cost of the sanitation system in the future.

A. Population growth is significant; currently 100,000 compared to 40,000 in 2019, so it has more than doubled. Population growth should be taken into account when assessing future costs more realistically.

Q. Do you think the introduction of Jokasou technology in the area can be technically viable as well as economically feasible?

A. Jokasou may be useful, but they are more difficult than septic tanks to maintain and manage, and it would be not so economically feasible.

Q. Can the results be replicated in other developing countries?

A. The results of this study are applicable to

Narok City, but if data from each city such as those in the CACTUS project database were applied, it could be used to evaluate future costs.

Q. Is contamination occurring around the infiltration pits?

A. It is believed that it is occurring. However, groundwater in Narok contains salt and people do not use it as drinking water, so there is no major concern for human health so far.

**(4) Post-Questionnaire**

- The content was enough to understand the lifecycle costs of urban sanitation.
- Most developing countries have focused much on water supply than sanitation. The content presented an opportunity on understanding how developing countries can quickly improve sanitation both in the short and long term.
- This content is helpful in my work.
- There should be a room for discussion not only questions and answers.
- Online event can be improved by increasing content on sanitation.
- If any event courses related to water treatment plant management and water quality monitoring; please let me know.



*Participants of 15<sup>th</sup> Webinar*

**Water source inspection tour in Kanagawa and Ms. Thitima's reception party on 22th February 2023.**

**Mr. Yoshinobu Ono**  
(Yokohama City Waterworks Bureau)

On February 22, 2023, Ms. Thitima Sangpraphakorn, Ms. Yamamoto, Mr. Sasayama, and Ono went on a water source inspection tour in Kanagawa. Ms. Thitima is a member of the Metropolitan Waterworks Authority (MWA) in Thailand, and came to Japan as part of her training at Kanto Gakuin University.

**About K.P.G. (Kanagawa Prefectural Government) Overseas Technical Trainees Program**

K.P.G. Overseas Technical Trainees Program invites young engineers and scientists from overseas to learn about technology and knowledge through training at local companies or institutions, and to promote exchange. WaQuAC-NET has recommended trainees for this program since 2014, and Ms. Thitima is the fifth trainee. The training theme for the 2022 fiscal year is "water quality inspection and management," and the host training institution is Kanto Gakuin University. The training period is about six months from early September 2022 to early March 2023.

**Water source inspection**

On the day of the inspection tour, we met at Yokohama Station and traveled by rental car. First, we headed upstream from the downstream of the Sagami River and headed to Miya-ga-se Dam, one of the water sources in Kanagawa. Miya-ga-se Dam is the largest dam in the metropolitan area with a capacity of 183 million cubic meters and is located about 50 kilometers from central Tokyo and about 40 kilometers from

downtown Yokohama. Completed in 2001, the dam has become an indispensable water source for Kanagawa Prefecture. Due to its abundant natural environment and its location within a day trip from Tokyo and Yokohama, it is a popular tourist spot as a natural park throughout the year. After arriving at Miya-ga-se Dam, they had dam curry at a restaurant. Dam curry is a curry that imagines Miya-ga-se Dam, and the mechanism is that when you remove the wiener stuck in the rice that is likened to the embankment, the curry is released. After the meal, we learned about the importance of utilizing and conserving water resources, as well as an overview of the electricity and water supply industry at the Water and Energy Museum. After touring around the Miya-ga-se Dam, we moved downstream and visited the Sagami Great Weir (a water source intake point located 12 kilometers upstream from the mouth of the Sagami Bay). The managing bridge has been open to the public since 2020, and Ms. Thitima walked back and forth along the 495-meter-long weir from end to end.



**Reception party**

After returning to Yokohama, we held a reception with Professor Kamata of Kanto Gakuin University. Ms. Thitima was highly regarded for her excellent performance, and she implemented her research project in no time. It would be great if WaQuAC-NET could continue to recommend trainees in the following years.

**Comments from Ms. Thitima**

Thank you for leading the site observation at Miyagase Dam and Sagami Weir.

I would like to give feedback to you. It was informative and helpful. I appreciated the way you explained the concepts. I learned a lot of new knowledge.

My lessons learned are as follows:

- Yokohama Water Resource system
- Overview of the management of water sources used to produce tap water
- Roles and Management to fully utilize the functions of Miyagase Dam
- Sagami Weir and Intake can help improve fish numbers, stabilize water levels, and stabilizing the effects of river alteration. The fish ladders are sometimes incorporated into weirs to aid in the fish passage.

Moreover, Miyagase Dam is so beautiful. The



Dam curry rice is very creative and delicious. Overall, I think you did a great job, and I appreciate your

effort in preparing and delivering the knowledge and information to me. It was a very great time. I really enjoyed it and look forward to learning more in the future. Thank you very much again for this opportunity.

### **My great experience on Kanagawa Overseas Technical Trainee**

**Ms. Thitima Sangpraphakor**  
**Metropolitan Waterworks Authority,**  
**(MWA), Thailand**

Hi everyone, I'm Thitima Sangpraphakorn, a scientist in Metropolitan Waterworks Authority (MWA) in Thailand. I was a trainee for the "Kanagawa Prefectural Government Program for Overseas Technical Trainees" in 2022. I would

like to share my experience as an overseas trainee in Japan. It was very impressive and unforgettable!

### **About training program**

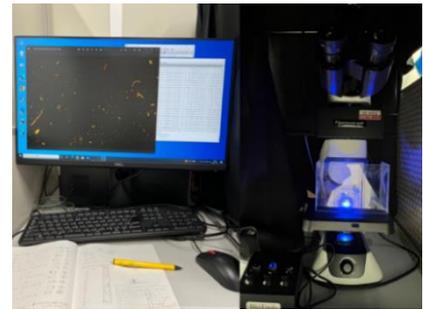
For the first month, I learned Japanese language from the Japanese Overseas Cooperative Association (JOCA)



instructors. I learned not only the Japanese language but also Japanese culture. It was very fun. I practiced many skills in Japanese.

After that, I started technical training in the field of water quality testing and management under Dr. Motoyuki Kamata at Kanto-Gakuin University.

I spent most of the time in the laboratory analyzing microplastics in tap water using Nile Red



staining Fluorescence Microscopy. It was very interesting!

### **Water source observation**

I had site observation at Miyagase Dam and Sagami weir with members of WaQuAC-Net.

I learned about Yokohama water source system, roles and management to utilize the functions of Miyagase Dam and Sagami Weir.

It was informative and helpful. I learned and took field trips about water quality testing and management at several places as follows: Yokohama Waterworks Bureau, Fukuoka Waterworks Bureau, and Asaka purification plant of Bureau Waterworks Tokyo Metropolitan Government.

Lastly, I learned about coagulation and flocculation at METAWATER company.

### About activities

Throughout the training period, I participated in JOCA's activities on Saturday, Sunday, and national holidays. I experienced Japanese culture on several cultural trips to shrines and temples in Kyoto, Nara, Osaka, Kamakura, Enoshima, and Kawasaki. And I went to see Cherry Blossom in Shizuoka. I also participated Earth Festa conducted by Kanagawa Prefectural Government.

Due to the impact of COVID-19, the activities



were changed to the private trips. Lastly, I spent my free time traveling in Japan. I visited many beautiful places in Japan such as Nikko, Aizu-Wakamatsu, Kawaguchiko, and Tokyo.

Especially, I also visited many tourist attractions in Kanagawa such as Yokohama, Hakone, Kawasaki, Enoshima, and Kamakura.

### Closing Ceremony and Farewell



### Impression and Appreciation

The past six months, I had an incredible Journey filled with growth, learning, and unforgettable experiences.

With the enthusiastic support of everyone, I was able to quickly acclimate and



start performing at my best. I learned new technical skills and gained a deeper understanding in the field of water testing and management. However, the most important thing I learned was the significance of teamwork and effective communication. I would like to thank the citizens of Kanagawa, the Kanagawa Prefectural Government, JOCA, Kanto Gakuin University, all training organizations, WaQuAC Net and MWA. Especially The most impressive thing is that Japanese people are very kind. Although communication with different languages is difficult, everyone taught me kindly. Finally, I would like to express my deep appreciation to everyone who has made this program possible, and for the support and encouragement of everyone. I'm really thankful.

### **The 2<sup>nd</sup> Executive Forum in Africa**

**Ms. Mina Yariucih**

(WaQuAC-NET Office)

#### **1. Overview**

The 2nd Executive Forum for Enhancing Sustainability of Urban Water Services in Sub-Saharan Africa was held in Johannesburg, South Africa, 7-9 March 2023, co-hosted by JICA, the Department of Water Resources of South Africa, and the South African Local Government Association (SALGA). Following the first forum

held in Rwanda in 2019, the Forum was held under the main theme “utility management for sustainable water supply services”, through a 2.5-day programme, the Forum aimed to 1) opportunities to have access to good practices of neighboring utilities and be inspired for solutions to their challenges, 2) build network with other utilities and JICA, and 3) share the values as 'a water family'.

**Participants:** 27 executives from 17 utilities in 11 countries participated. The participating countries were Ethiopia, Kenya (3 utilities), Tanzania, Uganda, Rwanda, Zambia and Malawi (2 utilities), Mozambique, Madagascar, Nigeria and South Africa (4 utilities). A total of 64 participants including officials from JICA projects, JICA overseas offices, co-host organizations and other relevant organizations in South Africa, as well as from JICA Headquarters, also attended the conference.

**Program:** The programme is shown in the table, and a lively exchange of views and knowledge was encouraged throughout, with three sub-themes set up to deepen discussion and knowledge sharing, including the utilities' initiatives and experiences from some utilities Day 1 and group sessions on Day 2. Sub-themes: 1) Improving water supply services and financing infrastructure development; 2) human resource development by utilities, 3) management strategy of water supply utility.

Day	Program
6/3	<ul style="list-style-type: none"> <li>• Welcome party (hosted by Dept. of Water and Sanitation, SA)</li> </ul>
7/3	<ul style="list-style-type: none"> <li>• Opening, remarks</li> <li>• Keynote speeches (JICA, WASAC/Rwanda)</li> <li>• Sharing on proactive practices for the common issues (5 utilities)</li> </ul>
8/3	<ul style="list-style-type: none"> <li>• Sub-theme specific presentations and discussions</li> <li>• Site observation (NRW activities, meter test bench, etc.)</li> </ul>
9/3	<ul style="list-style-type: none"> <li>• Report of outcomes of group sessions</li> <li>• Preparation and sharing of key takeaways</li> <li>• Wrap-up, closing (at noon)</li> </ul>

## 2. At the Forum

In opening remarks, the Director of the Ministry of Water and Sanitation of South Africa used the symbolic expression 'Each one, teach one' to refer to learning and sharing with each other. Throughout the programme, many participants referred to the significance of learning from each other, referring to this phrase.

In addition to Q&A and group discussions, the programme also provided many networking opportunities among participants during breaks and meal times, where they actively interacted with participants from other entities.

Participating entities formulated 'Key takeaways' from the insights gained at the forum. It is expected that they will be brought back to the entities for continued consideration. Through the forum, the participants were able to confirm that



although the environment in each country is different, there are common challenges and to have a common understanding of the effectiveness of learning from each other. Participants also have expectations for the next Forum. It is hoped that the Forum will be a catalyst to stimulate the performance improvement initiatives of the various utilities.

**Report of the 2023 WaQuAC-Net General Meeting**

**Ms. Keiko Yamamoto**  
(WaQuAC-Net Office)

The 2023 WaQuAC-Net general meeting was held on February 18<sup>th</sup> via ZOOM. The secretariate reported the 2022 WaQuAC-Net activities and accounting. Then, the 2023 action plan and the budget were proposed and discussed. Participants were Dr. Ishibashi, Mr. Iwao, Mr. Ozaki, Dr. Kamegai, Ms. Kuniyasu, Mr. Sasayama, Mr. Miwa, Ms. Yariuchi and Ms. Yamamoto. Totally 9 persons participated.

**Farewell Party for Ms. Sirapat Khodseewong**

**Ms. Keiko Yamamoto**  
(WaQuAC-Net Office)

On April 19th, a farewell party for Ms. Sirapat Khodseewong (Ms. Nan) was held with Prof. Ishibashi, Mr. Sasayama, Mr. Ono and Ms. Yamamoto. Ms. Nan decided to return to Thailand because she got a job at Mahasarakham University near Khon Kaen, Thailand. She has been staying in Sendai, northern Japan, where she studied for more than three years as a doctoral student at Tohoku University. We enjoyed talking with her about her memories of Sendai and her new job in the Department of Public Health. She said she would continue the membership of WaQuAC-Net. Details will be provided in the next newsletter.



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(Yariuchi, Yamamoto)

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**Schedule:**

May19: Water Quality Intertational Talk

July : 16th Webinar “Leadership for Strengthening Management of Water Utility” by H.E. Ek Sonn Chan

August 1: Newsletter vol.58 in Japanese

August 15: Newsletter vol.58 English