

## Aiming to Improve Medical Skills with Japan's Quality, Easy-to-Use Teaching Materials!

—Contributing to the spread of simulation-based medical education in Ecuador—



Simulation-based education\*1 for learning the basics of medical practice through practical training has become a new global trend in the medical education sector, and its importance is recognized in Ecuador as well. The Faculty of Medical Sciences of the Central University of Ecuador (UCE) had prepared dedicated classrooms and equipment for this. However, as computer-controlled high-performance equipment had been introduced, it had become difficult for the University to do maintenance work on its own and update the dedicated software. Furthermore, they had problems such as a limited number of students who could participate in simulation practice at one time. UCE therefore asked Japan for support.

Around the same time, Mr. TAKAYAMA Toshiyuki, President of Kyoto Kagaku Co., Ltd. (Kyoto Prefecture), a manufacturer of medical simulators, visited Ecuador for a market survey of Latin America and visited UCE. "This encounter was truly miraculous. We visited UCE by pure chance, but it was at exactly the right time when our products were needed," said Mr. Takayama.

Mr. Takayama and employees of Kyoto Kagaku travelled back and forth between Ecuador and Japan several times in a period of just one month after receiving the request for support from UCE and developed a plan for a project while consulting with the JICA Ecuador Office as well. Subsequently, the company made an application to JICA's SDGs Business Supporting Surveys, and the proposal was adopted. Then the Project for Strengthening Human Resources for Universal Health Coverage through Simulation-Based Medical Education was initiated from December 2019 (completion planned for January 2023).

Under this project, Kyoto Kagaku works with UCE as the counterpart institution to carry out simulation-based education verifications tailored to the local circumstances, using 48 types of medical and nursing education simulators

containing 104 items made by Kyoto Kagaku (including physical examinations, medical procedures and care, perinatal and pediatric medical care, and disaster first aid and medical care). Immediately after the start of the project, COVID-19



Practical study on tracheal intubation by medical students of the Faculty of Medical Science of UCE (Photo: Kyoto Kagaku Co., Ltd.)

countermeasures such as curfew restrictions were taken, and face-to-face classes were cancelled at UCE. Nevertheless, the demonstration event upon arrival of the equipment was broadly covered by the media, and expectations on the Ecuadorian side are growing.

Simulators of Kyoto Kagaku are unique in that they recreate the feeling of human skin by special materials and they are anatomically accurate. "When the UCE professors first touched the simulators, they noticed its high quality and expressed their excitement. It is also easy to maintain, as it is possible to replace deteriorating parts, for example injection pads where the needles for injections are inserted. They are suited to local conditions because UCE can purchase a variety of simulators as each one is not too expensive, and many students can practice at once," said JICA Ecuador Office staff member Andrés Mencías.

Furthermore, as a unified curriculum for simulation-based education has not been developed in Ecuador, this project also supports the preparation of such curriculum. The preparation of a unified curriculum using Kyoto Kagaku's simulators is expected to improve skills and provide a high level of practical training at 22 university medical schools in Ecuador, including UCE.

Concerning the future prospects, Mr. Takayama said, "We would like to improve the level of medical education in Ecuador as a whole with this project as a starting point. Furthermore, for Kyoto Kagaku as well, the project offers an opportunity to expand our business in Latin America, where we had no previous track record."

The dream of Mr. Takayama and Kyoto Kagaku grows, hoping that the success of simulation-based education in Ecuador will lead to the improvement of medical education levels throughout Latin America.



The Rector of UCE and the Director of the Medical and Robotics Simulation Clinic testing a heart disease examination simulator at the press conference venue when the equipment arrived (Photo: Kyoto Kagaku Co., Ltd.)

\*1 This refers to using expertly-developed medical simulators to learn techniques such as injection, suturing, and medical examinations in a form close to actual practice in order to train doctors, nurses, and other medical workers. It has drawn interest as a way to provide safe and secure medical services and also for the fact that, after the spread of COVID-19, direct contact with patients has become difficult.

## Team Yokohama's Techniques Help Upgrade Malawi's Human Resources in the Tap Water Sector

—Solution of the Non-Revenue Water problem and improvement of water supply services—



In Lilongwe City, the capital of Malawi, the water demand is increasing due to population growth, but the amount of tap water supplied within the city is not keeping pace with that demand. Furthermore, the proportion of Non-Revenue Water (NRW)\*1 is extremely high, which has become a large problem.

For that reason, Japan commenced the “Project for Strengthening the Capacity of Non-Revenue Water Reduction for Lilongwe Water Board” from 2019, in response to a request from the Government of Malawi, and an employee of the Yokohama Waterworks Bureau has been dispatched as one of the JICA experts. Since its first participation in a JICA survey mission in 1977, the Yokohama Waterworks Bureau has offered technical guidance through its employees dispatched to Africa and training in Japan over many years. Its support implemented to date to improve water supply administration in African countries has been highly appreciated both domestically and internationally.

This project implements fact-finding surveys and analyses of NRW, develops effective data-based NRW reduction plans, and provides on-site work guidance for NRW survey methods and reduction, among other efforts, for the Lilongwe Water Board (LWB). In 2020, in response to the spread of COVID-19, the experts had to return to Japan temporarily, however, they conducted a residual chlorine concentration distribution survey\*2 as a COVID-19 countermeasure and provided technical guidance remotely based on the survey results. The Government and people of Malawi have high expectations for the project, and in interviews with the residents of the district where this project was implemented, they expressed a desire to reduce water leakages and to use the tap water from LWB rather than well water.

“According to the analysis implemented together with the LWB engineers, NRW accounted for as much as 40% of the total water supplied in Lilongwe, and water leakages accounted for 25%. LWB’s conventional measures only repaired leaks that appeared above ground and it did not have the techniques or equipment to detect water leakages underground. In this project, we are providing guidance on



Mr. Sekimoto providing guidance on technology for detecting underground water leakages (Photo: JICA)

skills for detecting and repairing underground water losses,” said JICA expert Mr. ITAYA Hidefumi from the Yokohama Waterworks Bureau, talking about the situation at the time and the current initiative.

Conducting the work from surveying to repairing together with JICA experts, and sharing the experience on “how to reduce NRW” has served as a valuable guide to the future for LWB. JICA expert Mr. SEKIMOTO Shinichi, who is providing guidance in Lilongwe City said, “The City has hard ground, so laying water pipes underground is difficult, and they are sometimes exposed above the ground, which is the cause of water leakages and water theft. Moreover, there were many issues such as a lack of techniques and equipment for water leakage repairs. During the provision of technical guidance, we have accumulated successful experiences together. As a result, the LWB employees are now getting a new mindset that they can reduce NRW by themselves with their ingenuity.”

“There is no end to initiatives for NRW measures, just as in Japan. For example, even if a water pipe with a water leakage is repaired once, still the pipe will get older, and the number of water leakages will increase again. That is why it is truly important that LWB is able to continue the activities on its own after we return to Japan, and we are currently carrying out the technical transfers while being very conscious of sustainability,” said Mr. Itaya.

The experience and skills of local public entities and other organizations in Japan gained through the accumulation of steady daily efforts are greatly contributing to the improvement of water services and people’s water and hygiene environment in Malawi.



Mr. Itaya giving guidance on the development of an NRW reduction plan (Photo: JICA)

\*1 Unbilled water that is caused by water leakage due to aging water supply and distribution pipes, illegal water theft, and faulty water meters.

\*2 The survey was implemented because chlorination of the water supply is an effective measure against COVID-19. “Residual chlorine” refers to how the chlorine agent infused for sterilization in the process of making tap water at water purification plants and elsewhere remains in the tap water as chlorine ions. The chlorine ions kill viruses and disease-causing bacteria, so management to ensure that they exist in the tap water at all times is important.

MASTER  
TECHNIQUES

## from Japan to the World

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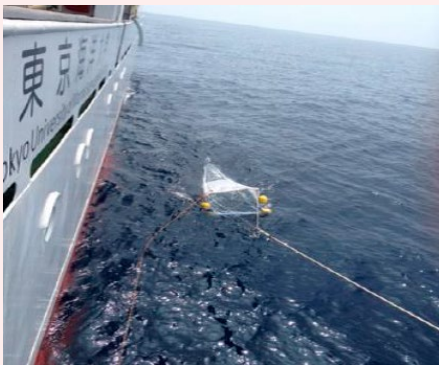
Academia in Japan and Thailand Taking on  
the Challenge of Clarifying the Actual State of  
the Marine Plastic Wastes Problem

—Intellectual contribution to science-based policy making—



In recent years, global interest in marine pollution caused by plastic wastes has been rising.\*1 Plastic has now become essential for our lives and supports the lives of many people in developing countries, including the vulnerable. For example, it enables us to transport drinking water to the regions without a water supply. However, plastic can have a serious impact on ecosystems if it is not processed appropriately after use and is released out into the natural world, so measures to deal with marine plastic wastes have become an urgent issue. Researchers on marine plastic pollution have been rapidly increasing globally since approximately 10 years ago, but large aspects of the problem remain unexplained scientifically, including its outflow routes and the impact on the marine environment.

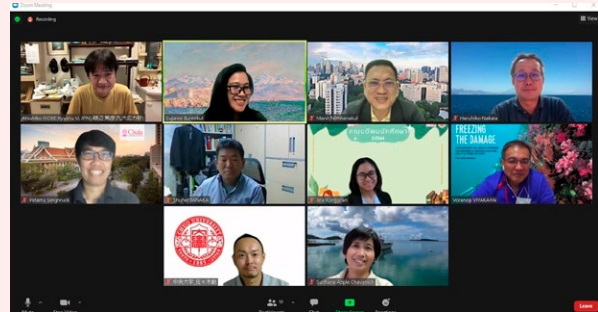
In response to this situation, a research team led by Dr. ISOBE Atsuhiko, Professor of Kyushu University, and Dr. Voranop Viyakarn, Professor of Chulalongkorn University in Thailand, commenced the “Project for Formation of a Center of Excellence for Marine Plastic Pollution Studies in the Southeast Asian Seas” under the Science and Technology Research Partnership for Sustainable Development (SATREPS)\*2 program. From its base at the Center of Excellence in Thailand, the team is conducting scientific surveys and analysis on the path of generation and amounts of plastic wastes, among other matters, in the Southeast Asian seas, a marine plastic pollution hotspot.\*3



Collecting microplastics (Photo: Kyushu University)

“In order to solve this problem, firstly we need to accurately ascertain the volume and the routes of the marine plastic wastes generated. Due to the impact of COVID-19, Japan’s researchers currently cannot travel overseas, so Thailand’s researchers are using new technologies such as drones to monitor the land, rivers, and oceans, and researchers in both countries are holding a series of discussions while checking the survey results online,” said Dr. Isobe.

Dr. Viyakarn, the representative of the Thai side, studied at a high school in Japan as a Royal Thai Government scholarship student and devoted himself to his studies in Japan for



A meeting between researchers from Japan and Thailand held online due to COVID-19 (Dr. Isobe is leftmost in the top row, and Dr. Viyakarn is rightmost in the middle row) (Photo: Kyushu University)

13-and-a-half years until he earned his doctorate. “I would like the research technologies of Japan to be utilized, and the young researchers of Thailand and Japan to be trained through this project. One of the important objectives of this project is enhancing the capacity and developing human resources of research institutions,” said Dr. Viyakarn. In Thailand, the Center for Ocean Plastic Studies (COPS), a satellite research center of Kyushu University, was opened in Chulalongkorn University in April 2022.

“We have received support from the Japan Science and Technology Agency (JST), and already our partnerships with overseas research institutions in the surrounding countries are expanding. The problem of plastic wastes measures is not a simple matter of eliminating all plastics at once. In particular, it is necessary to advance its reduction initiatives with the consent of all people, while taking into consideration the impact on the lives of people in vulnerable positions. For that reason, consensus building based on scientific evidence is essential. We hope that this project will establish a center of excellence that reaches a global audience, and that Thailand will become a role model for plastic wastes reduction among developing countries,” said Dr. Isobe.

It is expected that the collaboration between the scientists of Japan and Thailand will spread across Southeast Asia and then to the entire world, including Japan, with the aim of solving the plastic wastes problem.

\*1 See Part II 3 “(6) Actions on the Environment and Climate Change.”

\*2 See the glossary on page 39.

\*3 An area or region with a high concentration of pollutants.

# MASTER TECHNIQUES

## from Japan to the World

### 4

### Building a Forest Resources Management Model that Reconciles Tropical Rainforest Conservation with the Lives of Indigenous Peoples

—Improving the lives of people living in the forest through joint research with Cameroon—



Southeast Cameroon is covered by tropical rainforests with high biodiversity. However, sustaining these rainforest ecosystems has been increasingly difficult since the 1990s due to deforestation for timber exports and overhunting of ivory and bushmeat. Therefore, the Government of Cameroon has established several natural reserves where hunting and timber exploitation are prohibited. Meanwhile, in this region, an ethnic group called the Baka has practiced hunting and gathering, coexisting with nature since long ago. Ironically, the government's conservation policy has deemed Baka's hunting activities for subsistence illegal, making it difficult for them to sustain their traditional lifestyle.

Against this backdrop, researchers from Japan, led by Dr. YASUOKA Hirokazu, Associate Professor at the Center for African Area Studies of Kyoto University, formed an international joint research team with Cameroonian researchers from the Institute of Agricultural Research for Development (IRAD) and other institutes. Dr. Yasuoka has long conducted interdisciplinary research on the ecology of people in the Congo Basin. The team commenced the "Project of Co-creation of Innovative Forest Resources Management Combining Ecological Methods and Indigenous Knowledge (COMECA)" based on the framework of the Science and Technology Research Partnership for Sustainable Development (SATREPS) program.

Under this project, the team conducts ecological surveys of wildlife in and around the national parks of southeastern Cameroon. Moreover, the researchers combine the scientific results with the indigenous knowledge of local people (experience-based knowledge, skills and practice related to their land and flora and fauna, which are often inappropriate to generalize in a scientific manner). In this way, the team will prepare proposals and a roadmap for the government to sustainably use wildlife and non-timber forest products



Placing a camera trap for a wildlife survey while camping together with local assistants in the tropical rainforest (Photo: COMECA Project)



A Peters's duiker, one of the main hunting targets in the project site, captured by a camera trap placed in the forest (Photo: COMECA Project)

(NTFP).<sup>\*1</sup> It also plans to cooperate with IRAD, local peoples and others to develop processing methods for Irvingia nuts and other NTFPs to promote alternative means for income.

"To build relationships of trust and to work together for forest conservation, it is necessary to create a system where residents are proactively involved in the use and management of forest resources," said Dr. Yasuoka. "We aim to establish a management model that integrates indigenous and scientific knowledge to build a bridge between conservation authorities and local people. This model will enable the residents to continue their livelihood customs with wild meat while maintaining biodiversity."

Dr. HONGO Shun, a Program-specific Researcher of the COMECA Project, has been conducting fieldwork since 2018. Using motion-triggered camera traps to record wild animals, he estimates the population density of hunted animals and develops a system for monitoring their abundance. "Together with local people," Dr. Hongo said, "we will explore a method where they can monitor faunal resources by themselves employing their indigenous knowledge." He also supervises researchers and students at counterpart institutions in Cameroon.

"The Congo Basin has the world's second-largest tropical rainforests after the Amazon, and a variety of people live in the area besides hunter-gatherers. Although the COVID-19 pandemic has hampered the project's progress, we intend to make steady advances to improve the lives of the people in the forest and the biodiversity conservation," said Dr. Yasuoka.

Combining science and indigenous knowledge, the research team of Japan and Cameroon is now building a forest resource management model for sustainable use of the Congo Basin tropical rainforests, together with local people.

<sup>\*1</sup> A variety of products other than timber that are harvested in forest regions, such as nuts, mushrooms, and berries.