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Tackling the Challenge of Waste

Special Feature: Waste Management

Tackling the Challenge of Waste

As an economy grows, it unavoidably means having to deal with the problem of waste.

Appropriate waste management systems reduce the burden on the environment and help create a sustainable, sound material-cycle society. Using its knowledge and technology, Japan is working closely with developing countries to solve the serious problem of garbage.

Key Resource Person: Mitsuo Yoshida, International Network for Environmental & Humanitarian Cooperation (INEHC), Non-Profit Inc. Assoc.

Photography: Yusuke Abe

If the problem is ignored, tragedy will eventually strike

Waste generation is a natural consequence of people living their daily lives. In Japan, for example, each individual generates about a kilogram of waste per day, which amounts to 365 kilograms per year. Due to increased concern for the environment, Japan has successfully reduced its annual volume of waste since 2000; however, looking at the history of developed countries, the statistics make it clear that as economic development progresses, the amount of waste also increases. As a country develops, production activities accelerate, and imports increase as well, so the amount of waste naturally increases. Therefore, becoming prosperous can be

equated to producing abundant waste.

In developing countries, even modest economic growth may lead to a sharp increase in the amount of waste—sometimes more than double—making it very hard for waste collection services and the construction of disposal sites to keep pace. In the worst cases, the waste is left mostly untreated.

Mitsuo Yoshida, Director of the International Network for Environmental & Humanitarian Cooperation, has been involved in the waste management sector of JICA for more than 20 years. In the case of developing countries, he says that “Some countries and regions fail to provide proper waste services due to challenges such as having a wide coverage area. However, the biggest problem is

that waste management is not prioritized enough as a policy issue. This will lead to limited budgets for human resource development and appropriate management system development.

Proper waste management in a low-income city is said to require five to ten times the expenditure that is currently spent per person. Although it goes unspoken, many governments would rather invest in more visible things such as infrastructure development.

Experts agree that once economic development reaches GDP per capita \$2,000-\$3,000, the waste collection rate rises considerably. At this point, people will notice if it is left uncollected, often triggering strong calls from the public for sanitation measures.

On the other hand, waste disposal sites tend to be located away from urban areas; this means politicians, and those in the position to allocate budgets, barely understand the situation on the ground. As a result, open dumps, where garbage is simply thrown and piled up in vacant lots, valleys, depressions, and other places, are becoming widespread; and leachate from waste disposal sites, as well as methane gas produced in anaerobic environments, have become pollutants.

“Another serious problem is the risk of collapse of waste mountains. In 2000, this has resulted in the death of more than 300 people in Manila, the Philippines; and in 2017, 32 people lost their lives in Colombo, Sri Lanka, 46 in Addis Ababa, Ethiopia, and 16 in Maputo, Mozambique. Despite the large-scale urbanization caused by economic development, not everyone can find work, so the poor make a living by picking up valuable items from these piles of garbage, and illegally residing near waste disposal sites. These factors create a vicious cycle.”

Working hand-in-hand to support development

The development of waste management in Japan can be broken down into four stages: 1) the improvement of public health through waste collection; 2) the reduction of environmental impact

and prevention of pollution through proper waste disposal at landfills; 3) the reduction of landfill waste through the introduction of intermediate waste treatment; and the current stage, 4) the creation of a sound material-cycle society through the 3Rs (reduce, reuse, recycle). Japan worked on 2) and 3) simultaneously in the 1960s; and by constructing waste incineration facilities, it greatly reduced the amount of its landfill waste.

Nevertheless, these processes cannot simply be applied as-is to waste management in developing countries. Rapid economic growth with mass consumption and globalization has led to shortened transitions times between stages, and in some cases, the process of development needs to be considered as working simultaneously in multiple stages.

“The trend in waste management is shifting toward recycling of materials and energy recovery through incineration. However, it is up to developing countries to choose which path to take. They have the opportunity to learn from the experience of different countries and consider their own waste problem, while Japan can also play the important role of offering its most recommended measures for achieving whatever they decide on.”

The recommendations will vary depending on the geographical conditions, environment, and culture of the country, and even the size of the cities within the same country. JICA extends its cooperation and wants to work together with each country from the latter's perspective.

One of the local Sri Lankan officials introduced in this special feature states, “I appreciate Japan's cooperation. More than that, though, I'm happy that I was able to become familiar with the Japanese principle of *Mottainai*, which conveys a sense of regret over creating waste. I'm very thankful.” Hopeful words indeed. Let's work together as people of a shared world,

so we can put a smile on the face of future generations!

..... Democratic Socialist Republic of Sri Lanka

Achieving sustainable waste management that is compatible with local characteristics

Passing On a Rich Natural Environment to Future Generations by Reducing Environmental Impact

Like many nations, Sri Lanka is faced with the problem of waste management. We followed the daily activities of experts in Sri Lanka tackling this problem with Japanese technology and vision.

Photography: Yusuke Abe



Democratic Socialist Republic of Sri Lanka

Capital: Sri Jayawardenepura Kotte
Currency: Rupee
Population: Approx. 21.03 million (as of 2016)
Official Language(s): Sinhalese and Tamil
Link Language: English

[Project Introduction]

Experts in Pollution Control and Reduction of Environmental Burden in Solid Waste Management

(February 2017 - February 2019)

JICA Expert Yoko Onuma is collaborating with a team, including Naofumi Sato from the EX Research Institute and consultants from Kokusai Kogyo Co., Ltd., to improve the environment through appropriate waste management by creating guidelines for final disposal sites based on pollution control techniques for landfills developed by Japanese and Sri Lankan researchers. Cooperation is underway in the three local authorities of Kurunegala Municipal Council, Ratnapura Municipal Council, and Kat-aragama Pradeshiya Sabha, according to their respective local characteristics.

As a participant in the JICA technical cooperation project, consultant Naofumi Sato recalls his first visit to Sri Lanka in 2002, "At that time, the streets were filled with garbage, and there were sanitary problems. However, Sri Lanka has changed greatly over the past 10 years. Citizen awareness has also changed as a result of steady long-term activities such as giving advice and suggestions for waste segregation and collection to government agencies. Intermediate treatments such as composting (making compost by fermenting kitchen waste), which had only been implemented in about 10 local authorities, are now being carried out in 120 of the 335 local authorities in the country. Sanitation in the towns has gradually improved, and we're now at the stage of planning final disposal sites that will reduce environmental impact."

Since the Sri Lankan government established the National Strategy for Solid Waste Management in 2000, it has been working on solving problems in this field; however, there are some issues peculiar to the country. Yoko Onuma, who works for the Central Environmental Authority (CEA) in Sri Lanka as a JICA Expert, explains that, "The main final disposal sites in Sri Lanka practice the environmentally burdensome open dumping method, where pits are dug and filled with waste. In the Western Province, where the country's largest city of Colombo is located, around 2,100 tons of garbage a day are sent to the landfill. Sri Lanka is an island nation with many mountains and wetlands, placing limitations on the amount of land that can be converted to disposal sites. Moreover, local residents oppose such efforts due to concerns over offensive odors and risk of health hazards."

Developing new sustainable, low-cost technology: that effectively tackles the challenge of waste management has been a long process for the Sri Lankan government and JICA. Commencing with a survey in 2002, they have been cooperating in structural developments and training-based human resource development in local authorities. In 2011, they implemented the "Project for Development of Pollution Control and Environmental Restoration Technologies of Waste Landfill Sites Taking into Account Geographical Characteristics in Sri Lanka" with Saitama University and other organizations. This project, which ran for a period of five years, created sustainable and applicable guidelines for planning, managing, and preventing pollution at waste disposal sites. It also developed technologies for low-cost, low-maintenance and low-environmental impact facilities using materials that can be procured locally.

Onuma is currently providing support for a trial implementation of the guidelines in three local authorities. Working hard every day, she says she wants to help improve the capabilities of the relevant institutions in Sri Lanka, as a basis for the proper implementation of guidelines nationwide in the future.

"There was a major landslide at a final disposal site called



Right: The composting plant at Kataragama's waste disposal site. Kitchen waste and recyclable materials are separated from the mixed waste. / Left: Site manager Ariyapala and Japan Overseas Cooperation Volunteer Shinya Inoue having a discussion at the composting plant in Kataragama

Final disposal site in Karadiyana

This open-dump waste disposal site is the dumpsite for seven local authorities in the Western Province. It receives around 500 tons of waste per day. Data is collected by each local authority to manage the volume of waste. In February 2018, an automated sorting machine was installed as part of JICA's "Verification Survey with the Private Sector for Disseminating Japanese Technologies for Municipal Solid Waste Material Recovery Facilities." Using technology for highly accurate sorting of valuable resources and compost material, it collects resources from the mixed waste delivered to the disposal site and produces compost. This project was designed to improve environmental sanitation by addressing problems such as foul odors and water contamination; it also aims to produce quality, organic compost and mitigate soil degradation. Nadeeka, who works for Recycle (headquarters in Chiba), the company that operates the facility, says with hope, "Someday, I want to make compost that is optimal for each crop, whether it be vegetables or rice."

Left to right: Japan Overseas Cooperation Volunteer Akifumi Kanachi provides advice to local administrations and holds environmental lectures at schools; Ranuka Gunawardhana; Nadeeka Edirisinghe of Recycle; Yoko Onuma; and Dhanuka Wijerathne (manager of the Karadiyana final disposal site, WMA).

Meethotamulla last year. It's an open dumpsite that has been a dumping ground for Colombo's garbage. It was a major disaster; 32 people died, and 418 families were affected. The danger of collapse had been pointed out for some time, and there was even an evacuation advisory issued several days before the incident due to the continuous rain. The accurate advice provided by the experts from the Japan Disaster Relief team right after the accident was truly encouraging to the locals. It happened soon after I assumed this post, and I was uneasy because I still did not have a feel for the place. Regardless, I did my best to coordinate with the relevant officials. This incident showed not just the Sri Lankan government officials, but also the citizens, the importance of waste management. As a specialist, I am trying to tackle the issues faced by the Sri Lankan government, for example, by suggesting concrete ways to make improvements based on objective data about waste management."

Developing facilities that are low-cost, easy to maintain, and can be operated long term

Professor Ken Kawamoto of the Graduate School of Science and Engineering, Saitama University, actively works as a specialist in the establishment of measures to prevent soil and groundwater contamination, as well as technologies for restoring waste disposal sites in Sri Lanka and other Asian countries. He prepared guidelines in cooperation with JICA, and has done research on water purification technology and pollution prevention utilizing the locally and readily available coconut fiber, coconut shell charcoal, geomaterials with high heavy metal adsorption properties, and expansive clay.

Yoko Onuma, JICA Expert

Onuma is currently engaged in technical cooperation in three areas of Sri Lanka in order to implement guidelines. Narrowing down the candidate local authorities from all over the country from 2015 to 2016, she and other experts toured disposal sites and selected the three areas based on the environment and enthusiasm of the local authorities. She is helping the local authorities by giving advice on maintaining and managing the disposal sites and performing repairs and improvements, so that in the future they can continue the activities independently. She intends to prepare a manual based on the results of activities in these three local authorities, as well as cooperate with CEA to spread the activities all over the country.



**Everyone's awareness will help change society:
Those who **take out** waste;
Those who **collect** it; and
Those who **process** it.**



Colleagues working together to improve waste management in Kataragama Pradeshiya Sabha. There are high expectations for the efforts being promoted by the team, which includes city staff and specialists from Japan.

“How do we make sure that the Sri Lankan government can manage and implement the guidelines by itself when support from Japan comes to an end? As a fellow island country, Japan's waste management method is effective, although not everything can be applied. Take the water-sealing material used to prevent leachate (contaminated water from waste disposal sites) from seeping into the ground as an example; the material used in Japan is too expensive for Sri Lanka, so it can't always be used. That is what made me think about using Sri Lanka's very own expansive clay as a water-sealing material. We have to build facilities that are capable of performance similar to large-scale facilities, while keeping them low-cost and low-maintenance. Like with medicine, generic construction would work. Since Sri Lanka is larger than Kyushu but smaller than Hokkaido in Japan, disposal facilities that are easy to oversee and are on a manageable scale are appropriate, especially when the limited number of workers in this field is considered. Moreover, in order to

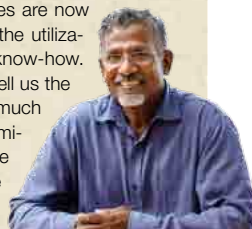


Even the elephants...

More and more elephants are suffering from health problems due to ingestion of plastic bags and other garbage that cannot be digested.

**Indrarathna, Deputy Director General,
Central Environmental Authority**

The guidelines prepared in cooperation with JICA are based on advanced technology that is very important for reducing costs and environmental impact. In fact, the guidelines are now being used to improve disposal sites through the utilization of the country's resources and technical know-how. We are currently waiting on a report which will tell us the degree to which costs were reduced, and how much improvement was made with respect to contamination at the disposal sites. We hope to use the same technology for other disposal sites in the country based on the results.



ensure a sustainable operation of the facilities, it's essential that we become thoroughly familiar with the natural features of each region and build facilities that address those in detail.”

Kataragama Pradeshiya Sabha, a town in southern Sri Lanka with a population of around 22,000, is one of the local authorities currently receiving cooperation from a team of JICA Experts. Located next to a national park, this town is home to a temple that is sacred to the Sri Lankan people; so during festivals, as many as a million people come from all over the country. Their disposal facility had problems dealing with the large amount of garbage thrown out by visitors, a problem compounded by the 60 wild elephants living nearby that would rummage through the waste. At the same time, Sato explains, “At facilities that do not control seepage, leachate seeps into the soil and contaminates groundwater.” Standing at the planned site for Kataragama's disposal facility, he points out the difficulty of implementing measures against the impact of waste disposal on the environment.

“Subsoil water (underground water veins) in some parts of the town is contaminated according to the numbers, so we regularly survey the water quality.”

At the improvement site, local clay was used for seepage control, and an electric fence was installed to keep elephants out. Taking advantage of its location at the base of a mountain, the design will allow collection of leachate via the natural grade, without using motorized pumps and other equipment. The collected leachate will then be treated using coconut fibers.

“We also plan to introduce a treatment facility for raw sewage dumped at the disposal site. Treated sewage water will be used for the bacterial reactions required to make compost. Moreover, the sludge generated by the sewage treatment process contains nitrogen and phosphorus, which are important for plant growth; we will mix the sludge with the compost to increase its value.” These are just some of the measures developed to effectively utilize waste and make them useful in daily life.

**Jayathilaka, Secretary,
Kataragama Pradeshiya Sabha**

Kataragama Pradeshiya Sabha is a unique town in Sri Lanka. Many people visit this place as it is sacred to Buddhists, Hindus, and Muslims. We used to do waste management operations without a plan, so we were unable to handle the increase in the amount of waste prior to receiving JICA's cooperation. JICA is currently tackling various issues to realize systematic, efficient waste management in this location. We are now facing the challenges to establish an effective waste disposal system together with citizens.



**Composting waste.
Thoroughly promoting reuse!**



A composting bucket at a hotel in Kataragama Pradeshiya Sabha. Left to right: Layan Gunasekara, who coordinates and does activities with the town of Kataragama Pradeshiya Sabha and its residents five days a week; Chiharu Iida and Naofumi Sato from the EX Research Institute; and the hotel owner who placed a customized sticker on the bucket to ensure proper sorting.

**Improving efficiency
with GPS!**



A worker heading out to collect waste carries a GPS device with the aim of improving the efficiency of waste management, such as by eliminating the inadvertent skipping of areas.

Sustainable waste management starts with effective utilization of waste

In Sri Lanka, household waste is largely divided into kitchen waste and mixed waste. Starting the segregation and composting of kitchen waste is essential, as kitchen waste accounts for around 60% of the waste in the country. In addition, the demand for compost is high in Sri Lanka's thriving agriculture industry.

CEA Deputy Director General Indrarathna talks of its importance, “In 2016, the Kandy District brought in composting machines made by the Japanese manufacturing company Kawashima Co., Ltd., (based in Gunma). Currently, the Ministry of Local Government and Provincial Councils is making plans to introduce that machinery nationwide and, in the future, make compost across wide areas.” This is also a good example of how the technology of Japanese SMEs introduced through JICA's cooperation has been recognized locally and spread.

Although in place for some time, the system for segregation and collection of kitchen waste in Kataragama Pradeshiya Sabha had not been very successful. Secretary Jayathilaka says, “In conjunction with the improvements currently underway at the disposal site, we are collecting basic data on waste and promoting ongoing efforts to change the attitude among residents. I feel that the residents are becoming more aware of the 3R's (reduce, reuse, recycle). Last year we held a contest for schools and Buddhist institutions, such as Sunday schools, to come up with a logo and slogan for promoting the 3R's. More people are becoming aware of the 3R's thanks to the combined efforts of everyone involved.”

3R activities are currently being promoted in two areas of the town. While looking at segregated garbage being collected in the town, Sato says with a smile, “Many people are involved in waste management, from segregation to treatment. It's important that

**Professor Ken Kawamoto,
Graduate School of Science
and Engineering,
Saitama University**

We aim to achieve sustainable operations at disposal facilities based on Japanese technology and local circumstances. When introducing waste water treatment facilities that use coconut fiber, ideas such as using the treated water to make compost and thereby not wasting it are also important. Additionally, sharing the results of the promotion of 3R activities in an easy-to-understand manner is necessary for ensuring that the project continues. Such results include not only the amount of waste reduced at final disposal sites, but also specific monetary amounts such as the profits earned from the sale of valuable resources and compost.



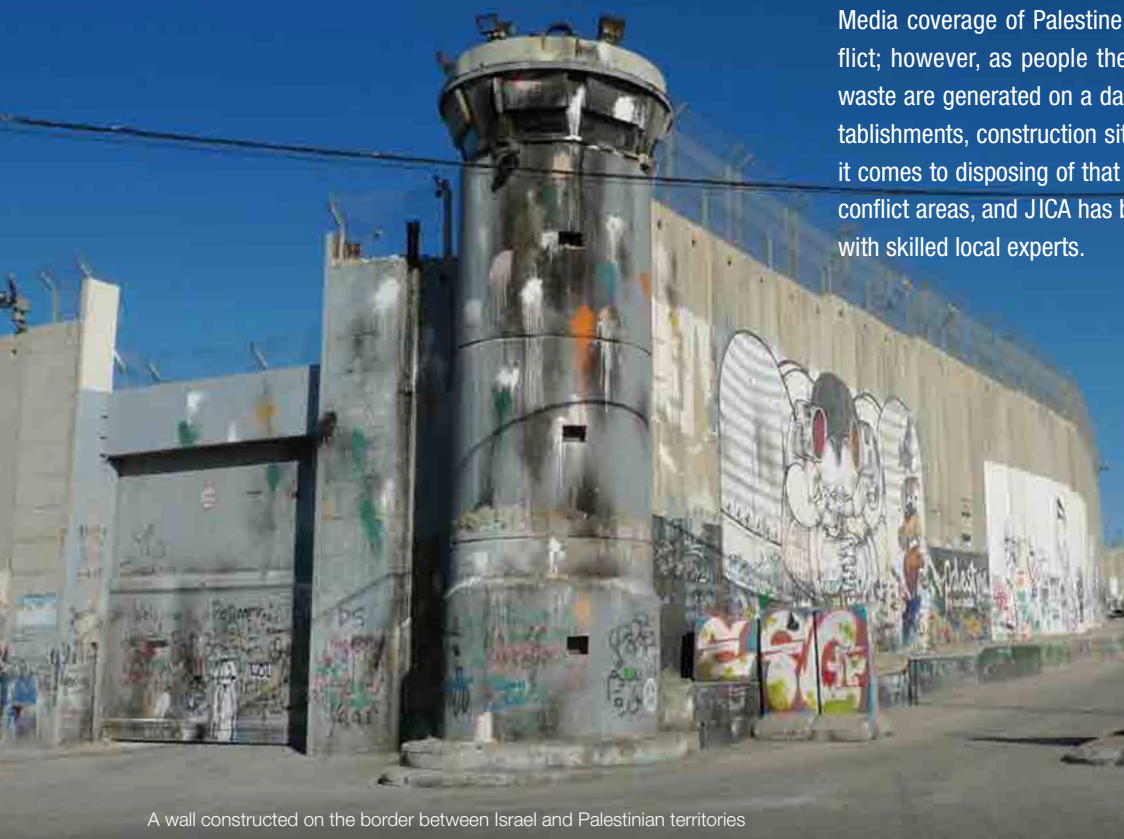
those throwing out waste make an effort to limit the amount of waste they produce and become aware of the need to segregate it. Those involved in waste treatment also need to take pride in their work. The only way to achieve this is to keep having discussions and gain the people's understanding. When it comes to maintaining waste management, everything depends on the people.” He is busy making preparations so that the local authority can run the operations by itself in the future, while providing guidance on matters such as efficient waste segregation, usage of compost at one's home, and measurement of the total volume of waste at the disposal site.

In November 2017, Onuma invited a waste management officer from Shibushi City, Kagoshima Prefecture to Sri Lanka. She hoped it would help the locals get a feel of the process if the officer tells them about the state of segregation and collection in Shibushi City. With a population of around 30,000, Shibushi City does not have an incineration facility and instead processes its waste through segregation, collection, and resource recovery. The citizens have come together to segregate their waste into 29 categories as part of the city's waste management operations.

Considering their limited land area and inability to construct incineration facilities, segregation and collection will be a major key to success in the small- and medium-sized local authorities of Sri Lanka. Impressed by Shibushi City's efforts, staff members from CEA and Sri Lankan local authorities visited Shibushi City in February 2018 of their own accord. Members of the group who saw the city's efforts firsthand were inspired by the fact that the measures were mainly led by the municipality and not the national government; that the population of the city was similar to that of small- and medium-sized local authorities in Sri Lanka; that there were concrete ideas they could adopt; and that the city had a recycling system and was working to minimize waste. They were determined to spread the same approaches throughout Sri Lanka.

The technology and way of thinking cultivated by the island nation of Japan have become an important resource for a sustainable future at waste management sites in Sri Lanka. Over time, waste management in the area continues to make progress. It is a place where the hopes of the Japanese engineers and specialists who have worked on these efforts and joined the journey live on.

Tackling Garbage Problems Peculiar to Conflict Areas



A wall constructed on the border between Israel and Palestinian territories

Media coverage of Palestine mostly reports on the enduring conflict; however, as people there lead their lives, large amounts of waste are generated on a daily basis from homes, commercial establishments, construction sites, and other places of activity. When it comes to disposing of that waste, there are problems peculiar to conflict areas, and JICA has been tackling these problems together with skilled local experts.

Article: Tatsuya Mitsuishi



Palestinian Territories

Population: Approx. 4.95 million (as of 2017)
Official Language(s): Arabic

Project for Technical Assistance in Solid Waste Management (January 2015 to July 2019)

This project has assisted 12 Joint Service Councils (JSC) established in the West Bank to ensure proper waste collection and transport. In addition to Local Expert Team (LET) forming and training of local staff, the project assisted in the formulation of the National Strategy for Solid Waste Management in the Palestinian Territory.

A major obstacle to waste collection and transport

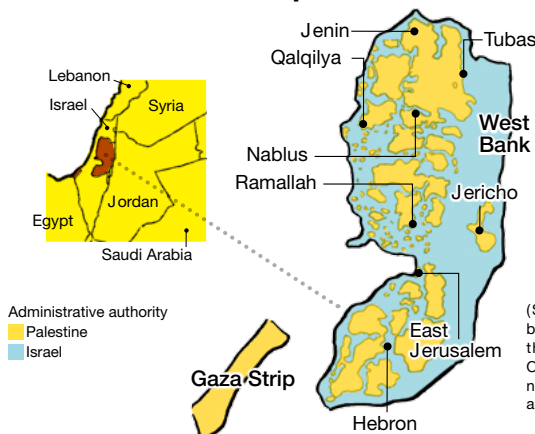
“The West Bank in Palestine is roughly the size of Chiba Prefecture of Japan (5,156km²). However, where normally it would just take 10 minutes to get to the next town by car, sometimes it takes several hours because roads are blocked off, and it takes time to get through the checkpoints.”

So explains Takaaki Murata of JICA, who is currently staying in Palestine and working for the project. The Oslo I Accord (1993) provided for the creation of the interim self-government body called the Palestinian Authority (PA); however, the neighboring country, Israel, is in charge of the regional security and administration of around 60% of the West Bank, so Israeli settlements are scattered about like islands near Palestinian residential areas. Palestinians are not allowed to go through these areas, and checkpoints manned by Israeli soldiers are set up in each area, which, as mentioned above, is one of the reasons movement is restricted.

Waste collection and transport is a major issue in Palestine. Although it is a conflict area, many Palestinians live there and, naturally, they generate waste daily. Currently, 430,000 tons of waste is generated in the Palestinian West Bank per year, which works out to 0.8 kilograms per person per day. Transporting the waste to disposal sites takes time and money because of the settlements and checkpoints. Securing new disposal sites is also difficult as it sometimes requires negotiations with Israel.

As a result, illegal open-air dumps called random dumpsites

Detached residential areas make garbage collection and transportation difficult



Administrative authority
Palestine
Israel

(Source: Prepared based on data from the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA))



The Local Expert Team (LET) comprised of experts from leading JSCs where waste management is on track, such as the JSC in Jericho, which was supported in the Phase 1 project. Public awareness campaigns are also carried out for residents.

have popped up here and there. These random dumpsites generate foul odors and harbor pests that carry disease; they have caused problems such as contaminated groundwater and soil, worsening the living environment. International cooperation is being implemented to address these problems and carry out appropriate waste management.

JICA has been engaged in Phase 1 (2005-2010) and Phase 2 (2015-2019) of the technical cooperation, in addition to grant aid for the establishment of disposal sites and provision of equipment such as garbage collection vehicles and containers.

In Phase 1, we were able to launch waste collection and transport services through the Joint Service Council (JSC) in Jericho within the West Bank. JSCs are organizations that conduct waste management over wide areas, among municipalities forming associations to perform the work that had been done individually on a smaller scale. This allows more efficient utilization of personnel, vehicles, and funds. Twelve JSCs have been established based on the model of the JSC in Jericho and other trial areas, with every governorate in the West Bank having one JSC. The Ministry of Local Government (MoLG) now has an office that manages all JSCs. As for the facilities, two sanitary landfills were constructed with financial assistance from the World Bank—one in Jenin in the north, and one in Bethlehem in the south. However, some JSCs are lacking in organizational structure and capabilities for proper collection and transport of waste; in order to make improvements in that area, Phase 2 of the JICA technical cooperation project was launched in 2015.

“MoLG’s JSC Office is the overseeing body for the JSCs, but when it was established, it consisted of only two officers: a director and a deputy director. The project could not proceed in such a state, so MoLG increased the number of staff members by three, but these new members were not necessarily familiar with solid waste management. To address this problem, four experienced, incumbent executive directors of other JSCs that had made good progress were added to the project team as the Local Expert Team (LET) for



A sanitary disposal site in Hebron, constructed with support from the World Bank. It is nearing its capacity, so expanding the site and constructing a new disposal site is an urgent issue.



A garbage-transporting donkey!?

A donkey-drawn cart for transporting garbage. Not enough fuel can be obtained for garbage trucks in the Gaza Strip due to economic sanctions imposed by Israel.

Producing a television program to call attention to waste management!

Japan’s consultant firm Yachiyo Engineering produced a local television program as part of the public awareness campaign for residents. The significance and workings of waste management are presented in an easy-to-understand manner, and as much as 73% of the residents watch it, including rebroadcasts.



Takaaki Murata, JICA Expert

Murata was assigned to Palestine from November 2016 to January 2017 while he was working at the Global Environment Department of JICA’s headquarters. He was dispatched to Palestine as a JICA Expert for the project. He is assisting to improve waste management by cooperating with MoLG, JSCs and local experts.



providing technical advice.

The role of the LET is to assist the office, provide technical advice to each JSC, evaluate the guidelines and other materials prepared through the project, and establish a sustainable technical support structure among Palestinians even after external support ends. Utilizing local experts was a novel approach for JICA’s waste management projects, but it’s very meaningful for us to train outstanding human resources that can work on waste issues in a sustainable manner.”

With the project, we worked on increasing the number of office staff and training them, while pouring efforts into public awareness, such as having a local company produce a television program about improving waste collection.

These efforts have borne fruit. The organizational structure of JSCs in the West Bank has come together, and they are now able to systematically perform activities. The waste collection service coverage of the five JSCs that were supported as part of the project increased from 44% when the project was started in 2015 to 90% as of 2018. Moreover, with the support of JICA and the LET, the National Strategy for Solid Waste Management (2017-2022) was developed.

There is also a new movement in Palestine. In October 2017, two Palestinian territories, the West Bank and the Gaza Strip, are moving toward administrative unification. Naturally, the Gaza Strip also needs to make improvements to waste management based on a unified policy, such as the aforementioned national strategy. JICA will continue to provide assistance to help create a better future.

Disaster Waste Management and the 3R + Return Initiative

A Cyclone Hits!

Disaster Waste Management in Tonga

The 8th Pacific Islands Leaders Meeting (PALM 8) was held in Iwaki City, Fukushima from May 18 to 19, 2018. The Leaders confirmed the importance of waste management and 3R policies, and noted the value of the Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries (J-PRISM). Here, we report the efforts being undertaken through J-PRISM.



Shinnosuke Oda,
Kokusai Kogyo

Oda works as an expert for improving waste management in Tonga. He provides support through on-the-job training for local staff on the disposal of disaster waste brought by Cyclone Gita.



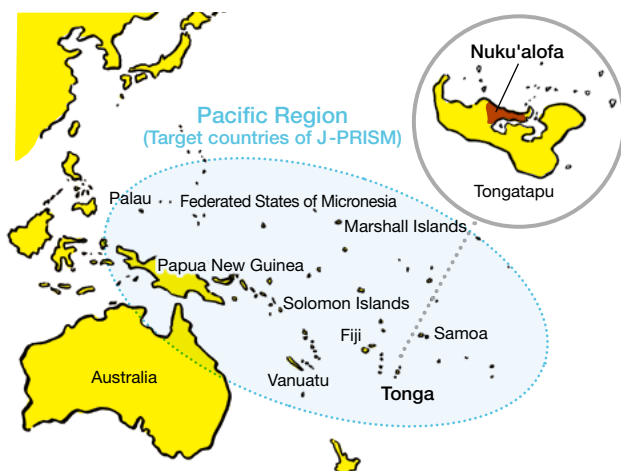
Tonga

Capital: Nuku'alofa
Currency: Pa'anga
Population: Approx. 106,000 (as of 2015)
Official Language(s): Tongan, English

[Project Introduction]

Japanese Technical Cooperation Project for Promotion of Regional Initiative on Solid Waste Management in Pacific Island Countries Phase 2 (J-PRISM 2)
(February 2017-February 2022)

This project is carried out across the Pacific region. It is centered on four themes, namely (1) monitoring of the "Pacific Regional Waste and Pollution Management Strategy;" (2) fostering waste management experts in the region; (3) preparing disaster waste management guidelines; and (4) the 3R + Return initiative for exporting valuable resources within the region.



The Pacific Islands are a disaster-prone region



Cyclone Gita hit Tongatapu, where Nuku'alofa, the capital of Tonga, is located. It caused great damage and produced an enormous amount of disaster waste.



Thorough keeping of waste records!



The Tapuhia disposal site where green waste was transported in trucks. The officer records the name of the person hauling the waste, the category of the waste, and other details.



The owner of a piece of roadside land answered the call made by the president of WAL on the radio and provided his land as a temporary storage location for green waste.

Utilizing the experience of the cyclone in future waste management

On February 12, 2018, Cyclone Gita hit the Pacific island nation of Tonga. Shinnosuke Oda, who was in Tonga as a JICA expert, says, "From what I've heard, it was the biggest cyclone to ever hit Tongatapu." Fortunately, no casualties were reported, but trees and telephone poles were knocked down throughout the area, roofs were blown off houses, and the supply of electricity and water was disrupted for more than a week. The morning after the storm, green waste (such as trees) and housing materials were scattered all over the roads, and the residents just stood in a daze in front of it all.

The public waste corporation Waste Authority Limited (WAL) contracted by Tonga's Ministry of Social Insurance began disposing of the disaster waste that had accumulated throughout the city. In addition to WAL, residents took the initiative to pile green waste and bulky waste onto trucks and take them to the Tapuhia disposal site, which is the only one on the island of Tongatapu; however, there was so much waste that long lines formed.

WAL's waste management services are provided at a monthly rate of about JPY 500 per household on Tongatapu. Oda's initial objective was to support WAL in extending the reach of these services to the remote island of Vava'u. However, the amount of damage was so extensive that he had to quickly change the activity

schedule and perform on-the-job training for WAL staff members. He kept a record of the waste disposal process, saying that the experience gained from the disaster would also be useful as WAL provides services to the island of Vava'u.

While performing on-the-job training for recovery work, Oda noticed an issue with Tonga's disaster waste management.

"There aren't enough garbage trucks, the heavy equipment at the disposal site is insufficient, and they are all poorly maintained."

WAL has eight garbage trucks for household waste; however, all of them were used to dispose of disaster waste, so the household waste collection service was suspended for a week, leaving household waste to accumulate. When the service resumed, they had to collect a large amount of household waste.

"In Tonga, under a declaration of national emergency like this, Tonga's National Emergency Management Office (NEMO) presides over all activities related to disaster management. WAL obtained the approval of NEMO to deploy the necessary heavy machinery for waste disposal, but coordination between the offices was less than satisfactory, and most of the machinery was left unused at the disposal site. I thought that an emergency channel of communication with NEMO, securing of heavy machinery and vehicles, and a plan for taking in disaster waste were indispensable."

As the situation was unfolding, a baseless rumor began to spread that the disposal site was full and could not take any more

waste. In response, the president of WAL went on the radio to tell the citizens to dispose of green waste in swamps. He assured them that it would not be considered illegal dumping, and, at the same time, instructed them to obtain permission from the landowner first. One resident called the radio station and said that the waste could be disposed of on his property, so the radio station quickly broadcast that offer; as a result, residents who could not take their green waste all the way to the disposal site were able to dispose of it in a vacant lot by the road.

The president of WAL promised to carefully consider Oda's proposal to establish temporary disaster waste storage sites in 10 places around the island, prepare a map, and familiarize people with the locations to avoid confusion during emergencies.

J-PRISM was launched in 2011, and its Phase 2 began in February 2017 and will run for a period of five years. One of the pillars of the initiative is the preparation of disaster waste management guidelines for the entire region, and the work has begun in Samoa. Tonga's waste management experience in the aftermath of Cyclone Gita is expected to be utilized in the preparation of guidelines.

Establishing a recycling association to achieve "3R + Return"

The "3R + Return" initiative is also one of the pillars of the activities for J-PRISM 2 and is tailored to the needs of island coun-

tries. It adds "return" to the 3R's of "reduce," "reuse," and "recycle." The concept of "return" involves the export of recyclable resources, valuable resources, and other materials that are difficult to process.

Associations of recyclers are being established within the region to solve the outlined challenges. In countries with small populations, it takes time to collect a certain amount of resources to return; and when fuel costs for the ships transporting them are included, they could take a loss depending on the purchase price. If not exported, this waste will end up at the final disposal site, which reduces the lifespan of the disposal site. Countries in the region are coming together in order to export and return the resources; as a result, discussions are taking place throughout the region regarding the location for facilities to serve as a base for recycling and exports.

Recyclable waste gathered from 3R activities is sent overseas

A recycling center in the state of Koror on the island of Palau where aluminum cans are packaged for recycling. Once a certain amount is accumulated, it is loaded onto a ship and exported.





African Clean Cities Platform (ACCP)

The African Clean Cities Platform (ACCP) was established in April 2017. Participating African countries and partner agencies came together to begin activities for sharing knowledge on waste management, promoting public and private partnership and financial investment, and working towards sustainable development goals (SDGs). In January 2018, administrative officials in charge of waste management from five countries visited Japan and participated in training to learn about municipal waste management in Japan.

AFRICAN CLEAN CITIES PLATFORM
PLATE-FORME AFRICAINE DES VILLES PROPRES



Launching a platform geared towards solving waste problems

Cities in Africa are facing an increasingly serious waste problem as their economies grow and urban populations increase. Improvement of the living environment is essential to continue sustainable growth. With this as background, at a side event held at the Sixth Tokyo International Conference on African Development (TICAD VI) in Nairobi, Kenya in August 2016, participants came to a consensus on the necessity of creating a framework for solving the waste problem; subsequently, a preparatory meeting was held in Mozambique in April 2017 to establish a platform for this task. Japan's Ministry of the Environment, JICA, the City of Yokohama, the United Nations Environment Programme, and the United Nations Human Settlements Programme proposed the establishment of the African Clean Cities Platform (ACCP), and the Maputo Declaration was adopted to endorse the establishment.

As of September 2018, there are now 34 countries participating in the ACCP. In June of this year, administrative officials in charge of waste management from national governments and major cities gathered for the first annual meeting in the Moroccan capital, Rabat. In addition, a training program dedicated to the ACCP was launched to disseminate knowledge and to improve practical waste management skills. Activities for sharing information among participating countries are now in full swing.



The African Clean Cities Platform was established in Maputo, the capital of Mozambique. Attendees of the preparatory meeting included ministers and heads of local governments from participating countries, including State Minister of the Environment Tadahiko Ito from Japan.

We share the common goal of 'clean and healthy cities in Africa!'



Learning Japanese practices in municipal waste management; attending a training program in Japan

As part of the activities of the ACCP, administrative officials in charge of waste management from Ivory Coast, Lesotho, Nigeria, South Sudan, and Sudan visited Japan from January to February 2018 to learn about municipal waste management.

They observed the flow of waste treatment in Yokohama City, Kanagawa. They expressed keen interest in how different kinds of waste are collected on different days of the week, and how workers collect garbage that has been set out by 8 a.m., which is a sight familiar to Japanese people. They also realized the necessity of raising public awareness of waste collection in their own countries, and the importance of communication between citizens and the government. The group also visited Shibushi City, Kagoshima to see how the municipality reduces waste through a comprehensive sorted collection of waste. They showed a strong interest in ways to reduce waste that would be also applicable to the challenges they face in their own countries, wherein waste is generally sent to landfills without any treatment.

Yokohama City, Kanagawa

Top right: Tour of the wastewater treatment facility for leachate from the Shinmeidai disposal site in Izumi-ku where the landfill site has already closed / Bottom right: Survey of a residential waste collection point in Kanagawa-ku where the group was highly impressed with the discipline of residents to follow the rules for garbage disposal. They also performed a mock collection of waste.

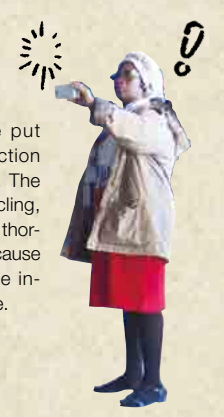


Shibushi City, Kagoshima

Left: Tour of the household waste composting facility at So Recycling Center's Matsuyama Organic Factory in Shibushi City



Right: Garbage put out to the collection point by citizens. The focus is on recycling, and the waste is thoroughly sorted because there is no waste incinerator available.



Trends



Tajikistan

JICA President's First Visit to the Republic of Tajikistan and the Kyrgyz Republic



This June, JICA President Shinichi Kitaoka paid his first visit as JICA president to the Republic of Tajikistan and the Kyrgyz Republic from June 23rd to the 30th. Two of the least developed of the former Soviet republics, these countries are, however, situated at a strategic point near Asia, Europe, Russia, and the Middle East. In both countries, JICA is mainly cooperating in the areas of industrial diversification, creation of transport infrastructure, and promotion of agriculture and business to address issues such as job creation and the deterioration of social infrastructure.

In Tajikistan, Mr. Kitaoka met with Prime Minister Rasulzoda and various dignitaries, and attended the handover ceremony of the grant aid project for the improvement of Dushanbe International Airport. Following this, he was invited as an honored guest to the celebration of National Unity and Reconciliation Day, where he met with President Rahmon and received expressions

of appreciation for Japan's development cooperation. The following day, Mr. Kitaoka visited a number of JICA projects in the south of the country, including an award-winning water supply system.

He spent his first day in the Kyrgyz Republic in the eastern part of the country visiting a One Village One Product project and a UNESCO World Heritage site. The next day, he went to the capital city Bishkek, where he met with President Zheenbekov and Prime Minister Abylgazyev, and attended a signing ceremony for a grant agreement, as well as a handover ceremony for the grant aid project for the improvement of equipment at Manas International Airport.

The two countries are important for the stability and connectivity of the Central Asia region. Building on this visit, Mr. Kitaoka said JICA will redouble its efforts to improve the stability of Tajikistan and the Kyrgyz Republic, and to strengthen its relationships with them.

JICA President Shinichi Kitaoka listens to the stories of the people who live near the water supply project in the Panj district.



Senegal

Humanized Maternity Care Gaining a Foothold in Senegal



In Senegal, the number of pregnant women giving birth in health facilities is increasing; and, consequently, maternal and neonatal mortality rates are dropping. Health facilities, which in the past were feared and avoided by expectant mothers because of unsanitary environments and unreliable medical care, are being transformed into places where mothers can give birth with peace of mind.

Aiming for a gentle, safe birth for mother and child, JICA has been carrying out the Project for Reinforcement for Maternal and Newborn Health Care in Senegal since 2009. In partnership with regional health centers, JICA is supporting the improvement of health facilities and training human resources for health. Based on the survey conducted in the Tambacounda region, and in cooperation with Senegal's Ministry of Health and Social Action, JICA created an apposite model of caring for mothers, newborns, and childbirth. The model introduced in Senegal is

in operation in all 14 regions, of Senegal at approximately 100 health facilities today. The ones working to spread knowledge related to safe childbirth based on this model are the women with childbirth experience in each village; they are called "Bajenu Gox" and are known as "the mothers of the community." Bajenu Gox, along with local midwives, hold classes in various villages to give women correct knowledge related to childbirth. They counsel women on pregnancy and birth and accompany them to examinations at health facilities.

About 20 years have passed since JICA started its "humanized maternity care" initiative in Brazil, establishing there the standard practice of protecting the safety and dignity of mothers and babies at birth. JICA is currently implementing this highly successful initiative in eight countries including Senegal, Mozambique, and Cambodia.

A mother looks into the eyes of her healthy newborn baby boy.



Nepal

3,500 Enumerators Travel Around Nepal for its 1st Economic Census



The field operation of the first ever national economic census commenced in Nepal this year between the months of mid-April to mid-June. The National Economic Census 2018 is responsible for collecting data on establishment numbers, and the amounts of their sales, in order to clarify the structure and scale of the national economy. The preliminary results, published on the 13th of September, show that there are 922,445 establishments employing 3,408,746 people in Nepal, and the government can now utilize this data to comprehend the economic structure of the country accurately, and formulate effective policies to promote economic growth.

JICA, in cooperation with the Ministry of Internal Affairs and Communications, the Statistical Information Institute for Consulting and Analysis, and the Japan Economic Research Institute Inc., has been providing technical support to Nepal's Central Bureau of Statistics (CBS). The support

covers the planning of the census from operation to implementation, data processing, analysis and dissemination of results, as well as the training and equipping of approximately 3,500 enumerators in different stages. Simultaneously, the CBS economic census officials participated in the training program in Japan, where they acquired the competency to become instructors capable of training CBS central officers. Later the CBS central officers trained local CBS officers throughout the country, and eventually the enumerators worked under their guidance.

The results derived from this survey can be used by the government of Nepal as a supporting data when planning industrial and economic policies, and by private industry for business strategy and planning, which will lead to more new business opportunities and contribute to the overall economic growth of Nepal.

Economic Census enumerators hold a banner informing people that the Economic Census is now underway.

Voices from the Field



Samira Chahir

Program Officer, JICA Morocco Office

Samira Chahir first encountered JICA in a magazine article, and it inspired her to join the organization and contribute to the social and economic development of her country. Eighteen years later, and now working as a Program Officer in charge of managing JICA projects in Morocco, she is certain she made the right decision.

Her work mostly involves contributing to initial identification, coordination, implementation, and evaluation of technical cooperation in the fields of environment, agriculture, and rural development. Chahir's responsibilities also include closely coordinating JICA's activities with various Moroccan government ministries to support agricultural and environmental initiatives, as well as helping foster private partnerships and facilitating research activities, and, recently, identifying and managing ODA Loan projects.

Chahir describes Morocco as a beautiful country with a high potential for growth. However, like most developing nations, it faces significant challenges that require lots of support and cooperative action to realize a path to sustainable development that also preserves the natural environment. Solid waste management is one of the major environmental threats to Morocco, and, although the government of Morocco has made significant headway, there is still much to be done to implement the national program of household waste management. What is required is a concerted strategy to enable the formulation of a long-term vision and planning; starting in March 2018, she has been in charge of one such JICA-initiated project to support the national strategy for the

valorization and treatment of household and similar waste.

This two-year project advocates specific strategies for waste management that take into consideration the characteristics of each region of the country, tailoring treatment methods and facilities for their particular needs, and aims to influence future government policy in this sector. Additionally, the project will significantly contribute to sharing knowledge about waste management in Africa via the African Clean Cities Platform (ACCP), which she hopes will allow African countries to identify their real needs and the appropriate methods to handle waste and protect the environment. Chahir expects that the ACCP will also help realize effective and sustainable financial mechanisms to address the challenges related to waste management in Africa; not only developing new innovative projects to solve important problems, but also creating jobs, generating investments, and helping improve the welfare of local communities.

In her role as a coordinator within JICA Morocco, she works closely with Moroccan authorities in seeking solutions to waste problems, giving her a sense of directly contributing to the birth of a clean and healthy Africa. "Since I first entered JICA, I can safely say it has been the greatest educational opportunity of my life, where every day constitutes a new challenge and a new opportunity for me to learn more and help my country have a brighter future." She is proud to say that her contribution to JICA activities in Morocco has been significant, and has changed the lives of millions of Moroccans.

Control Waste to Create a Valuable Resource

Keith Alverson

Director, UNEP International Environmental Technology Centre

This year, for World Environment Day on June 5th, UNEP's International Environmental Technology Centre published two important reports. The first of these, *Single-Use Plastics: A Roadmap for Sustainability*, provides an overview of plastic waste globally. According to the report, more than 140 million tons of single-use plastic packaging waste was generated in 2015. Of this, about 30% was recycled and incinerated, 40% land-filled, and 30%—45 million tons!—simply leaked into the environment. The report also looks at priority actions to minimize the plastic waste problem; one of which, legislation to ban plastic bags, has been predominantly implemented in Africa. At first glance, this seems to indicate that African countries are leading the world in taking bold environmental actions against waste, but digging a bit deeper, one can see that there are many reasons African governments are banning single-use plastics.

One reason is that African countries don't have functional waste management systems, and outright bans appear to provide a quick and easy alternative. Some anecdotal evidence suggesting that these actions may be making a positive difference have, recently, even been promoted by UNEP. Unfortunately, according to our report, it is not at all clear that this is always the case. Usually there is simply not enough data to assess if bans are effective or not, and most of the examples of such glaring paucity of data are, not too surprisingly, in Africa. This brings me to our second World Environment Day report, *Africa Waste Management Outlook*. According to this report, 125 million tons of municipal solid waste was generated in Africa in 2012, a figure which is on



track to double by 2025. On average only about half of this waste is collected, and of that which is collected, about 90% is disposed of at uncontrolled dumpsites or landfills.

The outlook report highlights two areas of intervention to address current and future waste management challenges on the continent. First, bring waste under control. Collection and controlled disposal is the first step required for sustainable or, indeed, any kind of development. Second, harness the opportunities of waste as a resource. At present, about 75% of municipal solid waste generated in Africa is recyclable, yet only 4% is recycled. By formalizing the waste management sector, African countries can catalyze local technological development, create job opportunities, and gain enormous wealth from currently untapped resources. Unlike climate change, where populations in Africa are vulnerable to a problem that is largely caused elsewhere, waste is an African problem requiring African solutions. In this context, JICA recently launched the African Clean Cities Platform*, bringing together 60 cities in 31 African countries to work together to achieve these goals. UNEP is proud to cooperate with this JICA initiative, helping African cities to better monitor and publicize waste statistics to improve the health of, and provide economic opportunities for, their citizens.

* <http://africancleancities.org>

Profile:

Keith Alverson is the Director of the UNEP International Environmental Technology Centre in Osaka, Japan. The center serves as a global center of excellence on environmentally sound technologies with a focus on waste management.