

oa in western India is one of the country's smallest states, with a population of around 1.5 million. It is famous for its UNESCO World Heritage churches and convents, built when it was a Portuguese colony, and its beautiful Indian Ocean beaches. Goa has become a major sightseeing destination, with 2 million visitors each year—but the state's water supply has not kept up with the demand this entails.

In 2007, JICA began cooperating on various initiatives in Goa, including installation of water treatment plants and distribution pipes. A major problem came to light at the survey stage: fully 40% of the water shipped from treatment plants, an extremely high ratio, was "non-revenue water" (NRW), the difference between the volume of water put into a water distribution system and that for which customers are billed. The causes of NRW, such as leakage due to aging pipes, theft through illegal connections, and tampering with meters, are a major impediment to effective use of water.

Japan's average nationwide NRW, at less than 10%, is extremely low by global standards. In 2011, JICA started the Capacity Development Project for Non-Revenue Water Reduction in Goa, leveraging Japanese know-how and providing technical assist-

ance to the Goa Public Works Department (PWD) to cut the ratio in the state.

STEADY WORK TO FIND THE LEAKS

First, the project selected 45 PWD staff members and formed three teams. These teams were matched with Japanese specialists and began working on NRW reduction measures in three areas. It turned out that some of the staff had never heard of the term "non-revenue water," so the project began with the basics: an explanation of the phenomenon and the needed improvements. The PWD staff investigated household water usage, going from door to door to check water meters in gardens, establishing where pipes went within the area, and drawing up detailed maps. Until then, there had been no materials showing the number and location of water pipes.

Based on this exhaustive map of the pipe network, they began a survey to identify leakage points. In doing so, they used "listening rods," which are placed directly against underground pipes to sense leakages by picking up vibrations. The Japanese specialists accompanied the PWD staff and provided guidance in the use of the devices, which were



new to their counterparts. The task involved countless pipes and required an extraordinary level of persistence. Anand Watchasundar, project manager of the department, said, "The Japanese were meticulous in completing the work. We learned not only from their high level of technology but also from their diligent approach to the job."

TARGETING 24-HOUR WATER SUPPLY

Over two years, the 45 staff members on the three teams repeatedly discovered and repaired leaks in the state's water network. "Thanks to their efforts, NRW dropped by an average of over 20% in the three target areas," says Shinkichi Kobayashi of Nihon Suido Consultants, who worked with one of the teams. "Some of the workers have begun proactively implementing measures in other areas." As NRW was reduced, messages of gratitude came in from local residents pleased with the more reliable, higher-pressure water supply.

When you turn on a tap in India, there is no guarantee that water will flow. In some regions, water is available for just two or three hours a day, and residents have to fill their tanks during that window. The Goa Public Works Department has set an improvement target of 24-hour water availability, something that no other state has achieved. If it continues to steadily boost performance through implementation of NRW measures, this is a feasible target indeed.

WATER TO REMAIN A MAJOR POST-2015 ISSUE

Goal 7 of the United Nations' MDGs, focused on ensuring environmental sustainability, includes the target of securing access to safe drinking water. Water is slated to become a progressively scarcer resource as the global economy expands and the world population increases; awareness of and the focus on the wise use of limited water resources will

deepen in the post-2015 development agenda. This is particularly clear in India. Because of the country's remarkable economic development, there are clashes over water resources between citizens and between states. JICA and the Goa Public Works Department have begun efforts to share knowledge and techniques gained during the program with water authorities in other states. As a demonstration of more effective ways to use existing water resources, JICA's project in Goa is an important guidepost toward environmental sustainability in the future.



Public Works Department employees in Goa share leak-prevention techniques learned during the project with personnel from other states.

