Creating a Typhoon-Resilient Aquaculture Industry

Submersible fish cage introduced in the Philippines. Tied with ropes, the fish cage is designed to float and sink.

On November 8, 2013, Super Typhoon Yolanda hit the central Philippines. Tides as high as six meters swept into urban areas, leaving devastating damage. Disaster-hit Filipino regions are working to build communities that can avert future disasters and to restore aquaculture, the basis of the local industry. Seeing a need they can relate to, Japanese communities hit by the 2011 Great East Japan Earthquake, along with fishnet makers from Hiroshima Prefecture, are helping to rebuild the battered Filipino regions.

Areas affected by Typhoon Yolanda

LEARNING SELF-RELIANCE FROM THE EXPERIENCES OF HIGASHI-MATSUSHIMA

On November 8, 2013, Super Typhoon Yolanda (internationally known as Haiyan) struck four Filipino islands including Leyte and Samar. According to the Japan Meteorological Agency, the typhoon had record winds with gusts of up to 90 meters per second. Its power was described as unprecedented. In the central Philippines alone, the number of dead and missing reached 7,986 people. Approximately 1.14 million houses were damaged. Immediately, Japan provided large-scale emergency assistance. In February of the following year, JICA started a project on rehabilitation and recovery from Typhoon Yolanda in 18 municipalities in coastal regions including Tacloban City, which was severely damaged. With the aim of building disaster-resilient communities, that work entailed formulating rebuilding plans, refurbishing public facilities, and supporting efforts for the recovery of the livelihood of the people.

Using hazard maps that the project produced, land-use plans and evacuation plans were made for areas severely affected by high tides, including Tacloban City and the towns of Tanauan and Palo. These plans addressed the relocation of residents living within 40 meters from the coastline and indicated evacuation locations and routes.

In making those plans, JICA was guided by the experience of Higashi-Matsushima, a city in Japan's Miyagi Prefecture that was devastated in 2011 by the Great East Japan Earthquake. The Philippines' officials in charge of rebuilding, such as municipal officers in charge of disaster risk reduction management and planning, had previously visited Higashi-Matsushima four times to learn about relocating people, planning for rebuilding, and promoting disaster reduction measures.

In particular, Ildebrando Bernadas, an officer in charge of disaster reduction in Tacloban City, introduced a series of disaster mitigation measures based on what he had learned from Higashi-Matsuyama's experience. The measures include evacuation planning, early warning systems, and strategic storage of disaster relief supplies and lifesaving boats. Although Tacloban City is a large port serving trade cargo and large vessels, the city remained isolated from all outside help for three days following Typhoon Yolanda. From this experience, Bernadas and then-mayor Alfred Romualdez stress the importance of having the capacity to survive for at least three days without any outside help. In order not to depend solely on the government or military assistance, they have introduced action plans with timelines, in which the roles of the mayor and each city bureau during and after a disaster are described in chronological order, based on the Japanese model.

DISASTER MITIGATION WITH SUBMERSIBLE FISH CAGES: A SENSE OF MUTUAL HELP IS ALSO KEY

In 2014, in an effort to support the rehabilitation and recovery of local residents' means of livelihood, JICA began implementing projects that were aimed at promoting the cultivation of oysters and milkfish, popular seafood for many Filipinos. These projects incorporate special measures to help local residents prepare for disasters of the same magnitude as Typhoon Yolanda. Specifically, a new approach for milkfish cultivation is the use of submersible fish cages. This type of fish cage was developed first by Nitto Seimo Co., Ltd., a fishnet company in Fukuyama City, Hiroshima Prefecture. The cage submerges and resurfaces easily using a technology originally developed for pacific bluefin tuna cultivation in typhoon-prone Japan. By lowering itself as the typhoon approaches, the cage becomes less vulnerable to the effects of waves. Apart from the JICA project, in September 2013, Nitto Seimo had set up submersible fish cages for its own business in Palawan Island in the Philippines. The cages remained intact despite the fierce waves of Typhoon Yolanda. Fukuyama is a sister city of Tacloban, so it was only natural for Nitto Seimo to join in this project aimed at rehabilitating the aquaculture industry.

Takashi Hosokawa, who works in the Net Research and Development Section of the Technical Department at Nitto Seimo's Hakodate factory, reflects on the work. "If we had imported parts and materials from Japan for the submersible fish cages, costs would have been higher," he said. "That's why we started by doing field research and product development. That way, we were able to make the cages using locally available materials."

In addition to using local building materials for the compressors that submerse the fish cages, the project uses devices that are compatible with the fishing boat engines which are already familiar to local fishermen. This work culminated in October of 2014 when a total of 40 remodeled cages were set up in four disaster-stricken villages. Two months later, Typhoon Ruby (internationally known as Hagupit) with an equivalent power of Typhoon Yolanda approached the Philippines, again causing high waves. Despite the storm, every submersible fish cage was safe and undamaged while nearly all the conventional fish preserves made of bamboo and metal were destroyed.

Since 2015, as part of JICA's efforts to support small- and medium-sized Japanese companies doing business in developing countries in order to promote economic development, Nitto Seimo has been attempting, with the help of JICA, to further spread submersible fish cages across the Philippines. The company guides local businesses not only in how to operate and maintain the fish cages, but also on management issues related to the aquaculture industry, for example, on how much revenue to allocate to purchase fry and bait for the next fishing season. Now, as envisioned, some locals are successfully making a living in aquaculture. Hosokawa proudly recounts, "In a town called Guiuan, the whole community began to flourish thanks to the fisheries business with the fish cage as its basis. Local women got involved in processing fish raised in the cages, and they also raised young fish."

Similarly, Philippine oyster cultivation is supported by the city of Higashi-Matsushima, where the industry thrives. The city has hosted trainees from the Philippines at its aquaculture sites and processing facilities. In some cases, local fishers acted as instructors to share knowledge of how best to cultivate oysters. Advising their Filipino counterparts involved in aquaculture, the Japanese fishers talked about selecting suitable locations for cultivation, different kinds of quality oyster spats, and improvements such as how to attach as many spats as possible on the ropes. Thanks to these efforts, large oysters are now being cultivated in the field and are sold to local restaurants in the Philippines. In addition to raw oysters, cheesed and smoked oysters have become popular items on local restaurants' menus. Atsutoshi Hirabayashi, JICA's senior advisor, says, "In the process of building a value chain from production to processing to sales in the community, a sense of mutual cooperation has been strengthened among the local residents. Such collaboration helps people recover from a disaster in a sustainable way." He adds, "Mutual help is essential in building a community that is well prepared for natural disasters."

Although JICA's project on rehabilitation and recovery from Typhoon Yolanda officially ended in February of 2017, the city of Higashi-Matsushima continues its commitment to oyster cultivation in the Philippines through a grassroots cooperation initiative with an NPO based in Ishinomaki City, another city in Miyagi Prefecture that was devastated by the 2011 Great East Japan Earthquake. This initiative is part of The JICA Partnership Program, which aims to support local communities in developing countries.

Tacloban City and the surrounding areas are now experiencing post-disaster economic recovery with domestic investment flowing in from across the country for hotel construction and other related support. However, the wounds of the people are not entirely healed, and their livelihoods are yet to fully recover. With these goals as guidance, rebuilding efforts in the Philippines continue to move ahead in partnership with Japanese companies and the city of Higashi-Matsushima.

Using the experience of Higashi-Matsushima as reference, local Filipino residents in the disaster-stricken area check to see if evacuation routes are free of obstacles.

Left: Evacuation center during Typhoon Ruby. Lessons learned from Typhoon Yolanda allowed better management of the evacuation center.
Right: Meeting convened for Typhoon Ruby. Alfred Romualdez, mayor at that time, is in the right-hand corner in a red shirt. To his left, with folded arms, is Bernadas.