

Ocean Newsletter

Selected Papers

No. **23**
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Director's Message

As mankind moves into the 21st century, integrated policies of ocean governance are necessary for the sustainable development and use of our oceans and their resources and for the protection of the marine environment.

Towards this end, the Ocean Policy Research Institute of the Sasakawa Peace Foundation orients its research on ocean issues in line with the mission statement "Living in Harmony with the Oceans."

The Ocean Policy Research Institute of the Sasakawa Peace Foundation aims to conduct cross-sectoral research in ocean related issues in order to initiate debate on marine topics and to formulate both domestic and international policy proposals.

We publish a Japanese-language newsletter titled the "Ocean Newsletter" (previously known as "Ship & Ocean Newsletter") twice a month. "Ocean Newsletter Selected Papers No.23" contains English-language versions of papers from the Japanese Newsletter edition, published from No.411 (2017.9.20) to No.430 (2018.7.5). The Ocean Newsletter seeks to provide people of diverse viewpoints and backgrounds with a forum for discussion and to contribute to the formulation of maritime policies conducive to coexistence between mankind and the ocean.

Our Institute believes that the Newsletter can expand effective communication on these issues by introducing timely research abroad to an informed readership. It also welcomes responses from readers, some of which appear in the Newsletter.

It is our sincere hope that these Selected Papers will provide useful insights on policy debate in Japan and help to foster global policy dialogue on various ocean issues.

Atsushi SUNAMI
President

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Discussion: Innovation to Overcome the Dangers Facing Our Oceans

[KEYWORDS] protecting the oceans / Human Capacity Building Programs for Global Ocean Issues / diplomacy through science and technology

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Atsushi Sunami

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In 2018, a full 150 years since the start of the Meiji Period, there are increased expectations to take on new efforts in overcoming the growing dangers in our oceans. It is of utmost importance for Japan to take the lead in protecting this global common resource, by encouraging the international community to engage in innovative efforts such as promoting human capacity building and diplomacy through science and technology.

150 Years Since the Start of the Meiji Era

Sasakawa: “I would like to start by wishing a Happy New Year to you all. 2018 marks 150 years since the start of the Meiji period, marking one chapter in Japan’s history. I believe that it is important to keep in mind the events of the Meiji Restoration when we consider what Japan should be doing now and into the future.

The Japanese people started the Meiji Restoration by shouting, “Revere the Emperor and expel the foreign barbarians!” as they fought to gain political control. As soon as they did gain control however, they immediately changed modes. This shows how quickly the people of Japan can change. Another example of this can be seen in the Second World War. Although there had been strong anti-American sentiment throughout the war, as soon as we were occupied by the United States, our attitude changed instantly and completely. When General MacArthur finally left Japan, it is said that he received tens of thousands of letters saying, “Thank you, Mr. MacArthur. Please don’t leave.” This leaves me with the secret suspicion that we Japanese are a frightening people.

So, let’s think about what changes we’ll see in 2018, 150 years after the changes of the Meiji Restoration began. There has been ongoing political turmoil in recent years,



with the dissolution of Japan’s House of Representatives taking place roughly every two and a half years. We also had a six-year period during which our prime minister changed six times. Only recently have we entered a long-term period of political stability. The world currently has high hopes for Japan as a nation. Last year I toured France, Georgia, Azerbaijan, and elsewhere. This made me realize just how important political stability is. Recently, when NATO Secretary General and former Norwegian Prime Minister Jens Stoltenberg visited Japan, he commented that, “Security in the future is no longer a regional issue. We now need to think about it from a global perspective. One aspect of this concerns cyber security, and another concern is our oceans.” Japan is an oceanic state, so this may be a big opportunity to make use of the knowledge and various networks that have been built up to show Japan’s presence in ocean related fields.”

Sunami: “I have also participated in a number of international conferences related to the oceans in recent years. I came away feeling that other countries have high expectations for us.”

Sasakawa: “I feel strongly that political stability is of great importance.”

Sunami: “That is why we need to proactively communicate Japan’s position regarding the oceans to the rest of the world.”

Establishing a Comprehensive International Ocean Institute

Sasakawa: “While the government is saying that Japan is an oceanic state, it is a shame that our policies have not really caught up with that concept. If the public sector does not have the ability to do it, then the private sector should take the initiative. The government will then follow the lead of the private sector and put it on course. This is an age of role division, so we should not just complain about the

government. It has been 150 years since the Meiji period and 70 years since the end of WWII. As citizens, we have done nothing but assert our political rights. As a result, our country is now in debt by approximately ¥1,080 trillion (as of the end of March 2017).

Dying and leaving this for our children to deal with would make us a completely irresponsible generation. We cannot do this. But how should we go about paying back all this money? If we try to reach a balance between earnings and expenses and primary balances, we would need to immediately raise the consumption tax to 30%. But even raising it from 8% to 10% caused a huge public outcry. This is a crisis.

Besides debt, when we look at all the crises that Japan is facing, it is really only now that we are starting to hear people talking about the problems in the oceans. My dream is to build a unified, comprehensive international ocean institute. This is something that absolutely must be achieved. Our oceans are currently governed in silos. We have UNCLOS (United Nations Convention on the Law of the Sea) but matters concerning seafood are determined by the FAO (Food and Agriculture Organization of the United Nations). We only have one ocean. We need to protect it as a shared global asset.

The Republic of Malta was directly involved in the creation of UNCLOS. At the time, Arvid Pardo, a representative for Malta's government, made a speech where he stated that deep-sea resources should be used for peaceful purposes, and should be developed in such a way that they benefit the human race as a whole. This momentum led to the revision of international laws. When I made a speech at the UN Ocean Conference held in June 2017 about ocean governance, the Republic of Malta was the first state within UNCLOS to agree with my proposal. The Nippon Foundation and Malta are now cooperating to create a new framework for ocean governance. But Malta is a small country, so I think we also need to involve large ocean-based countries like Sweden and Norway. There is a lot of effort going on behind the scenes to make this a reality. But what do you think about this?"

Sunami: "Hearing about that led me to participate in the "Our Ocean" conference held in Malta in October 2017."

Sasakawa: "Is that right. What kind of discussions did you have there?"



Sunami: "Well, the participants were aware that these vertical divisions are problematic. This is a worldwide problem, of course, not just a Japanese one. The fact that there is no formal, UN authorized organization for tackling the current problems in our oceans is an issue. Everyone there voiced the same opinion that we need a proper organization to support conferences about the ocean. However, even though there was a shared awareness of this problem, it will probably be a private group, as opposed to a government-based group, that will take the initiative. I have high hopes that you, Chairman Sasakawa, will take the reins. Governments can only act upon formally decided matters. I felt that it is important to begin creating the necessary environment before we begin international negotiations for this."

Sasakawa: "For example, international conferences such as for UN-HABITAT (UN Human Settlements Program) are only held once every 20 years, but they continue to exist to this day. These programs have not been scrapped and rebuilt, so the organizations become more and more bloated, and for the most part are no longer functioning. It is a bit disappointing to think that resources are not being used effectively. I think that we need a slimmer solution for ocean-based problems, to avoid such an outcome."

Sunami: "I really hope this is a challenge you might accept."

Developing Personnel to Respond to Ocean Crises

Sasakawa: "I think we need to create an organization that takes action. However, when Western countries get involved, there is the north-south problem. That is, northern countries will not answer to the demands of developing southern countries. That leads to a situation where nothing gets decided. If Japan acts as a lead-off man, it might be easier to attain international coordination."

Sunami: “But don’t you think Japan is working steadily with regards to the north-south problem? The Nippon Foundation has established capacity development programs in developing countries. For example, cabinet ministers who were visiting Japan from Cambodia had previously studied in Japan. As a result, they have come to respect Japan, which has created connections between our countries. It made me feel that Japan is in the perfect position to connect the advanced, northern countries and the developing southern ones.”

Sasakawa: “Ocean governance requires coordination and cooperation among developing nations and small island states, as well as developed countries. However, developing nations, and in particular small island states, do not have the necessary expertise in the field of ocean governance. That is why The Nippon Foundation has been cooperating with leading international research institutes and universities, foreign governments, NGOs, and international organizations for its long-running program of “Human Capacity Building Programs for Global Ocean Issues.” The program has nurtured 1,075 individuals from 129 countries. We are now putting forth even greater efforts. At present, the legal order on the oceans is becoming an increasingly important worldwide issue. We need experts who are knowledgeable in international law for this, so we are working with the International Maritime Law Institute (IMLI) and the International Tribunal on the Law of the Sea (ITLOS) to train legal experts. We are also cooperating with the UN to provide ocean-related training for senior government officials, administrative officials, and researchers.”

Sunami: “This is exactly what we mean when we talk about innovations that will help overcome the crises in our oceans. The Nippon Foundation’s contributions in this field are already well known internationally. I am really looking forward to the ongoing developments in regard to the “Human Capacity Building Programs for Global Ocean Issues.”

Sasakawa: “Humanity has traveled from land, to sea, to the skies, and finally into space. We seem to be transfixed on space at the moment, but the oceans contain their own fair share of mysteries. One of these is the bathymetry of the ocean floor. Even though we have an overall understanding of the features of the surface of Mars, we have only explored 15% of the ocean floor. Gaining a better understanding of ocean floor bathymetry would be useful for a wide variety of fields. It would allow for analysis of

tide mechanisms and resources on the ocean floor, better path predictions for tsunamis and the increasingly large-scale typhoons we are seeing, and changes in habitat distribution of ocean creatures caused by temperature increases.

The Nippon Foundation and GEBCO (General Bathymetric Chart of the Oceans) Guiding Committee have trained 78 fellows from 36 countries since 2004 in their Postgraduate Certificate in Ocean Bathymetry Training Program. In addition to these fellows, we are aiming to receive cooperation from 24 official bodies including NASA, the IHO (International Hydrographic Organization), and the National Geographic Society, as well as universities and public companies to analyze 100% of the bathymetry of the world’s ocean floor by 2030. Unmanned ships are also something to pay attention to. More than 90% of the world’s cargo is supported by ships. Making them unmanned would be an innovation in the distribution industry far beyond the invention of the automobile. In addition, most of the world’s shipping accidents are caused by human error, so the creation of unmanned ships is also important from a safety perspective.

When we talk about making something unmanned, there are always those who are concerned about job loss, such as for crews on ships. However, such worries are misplaced. Regardless of the generation, there are always innovations that change the roles that human beings play. We need these changes. Research into these ships is progressing in the west, and Japan cannot just recoil from this. We need proactive industry-academic-government input as well as input from other fields, and to tackle this as a nation.”

The Creation of a Japan that Protects the World’s Oceans

Sasakawa: “In order to prevent crises in our oceans, it is essential that our country take the lead in guiding international society towards change. Japan has developed into the country it is today because of the bountiful gifts it has received from the ocean. We are now a nation that has a wealth of advanced technology and knowledge related to the appropriate management of living marine resources and the prevention of global warming. We need to change from being a country protected by the oceans, to being a country that protects its oceans, while also evolving to become a country that protects the world’s oceans. Oceans should be treated as something of great importance. I think the time has come for Japan to be at the forefront in leading efforts to protect the world’s oceans, which every living being on Earth relies on.”



Sunami: “You are right. In order to save the oceans from crises, we need to foster coordination between science and policy measures, ensure the involvement of various stakeholders, and create a worldwide movement. The world has always had high hopes for Japan’s scientific technologies. Our country is promoting efforts through science and technology diplomacy, which will lead to cooperation in these fields and other forms of exchange. By connecting the two different fields of scientific technologies and diplomacy, we can aim to solve the problems being faced by the world. Although the ocean is a theme that exists on a global scale, it still contains a variety of mysteries that science has yet to unravel. It is therefore essential for scientific technologies and diplomacy to work in tandem.”

Sasakawa: “That is exactly right. We are planning to mobilize the wisdom of the world to create a prescription for mankind to address the crises facing the ocean. We will then host an international conference to debate and make decisions concerning this, work to communicate it to the world, and call on a broad range of sectors to facilitate its implementation. We are now pouring our efforts into preparing for an international conference to be held three years from now that will declare the promotion of a new form of

ocean governance. I hope to have people with a deep understanding of the oceans, as well as a strong interest, collaborate on this plan.”

Sunami: “The Ocean Policy Research Institute has also begun working to create an agenda for this international conference. For example: 1. “Passing the ocean on to future generations” through the recovery and preservation of its functions, 2. “Worldwide efforts towards tackling problems in the oceans” through recommendations for international ocean policies, 3. “The creation of a new international collaboration framework related to the oceans” through forming an international network, and 4. “Sharing our sense of mission to gain international cooperation” through proposing world ocean conferences, and other efforts. As the late Professor Elisabeth Mann Borgese, respected as the “mother of the oceans,” often stated, “problematique and solutique (Comprehensive solutions are required for complex problems).” We need to construct an international platform that can create these solutions, and will continue to work with The Nippon Foundation towards this, with the Ocean Policy Research Institute playing a central role. Thank you very much for your time today.” ■

CCS Demonstration Project Offshore Tomakomai

[KEYWORDS] Carbon Dioxide Capture and Storage (CCS) / global warming countermeasures / off the coast of Tomakomai

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(Ocean Newsletter No. 412, 5 October 2017)

A large-scale CCS demonstration project is being undertaken by the Japanese government in the Tomakomai area, Hokkaido Prefecture, Japan, starting from FY2012 and continuing until FY2020. CO₂ injection commenced in April 2016, and as of July 2017, around 66,000 metric tons of CO₂ have been stably and safely injected. CCS - "A Bridging Technology for the Energy of the Future" is not a replacement for renewable energy but instead aims to more quickly address carbon dioxide emissions while renewable energy capacity can be built and optimized. In this paper, we provide an overview and describe the progress of the Tomakomai CCS Demonstration Project.

CCS's Role Relating to the Aims of Reducing Carbon Dioxide

The purpose of reducing anthropogenic carbon dioxide (CO₂) is not just to mitigate global warming, but also to mitigate ocean acidification. The atmospheric concentrations of CO₂ have increased from a pre-industrial value of 280ppm to 400ppm in 2016. It is believed that almost 30% of CO₂ emitted into the atmosphere is absorbed by the oceans. According to the results of an oceanographic survey performed by the Japan Meteorological Agency, a trend of acidification (a reduction in pH) of ocean surface water was reported. According to a report by the Intergovernmental Panel on Climate Change (IPCC)¹⁾, if this acidification continues, the ocean will become less able to absorb CO₂. This will have an effect on the growth and reproduction of a variety of marine organisms, which may lead to large changes in the ecosystems of our oceans.

Carbon Dioxide Capture and Storage (CCS) technologies capture CO₂ emitted from thermal power plants and factories before it is released into the atmosphere. This CO₂ is then stored in a stable formation deep underground. These technologies may play a major role in reducing CO₂ emissions resulting from the use of fossil fuels. Because CCS can be implemented using a combination of existing technologies, there is hope worldwide that it will become another option to mitigate global warming, along with increased renewable energy usage and efficiency improvements in energy usage. In Japan, the "Plan for Global Warming Countermeasures," released by Cabinet decision in May 2016, indicates the aiming for deployment of CCS for 2030 and beyond.

Worldwide CCS Projects

Formations (reservoirs) that can be used to store CO₂ include deep saline aquifers²⁾ and oil reservoirs. The first underground storage in a deep saline aquifer began in Norway in 1996, at a natural gas production facility. Each year approximately 850,000 metric tons of CO₂ are injected into reservoirs 800 - 1,000m below the seabed. There has been

no CO₂ leakage in the 20 years the facility has been operating³⁾. A carbon tax was first introduced in Norway in 1991, and CCS is one way to avoid this tax. Injecting CO₂ into oil reservoirs has been used for more than 40 years as a technique of enhanced oil recovery (EOR)⁴⁾. It is believed that about 1 billion metric tons of CO₂ have been injected in this manner.

As of April 2017, there are 17 large-scale projects to inject anthropogenic CO₂ underground. This has led to a reduction of approximately 32 million metric tons of CO₂ yearly. Three of these projects store CO₂ in deep saline aquifers, with the rest using CO₂ for EOR purposes.

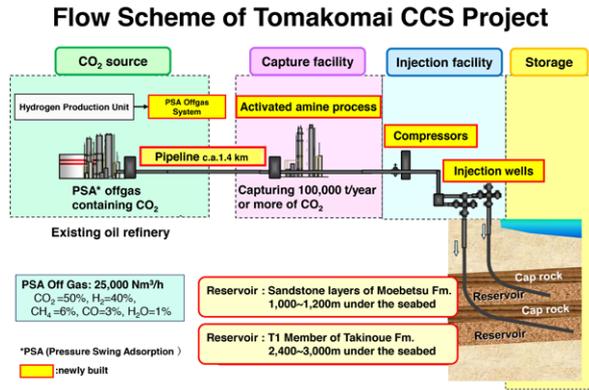
Overview of the Tomakomai CCS Demonstration Project and its Features that have Received Worldwide Attention

The government-funded CCS demonstration project in Tomakomai, Hokkaido in operation since April 2016, is also Japan's first integrated CCS project. A cumulative total of 66,000 metric tons of CO₂ have been injected into the reservoir as of the end of July 2017.

For four years between FY 2008 and FY 2011, the evaluation, examination, and surveys of candidate sites for the demonstration project were conducted under the prerequisite of starting a demonstration project at an early date. After taking into consideration 115 candidate sites with different combinations of CO₂ sources and reservoirs, and completing detailed prior examinations and surveys, Tomakomai was selected as the most suitable site. The Tomakomai CCS Demonstration Project is planned to continue for nine years between FY 2012 and FY 2020. Japan CCS Co., Ltd. was commissioned by the Ministry of Economy, Trade and Industry to undertake preparations for the project between FY 2012 and 2015. It was also commissioned to implement CO₂ injection in FY 2016 and FY 2017.

Through its operations, the Tomakomai CCS Demonstration Project aims to demonstrate the practical usage of CCS technology by around 2020. It has the important role of demonstrating that CCS can be performed practically,

■ Conceptual Diagram of the Tomakomai CCS Demonstration Project



safely, and in a stable manner.

The project is supplied with gas containing CO₂ from a hydrogen production unit of a nearby oil refinery. Approximately 100 thousand metric tons of CO₂ are captured, injected, and stored underground yearly. The behavior of this CO₂ is then observed everyday continuously. CO₂ will be injected for three years between FY 2016 and FY 2018. Monitoring will be performed during the injection period and then during the post injection period for another two years until FY2020, at which point the formation will have become stable. There are two reservoirs, namely the Moebetsu Formation and the Takinoue Formation.

While the project is only injecting small amounts of CO₂ yearly, and therefore is not included among the previously mentioned large-scale projects, it is receiving attention worldwide for the following reasons:

1. It is the first example of CCS where CO₂ is being injected from onshore to offshore. Drilling the deviated injection wells from onshore to offshore allows for large reductions of drilling and operation costs compared to offshore operation.
2. The Tomakomai Project is the first example of the application of an injection interval in the reservoirs of length in excess of 1,100m. This allows for the reduction of pressure loss during injection operations as well as suppression of pressure buildup in the formation.
3. A low-energy capture process has been selected to minimize production of CO₂ due to CCS operation.
4. Multiple monitoring systems of high density have been installed in the monitoring areas allowing for the acquisition of monitoring data to demonstrate that there is no relationship between the CO₂ injection and natural earthquakes.

relationship between the CO₂ injection and natural earthquakes.

5. Sub-seabed CO₂ sequestration was first included in the London Protocol as Annex 1 to the 1996 Protocol to the London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (effective in 2007). The Tomakomai Project is the first sub-seabed storage project to comply with the London Protocol.

Test injection into the Moebetsu Formation, which had been evaluated as having favorable injectivity, was conducted prior to full-scale injection operations. During test injections, the pressure rise in the reservoir was very small, at an injection rate of 200,000 metric tons a year, thereby confirming its superior injectivity, as expected. The performance and operability of the facilities were also deemed to be sufficient during the test injection period to undertake the subsequent demonstration project.

Observations of formation temperatures, pressure, and underground micro seismicity have been recorded in each well since the beginning of injection. There have been no anomalous data, and no micro seismicity attributable to the CO₂ injection has been detected.

Promoting the Smooth Operation of the Project

It is essential to secure the understanding and cooperation of the local government, fishery cooperatives as well as the local residents in order to ensure the smooth operation of the project. We recognize the importance of public acceptance in progressing with the project, and have been actively disseminating information on the project. The project has been promoted to the local community in a wide variety of ways. In addition, since the start of CO₂ injection, we have installed an electronic monitor in Tomakomai City Hall, displaying key information such as the injection status and micro seismicity monitoring. We are also disclosing information about the project both domestically and internationally. In FY 2016, over 2,000 people visited the project site.

According to the International Energy Agency, CCS will have to provide 14% of cumulative CO₂ emissions reduction through 2060 in order to keep worldwide temperatures to within 2°C of what they were prior to the industrial revolution. We plan to contribute to the ongoing success of this project, which will play an important role in the development of CCS technology as an essential part of future global warming countermeasures.

● This article was partially based on results of projects Japan CCS Co., Ltd. was commissioned to perform by the Ministry of Economy, Trade and Industry.

1) IPCC 5th Assessment Report (2013)
 2) Deep saline aquifer = formations in which pore spaces of rocks are filled with saline formation water unsuitable for drinking water
 3) See Final Report Summary - ECO2 (Sub-seabed CO₂ Storage: Impact on Marine Ecosystems (ECO2)) CORDIS, EU, 2016
 4) EOR: Enhanced Oil Recovery = Injecting gas into oil reservoirs to increase internal pressure, thereby allowing the remaining crude oil to be extracted.

The Fire of Rice Sheaves and its Connection to World Tsunami Awareness Day

[KEYWORDS] tsunami / disaster risk reduction education / Goryo Hamaguchi

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(Ocean Newsletter No. 414, 5 November 2017)

“World Tsunami Awareness Day,” designated on November 5th, is connected with the events that followed the Ansei Earthquake in 1854, when a great tsunami overtook Wakayama Prefecture's Hiromura Village (present day Hirogawa Town). During the disaster, Goryo Hamaguchi lit fire to sheaves of rice in an effort to alert those who had not started running upland to safety, saving their lives in the process. On a proposal by Japan, the United Nations General Assembly unanimously designated November 5th as “World Tsunami Awareness Day.” At Inamura-no-Hi no Yakata, we will continue to spread the story of the “Fire of Rice Sheaves,” in an effort to ensure absolutely zero victims from tsunami disasters.

Examining how Tsunami-Based Disasters are Reported

On March 11, 2011, a huge tsunami hit the Tohoku region of Japan. Seeing such an event occur in our country shocked people throughout Japan. I remember sitting in front of the television as I kept watching the footage of the tsunami being broadcast.

Disasters occur every year, but tsunamis only occur once every few years, or once every few decades. The tsunami after the Great East Japan Earthquake is said to be of a class that only occurs once every thousand of years. While it is difficult to say how we should best go about ensuring that information about tsunamis is handed down between generations, the story about the “Fire of the Rice Sheaves” is one way we could help people learn about tsunami risk reduction.

The Fire of Rice Sheaves and the Inamura-no-Hi no Yakata

The main house of the wealthy Hamaguchi family was located in Hiromura, in Kii Province (modern day Hirogawa, Arida District, Wakayama Prefecture). The family had been producing soy sauce in the city of Choshi, located on the Boso Peninsula, since the mid-1600s. The main character of the Fire of Rice Sheaves, Goryo Hamaguchi, was the 7th generation head of the Yamasa Corporation. At the time he had been traveling to and from his hometown of Hiromura and Choshi. It was during one of his visits home in 1854, that one of the series of Great Ansei Earthquakes occurred, which was followed by a tsunami. He had heard that earthquakes were often followed by tsunamis, and so appealed to the villagers to move to the Hachiman Shrine, which was located on higher ground. This information had been handed down between generations based upon experiences from previous disasters.

In 1896, the writer Lafcadio Hearn received a report about the Sanriku earthquake. He combined this with information he had learned about the Ansei tsunami at the end of the Edo period, to write the book “A Living God.” An ele-

mentary school teacher who read the book translated it into Japanese, rewriting it as a tale for his students as “Inamura-no-Hi.” The book was adopted as part of the elementary school reading curriculum between 1937 and 1947.

In 2007 the Inamura-no-Hi no Yakata (“Fire of Rice Sheaves Center”) was created as a facility that combines the Hamaguchi Goryo Archives and a Tsunami Educational Center¹⁾. The Inamura-no-Hi no Yakata uses the story as a way to raise awareness of tsunamis, based largely around the main character of Goryo Hamaguchi. The center uses exhibits, videos, and other forms of equipment to help visitors understand what kinds of disasters tsunamis create, and help them incorporate disaster risk reduction into their daily lives. The earthquake in 2011 led to a large number of people visiting the center who had realized that they could not just ignore tsunamis in their daily lives. Textbooks with information about tsunamis were printed the same year²⁾, with elementary school students now learning about tsunami risk reduction at school.



An image of the Inamura-no-Hi no Yakata. The Hamaguchi family's old residence was donated to Hirogawa town, leading to the creation of the center.

Recovery and Revitalization after a Tsunami

The tale of the Fire of Rice Sheaves aims to create a story out of the idea that tsunamis occur after earthquakes and that people need to evacuate to higher ground. To prompt people to evacuate, Goryo Hamaguchi set fire to sheaves of rice located next to the village headman's house. He did this knowing that the townspeople would quickly come to extinguish the fire, allowing them to be led to safety. His



The Hiromura Seawall created by Goryo Hamaguchi (national historical relic site)

quick thinking led to 97% of the town's 1,323 residents being saved. However, this is only the start of his story.

He not only provided leadership and guidance to quickly solve issues such as acquiring food, housing, and restoring lifelines for the evacuated residents, but also paid most of the costs involved. Unfortunately, the townspeople were concerned about the risk of another tsunami, and began to leave the town due to concerns about their livelihoods. This process had been repeated again and again throughout Hiromura's history. During the Muromachi period, Hiromura was a thriving castle town under the rule of the Hatakeyama clan, and had up to 1,700 households. The conquest of the Kii Peninsula by the Toyotomi clan and a tsunami that repeatedly hit the area led to the population being reduced to just 340 households in the Ansei era. Knowing this, Goryo felt a sense of impending crisis. He knew that if too many people left the village, Hiromura itself would cease to exist. This led him to consider the creation of seawalls. Hiromura already had seawalls in the form of the Hatakeyama seawall created in 1400, and the Wada seawall, located in the open water off the Kii Peninsula, which had been built based upon orders given by Yorinobu Tokugawa (the 10th son of Ieyasu Tokugawa), the first domain head of the area. However, neither of these had withstood the Ansei tsunami.

Goryo therefore planned to create an even larger seawall within the Hatakeyama seawall as a way of preparing for the next tsunami. Knowing that he could not rely on funding from the Kii Domain for its creation, he decided to pay for it himself. There was also support from another of the Hamaguchi households. Also knowing that he would need the permission of the Kii Domain to create it, he made his request by saying that "Creating the seawall would bring solace to a hundred generations of residents." After receiv-

ing permission, he hired victims of the disaster as laborers and paid them daily, thereby contributing to relief efforts.

Goryo Hamaguchi's Actions Lead to World Tsunami Awareness Day

After the Great East Japan Earthquake, the "Act on the Promotion of Tsunami Countermeasures" was enacted in June 2011, and November 5th became Tsunami Disaster Prevention Day. This led to awareness initiatives being implemented nationwide through evacuation drills, lectures, and other activities.

In March 2015 the 3rd United Nations World Conference on Disaster Risk Reduction was held in Sendai. At the conference, the Japanese government proposed that November 5th be named World Tsunami Awareness Day. Thereafter, the government and volunteers from the National Diet worked energetically to ensure this was enacted in countries around the world. The actions of the Japanese government led to 142 countries making a joint proposal at the 70th UN General Assembly held in the same year. The end result was that all UN member states agreed to this proposal. This unanimous vote showed that countries around the world truly understand the necessity and importance of disaster risk reduction.

This is where the connection between the Fire of Rice Sheaves and World Tsunami Awareness Day can be seen. However, having this Day enacted in itself is not enough. We must continue to reach out to the world, and realize that we are still at the starting line when it comes to the promotion of tsunami risk reduction. The first World Tsunami Awareness Day held last year led to projects being held around the world designed to mitigate tsunami-based risks. There were joint drills held between Japan, Chile, and other Central and South American countries, an educational campaign based on the Fire of Rice Sheaves was held in Indonesia, and female leaders from Pacific Island Countries visited our center for training sessions.

Aiming for Zero Tsunami Victims

The story of the Fire of Rice Sheaves, with its main character Goryo Hamaguchi, attempts to communicate to the world that "Tsunamis occur after earthquakes in coastal areas. If a tsunami occurs, run away to higher ground. If there's no higher ground in your country, try to get as far from the coast as possible." Japan, along with the Inamura-no-Hi no Yakata, aims to ensure that we have a world in which there are no victims of tsunamis. ■

1) Inamura-no-Hi no Yakata. <https://www.town.hirogawa.wakayama.jp/inamuranohi/english/>

2) In FY 2011, a biography of the life of Gihei Hamaguchi (Goryo) was written by Yoshiaki Kawata (associate professor at Kansai University, and Disaster Risk Reduction academic) under the title "Protecting our Hometowns in 100 years." This was published by Mitsumura Tosho Publishing in a Japanese (*Kokugo*) textbook aimed at elementary school students in fifth grade.

Ama Divers are Incredible!

[KEYWORDS] Ama divers / abalone farming / co-existence with the environment

Yoshikata Ishihara

Director, Toba Sea-Folk Museum

(Ocean Newsletter No. 415, 20 November 2017)

For close to 10 years now, we have continued in our efforts to have “Ama” divers placed on the UNESCO World Cultural Heritage List. Following their promotion in the NHK television drama “Ama-chan,” the Ama divers, who dive for fish unaided by oxygen tanks, attracted attention and popularity at the Ise-Shima Summit last year. However, the number of Ama divers has decreased, along with the decrease in traditional fishing methods and festivals. Ama divers, who exemplify co-existence with the ocean through sustainable fishing, are exceptional examples of Japan's ocean cultural heritage. We would like for more people to know how incredible they are.

Initiatives Towards Registration as a UNESCO Intangible Cultural Heritage

We have already been working for almost 10 years to have the practice of Ama diving registered as a UNESCO Intangible Cultural Heritage. In November of 2016 female divers from South Korea's Jeju Island were registered on this list. One of the conditions for applying was that Ama divers had to be an important national cultural property. We were originally hoping to be registered at the same time as South Korea's divers, but we were not even able to apply. In March of this year Ama divers were finally designated as an Important Intangible Folk Cultural Property, which allowed the application process to begin.

At first, we were often asked what Ama divers were, but recently we are being asked how Ama divers can be listed as a form of world heritage. After the NHK drama series “Amachan” raised awareness of Ama divers, the “Ama divers who free-dive to fish” received attention from the world's media at the 2016 Ise-Shima G7 Summit, further increasing their visibility.

But why are they Incredible?

So why are Ama divers so incredible, and what value do they have to modern Japan?

The first point that makes them incredible is their amazing diving skills. We call the time that Ama divers spend submerged in the water a “50-second battle.” This is the most time they can spend underwater harvesting seafood. They use their whole bodies to dive, with their entire focus being on finding the items they are searching for. They have to understand the movement of the water and stay aware of any dangers. This requires the use of all five senses throughout their dive. This requires high oxygen consumption, which limits the length of time they can remain underwater. Of course, there are differences between individuals, but generally the more experience they have, the larger their catch is. As well as diving techniques, their experience includes knowledge of the currents, tides, waves, and temperature of the ocean, as well as knowledge they have



Ama divers have ensured that the ocean's forests are protected.

accumulated about types of seafood, maturity, habitats, and breeding seasons. The acquisition of their abundant knowledge becomes their primary form of support when diving.

The fact that Ama divers are women also provides them with advantages in the ocean and when harvesting. In recent years, the number of male Ama divers is also increasing. The amounts they harvest in a single day are typically higher than the female divers. However, this difference becomes less obvious when looking at total yearly amounts. Female divers have endurance. They work persistently and persevere at their jobs. They also cooperate well with each other. They dive because they love doing it. The fact that they enjoy their jobs becomes the basis for what they do.

The second point is that Ama divers coexist with the natural environment in the ocean. While they believe in and rely on the abundance of the ocean, they also realize that the ocean is something that cannot be defied. The Ama divers pray to the gods of the ocean in each of the 27 districts they work in on the Shima Peninsula, hoping for abundant catches and for the warding off of calamities.

The divers say that their catches of abalone, turban shell, sea cucumber, and seaweed “well up out of the oceans.” During the fishing season, the divers are aware of exactly where the most seafood will “well up,” using their knowledge of the mysteries of nature. This helps them to get the



This poster “Ama divers are incredible!” was created when the practices of divers in Toba and Shima were designated as an Important Intangible Folk Cultural Property.

biggest catch possible. Ama divers have a deep instinctual awareness of the food chains and ecosystems that describe the interrelation between plants and animals in the oceans. If too much Arame seaweed is harvested, this will result in too much sunlight reaching the rocky ocean beds, reducing the food available for abalone and sea cucumber, leading to reductions in their numbers. This would mean the Ama divers would lose their catch. Their deep knowledge of this relationship means that Ama divers refer to communities of seaweed and algae as “the forests of the ocean” and take great care to ensure they do not over-harvest them.

However, there are certain overwhelming forces that prevent the Ama from doing their jobs - severe storms, typhoons, and strong seas/tsunami. In recent years, meteorological information has developed, and more detailed weather forecasts are available. However, as recently as a few decades ago sudden changes in ocean conditions led to many Ama divers losing their lives. Ama divers still live in awe of the ocean.

The third point is the role that Ama divers have as the cornerstone of the communal nature of Japanese fishing villages. Although Ama divers appear to work individually, they actually work as a community, and there are strong connections among them. Harvesting of seafood is performed on days when all of the divers from the villages in the area can participate. If one household cannot participate due to a funeral for example, no one dives on that day. This means that if there is a wedding, start of school ceremony, or birth in one of the villages, harvesting is not performed.

There are huts called “kamado” or “hiba” in the Ama divers’ villages, with one hut shared by several individuals. On work-days, the divers use the huts to change clothes, warm themselves in front of a fire, shower, eat, and rest. More than anything else, Ama divers love chatting. Topics can include everything from the amounts of abalone that were

harvested that day, to the price of items purchased the previous day on a trip to the city. There are also serious discussions about health, with topics including aches and pains in the legs and lower back, recent high blood pressure, or how good a certain doctor is. They also share information about their villages. This creates friendly relationships between the younger and older women who share these huts.

Traditional and Sustainable Fishing

The primary goal of the divers is to harvest as much seafood as possible. But this also includes ensuring that this is performed in a sustainable manner. This is their most important vow. This vow can also be seen in two of the terms they use: “open mouths” and “not big enough.”

On days in which the abalone open their mouths, the divers try to collect as many as possible, but none are collected if their mouths are closed. For example, during the summer harvesting season in the area around Toba city in Mie Prefecture, at most there are typically only 30 to 40 days during which the abalone open their mouths. In Mie Prefecture, it is illegal to harvest abalone that have a shell length of less than 10.6 cm, which leads to the second term “not big enough”. The size limit for the operculum (lid covering the opening of the shell) of turban shells is 2.5 cm. There are also a large number of other rules (conventions) for harvesting that the Ama divers follow. This is to ensure that they do not over-collect when harvesting. The fact that these rules were agreed upon by the divers and have been followed is precisely what has allowed them to exist for such a long time.

However, the practice of Ama diving is now at risk of dying out. This is due both to aging amongst the divers, and a lack of successors. At the peak of Ama diving in 1965, there were almost 3,000 divers working around the Shima Peninsula. This has now decreased to 700 and the average age of the divers is now almost 70. If this continues, the practice of Ama diving will end within 10 years, leading to the end of a 5,000-year-old practice.

Ocean-based cultural practices are disappearing one at a time from all four sides of the Japanese archipelago. The depopulation of seaside villages is leading to the extinction of traditional forms of fishing, festivals, and other customs. I hope that the Ama divers are protected as a final bulwark against this extinction. This is not just about ensuring that old customs are retained. I hope that the revival of the Ama divers is supported in a way that makes them a standard-bearer for protecting the ocean’s environments, and that they will help to both revive and recover primary ocean industries.

Hosting of the Coast Guard Global Summit (CGGS)

— Towards the Maintenance of International Maritime Order —

[KEYWORDS] Japan Coast Guard / rule of law / capacity building

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(Ocean Newsletter No. 416, 5 December 2017)

In response to increasingly globalized problems, including large-scale disasters from worldwide changes in natural environments as well as incidences of terrorism and piracy that have arisen with changes in social environments, the Japan Coast Guard hosted the Coast Guard Global Summit to share how each country has been cooperating with other countries and use this knowledge to build cooperative relationships and strengthen coordination on a global scale.

The Coast Guard Global Summit

The Japan Coast Guard hosted the world's first Coast Guard Global Summit (CGGS) on September 14, 2017, attracting participants from 35 countries, including heads of coast guards, as well as those from institutes whose official duties include maritime safety and security in Asia, the Pacific, the Americas, Europe, and Africa. They also included delegations from the International Maritime Organization (IMO), European Maritime Safety Agency (EMSA), and the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia - Information Sharing Centre (ReCAAP-ISC). The opening session began with welcome remarks from the organizers, delivered by Admiral Satoshi Nakajima, Commandant of the Japan Coast Guard, and Yohei Sasakawa, Chairman of The Nippon Foundation, followed by a greeting from the guest of honor, Keiichi Ishii, Minister of Land, Infrastructure, Transport and Tourism. Three sets of sessions followed, culminating with the closing session, which presented the chairman's summary statement.¹⁾



Scene from the Coast Guard Global Summit (Opening greeting by Admiral Satoshi Nakajima, Commandant of the Japan Coast Guard) (Photo courtesy of the Japan Coast Guard)

The Japan Coast Guard has committed to strengthening coordination among coast guards' operations in the North Pacific through hosting a number of international meetings including the North Pacific Coast Guard Forum (NPCGF) and Heads of Asian Coast Guard Agencies Meeting (HAC-GAM), with support from The Nippon Foundation. It has

also provided capacity building for coast guard personnel in Asia in order to maintain maritime order based on the rule of law and to put its efforts into improving maritime safety and the protection of marine environments. On the other hand, it has been recognized that climate change is bringing about natural disasters that have become larger in scale, and sudden changes in social environments, such as terrorism and extremism, are creating threats and danger at a global level. The Summit was hosted, in cooperation with The Nippon Foundation, to respond to these changes, based on the awareness that it is necessary to change existing cooperative relationships, from regional ones to global ones.

The Three Themes of the Summit

The Summit involved discussions of themes including maritime safety and environmental protection, maritime security, and capacity building. The first theme, of maritime safety and environmental protection, included discussion of the importance of close cooperation and coordination between coast guards in the event of a large-scale maritime disaster. Delegates also held discussions on the use of new technologies to detect ocean pollution such as using satellite-based remote sensing. The Global Search and Rescue Plan was also highlighted as an example of wider coordination at the global level. The second theme of maritime security examined multilateral cooperation regarding countermeasures for crimes at sea, taking high seas driftnet fishing in the North Pacific Ocean as an example. Countermeasures against piracy in South East Asia and off the Coast of Somalia were reported as an example of regionally-based international cooperation. The final theme of capacity building included a report on the status of international drills and seminars, as well as a report on initiatives regarding training and drills for personnel in third countries. A suggestion was made regarding the necessity of a new international framework that would allow personnel from coast guards around the world to tackle issues in a way that transcends existing forms of cooperation between countries. The closing session of the Summit featured the chairman's summary statement, which gained the general support of all attending organizations. The statement recognized that



Group photo of officials and agency heads from participating countries at the State Guest House, Akasaka Palace (Center: Prime Minister Shinzo Abe, Right: Yohei Sasakawa, Chairman of The Nippon Foundation, Left: Keiichi Ishii, Minister of Land, Infrastructure, Transport, and Tourism) (Photo courtesy of the Japan Coast Guard)

Hosting of the Coast Guard Global Summit (CGGS)

— Towards the Maintenance of International Maritime Order —

the duties of coast guards, which include maritime safety, peace, and environmental protection, play a vital role in ensuring the well-being and prosperity of international society. Based upon these points, delegates also recognized concerns related to threats, such as large-scale disasters and crimes at sea, caused by changes to the world's natural and societal environments, and that these issues needed to be dealt with in a broad manner. Delegates also agreed that current forms of regional coordination need to evolve one step further into a structure of global coordination as coast guards are the first responders and front-line actors in dealing with these threats. Above all, there was agreement that advanced technologies, best practices, and experiences need to be shared between countries, and that there is a need to consider the state of current global cooperation with regards to capacity building.

Significance of the Summit and Shared Views

The Summit was significant for two reasons: First, for recognizing that a shift from regional forms of cooperation to international forms is required; and Second, for highlighting the importance of capacity building in an era of globalization. Regarding the first point, coast guards are responsible for performing wide-ranging duties such as rescue operations, maritime law enforcement, and ensuring maritime traffic safety across large areas with only limited resources. It is for this reason that they have built up cooperative relationships with neighboring and nearby countries. For instance, in the case of the Japan Coast Guard, as well as building up bilateral cooperative relationships with countries such as China, Korea, and Russia for criminal investigations, rescue operations, and maritime disasters, it has also built up a relationship with the United States, on the opposite side of the Pacific. In addition, it has worked to improve international cooperation between multiple countries located in Asia and the North Pacific and strengthened international collaboration through initiatives such as NPCGF and HACGAM. As has been pointed out in recent years, natural disasters such as typhoons and hurricanes are becoming increasingly large-scale due to climate change. In addition, the problem of large-scale mixed migrants in the Mediterranean Sea and more serious crimes, such as piracy for ransom and acts of terrorism that have moved to the Asian region, have become threats against good order at sea. The Summit confirmed that in order to allow for

coast guards around the world to deal with these issues in an appropriate manner, dialogues need to become increasingly international and transcend regional frameworks. The importance of strengthening international cooperation was also confirmed.

The second point of significance was in regard to capacity building. Until recently, capacity building of coast guard personnel was carried out independently by individual countries, and drills/practical training were held at the regional level. The Japan Coast Guard has, primarily for members of coast guards in Asian countries, conducted hydrography, maritime rescue and environmental protection, and law enforcement capacity building programs through the Japan International Cooperation Agency (JICA). The Japan Coast Guard, National Graduate Institute for Policy Studies (GRIPS) and JICA have also coordinated to provide the Maritime Safety and Security Policy Program to support and strengthen the policy planning abilities of each agency. These programs were developed based on Japan's policy that the Government respects the sovereignty of coastal states and these coastal states should exercise their own authority in the marine areas under their jurisdiction to maintain order and protect the marine environment. In order to realize these ideas, capacity building of personnel within organizations to perform this work is just as important as assets such as ships and aircraft. This Summit confirmed that capacity building that allows for global solutions to be discovered is required in order to appropriately deal with issues in today's globalized society, including terrorism, piracy, and increasingly large-scale disasters. If this kind of system is constructed in the future, it will allow for the strengthening of international coordination based upon shared values between coast guards in a way that transcends the borders of nations. It will also allow for order to be maintained based on rules, and for the establishment of the rule of law on the oceans.

Aiming for Free and Open Oceans

Maintaining order and safety on the oceans is extremely important for an island nation like Japan that is so reliant on the sea. The most important factor for realizing free, open and stable oceans in the face of the challenges caused by globalization is international cooperation and coordination by the coast guards who find themselves on the front line when it comes to dealing with these threats. The fact that the Japan Coast Guard hosted the Coast Guard Global Summit has a great deal of significance as the first step in this process. ■

1) Hosting of the first "Coast Guard Global Summit" (Overview of Results) Japan Coast Guard URL <https://www.kaiho.mlit.go.jp/info/kouhou/post-403.html>

What Recovery Means for Us

— Thoughts Following Production of the Film “Fukushima Fishermen” —

[KEYWORDS] fisheries / recovery / Fukushima

Toru Yamada

Film Director

(Ocean Newsletter No. 422, 5 March 2018)

When describing the occupation of a fisherman, who lives in co-existence with the ocean, it could be both a “labor” that gives meaning to his life, as well as an “identity.” The film “Fukushima Fishermen” records a three-and-a-half-year period in the lives of Fukushima fishermen who were struck by the Great East Japan Earthquake and Tsunami and the subsequent nuclear power disaster. This is also the amount of time it took their damaged bodies to recover. In reflecting on the disaster, which occurred in consequence of the development of urban civilization, I would like to consider how it took away the dignity of the fishermen, as well as what it truly means for us to recover.

The Movie “Fukushima Fishermen”

Shinchi, the town in which the movie is set, is located on the northern-most edge of the Fukushima coastline, on the border with Miyagi Prefecture. It has a population of approximately 8,000 people. The fisheries cooperative in Shinchi is a branch of the Soma-Futaba Fisheries Coop, and has around 70 members.

Fishing operations in the area consist of dragnetting using small boats, gillnetting, and the use of fishing baskets. This allows for a variety of seafood to be caught including young lancefish, whitebait, flounder, flatfish, conger eel, mackerel, octopus, and surf clams.

The coastal villages of Shinchi were severely damaged by the earthquake, and the fishing industry was damaged by the tsunami and the effects of the accident at the Fukushima Daiichi Nuclear Power Station. This led to complete self-imposed controls on operations being put in place.

“Will the oceans ever be rehabilitated?” - I went to Shinchi as a volunteer to better understand the damage that had occurred there. In the process of gathering this information, I became curious as to what had happened to the fishermen, and decided to make a documentary about them.

Their work after the disaster involved gathering fish for monitoring purposes, and removing earthquake rubble from the oceans. This work was only available once or twice a week, and would end before midday.

Although they were almost able to scrape by due to money they received as compensation, they had lost their work and their purpose in life, and were spending their days playing *pachinko* (a form of gambling), fishing, or napping. Their lives were gradually declining.

By comparison, although the fishermen of neighboring Miyagi Prefecture had limits placed on the types of fish they could catch, they were able to continue their work, with the fishermen in Shinchi looking on. Although many of the fishing boats in Shinchi had survived the tsunami, they were unable to go out to sea solely because they were located in Fukushima Prefecture.



The film “Fukushima Fishermen”

In spite of this incredibly tough situation, the fishermen of Shinchi are hoping to recover, and continue to gather together at sunrise and sunset, watching the white-capped waves as they maintain their boats, to ensure they can set off at any time. Although they live apart from each other, they gather once a year to celebrate, going to shrines to pray for recovery. Being unable to fish is frustrating for them, but they continue to co-exist with the oceans. Even after the earthquake, the fishermen have not disappeared from the beaches.

The turning point finally came in June 2012, a year and a half after the earthquake. The results of over 40,000 sets of monitoring data showed that it was safe to begin limited fishing in a trial fashion. In March 2013, trial fishing of young lancefish began. Finally, their chance to return to the ocean and to their lives as fishermen had arrived.

In the midst of this, a meeting was held to explain a countermeasure to reduce polluted water running into the ocean from the Fukushima reactor, known as the groundwater bypass plan (this plan involved pumping groundwater on the mountain side before it enters the reactor building and decontaminating it before it is returned to the ocean). The meeting involved the government, Tokyo Electric Power Company, and the fishermen. Both the government and Tokyo Electric were hoping to have the fishermen agree to the plan in order to have the reactor decommissioned as quickly as possible. They were repeatedly told that there could be no recovery if the plan did not go forward, but a



The explanation meeting for the groundwater bypass plan.

What Recovery Means for Us

— Thoughts Following Production of the Film “Fukushima Fishermen” —

sense of mistrust led the fishermen to oppose it. There were a number of disputes, but in the end the fishermen agreed to the plan. It was an agonizing decision for them to make, but they continued to hold discussions until they all agreed. Their spirit of mutual assistance led them to realize they had to protect the sea, which in itself was a public resource.

Anba Festival

On November 3, 2016, five and a half years after the earthquake, the “Anba Festival” was held at Anbatsuno Shrine. This marked the first time it had been held in 10 years, and the first time it had been held since the earthquake.

The festival is performed at the seaside, and is typically held once every five years to pray to the god of the shrine “Anba” for safety and good fortune when fishing. The festival should have been held in 2011, but was delayed due to the earthquake and nuclear hazards following it. However, the festival was held to show that in the five years since the earthquake, there had been a great deal of progress in recovering both commercially and residentially from the disaster.

Tairyō-bata fishing flags fluttered along the beach beneath a clear blue sky. The townspeople had come together in a way that had not been seen since the earthquake, with the fishermen, who were carrying a portable mikoshi shrine, parading along the damaged coastline and through the new residential areas. The parade ended with them energetically charging into the ocean.

The blue, clear ocean showed no trace of what had happened five years ago. I was filming close to the fishermen as they strode into the water, which was spraying up around them. I realized how similar they looked to a video from the 1983 Anba Festival I’d seen in the town’s library. I could



Anba Festival

hear cheers from the women and children on the beach. The scene was exactly the same as that 33 years previously.

I could finally see how in the rich memory of Shinchi’s ocean, there was an unbroken line from generation to generation, regardless of any earthquakes that may have occurred. The time lost at the beach due to the earthquake was slowly coming back, and the wounds of the people living there were gradually healing. This was when the word “recovery” first came to my mind. I used this scene during the end credits of the movie, overlapping it with the historical video from 1983.

Our Recovery

From April 2015, monitoring results have shown that there are no varieties of seafood in the area that exceed standard values, with authorities deeming seafood caught in the area safe for eating. Trial fishing of three varieties of fish that began in 2012 expanded to 97 varieties in January 2017. In late March 2017 the shipment policies were amended to allow for “All kinds of seafood (except those for which shipment restrictions exist).” As of January 2018, about 193 varieties of seafood are allowed to be caught through the trial fishing scheme, with 10 varieties still restricted. From a safety perspective, the seas around Fukushima could return to full-scale operations at any time, but fish catches in 2017 were less than 20% of what they were before the earthquake. The problem surrounding processing the polluted water from the reactor is still bearing down heavily on the fishermen. If this problem is not resolved, rumors surrounding the oceans near Fukushima will not die out. It is still unclear how the industry will return to what it was before.

One of the final scenes of the movie features a comment from a fisherman that still moves me. “We’re ready to start fishing any time. In the end, it’s the rest of the world that hasn’t recovered yet, not us.”

But what does the idea that the rest of the world hasn’t recovered yet, as opposed to the disaster area, or “our recovery” imply? We could point out that there are a lot of people who are ignorant of the current situation in Fukushima. I think this misses the point. Instead we should question how the earthquake exposed the ways in which we live. Regardless of the painful situation the earthquake placed so many people in, I feel that the ongoing way in which the fishermen live their lives rooted in the memories of their land presents a question to us all. I do not have a clear answer to that question yet, but I plan to keep searching for one. ■

● “Fukushima Fishermen,” 2016. Running time: 89 minutes. Information on viewing the movie can be seen at <http://www.yamadatoru.com>.

The United Nations University's "Noto Satoumi Movement"

— Connecting Japan's Coastal Management to Global Ocean Problems —

[KEYWORDS] Satoyama-Satoumi / Globally Important Agricultural Heritage Systems (GIAHS) / Satoumi movement

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(Ocean Newsletter No. 423, 20 March 2018)

The United Nations University (UNU) has been conducting the “Noto Satoumi Movement” since 2015 on the research and conservation of “Noto's Satoyama Satoumi” in Noto Peninsula of Ishikawa Prefecture, which is designated by the Food and Agriculture Organization of the United Nations (FAO) as Globally Important Agricultural Heritage Systems (GIAHS). In order to promote the concept of *Satoumi*, the importance of its conservation and the livelihoods of people working on *Satoumi* (coastal seas settlements), we have been making public outreach efforts on *Satoumi* creation such as conducting a series of public lectures, research studies, and conservation activities. In addition, we have been disseminating the idea of *Satoumi* to the world, and expanding the network of cooperation in promoting *Satoumi* creation.

Japan's Proposal to the World - the Concept of Satoyama-Satoumi

UNU, together with the Japan Ministry of the Environment, introduced the concept of *Satoyama* for maintaining and conserving of secondary natural environments at the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD-COP10) held in 2010 in Nagoya, Aichi Prefecture. These environments have been formed and maintained by people from ancient times through production activities related to agriculture, forestry, and fisheries. The Japanese terms of *Satoyama* (里山) and *Satoumi* (里海)¹⁾ were presented to the world as concepts for environmental conservation to emphasize on the importance of human intervention in creating societies in harmony with nature.

The Noto Peninsula region of Ishikawa Prefecture was presented as one of the model cases to illustrate these *Satoyama-Satoumi* concepts at the CBD-COP10 meeting. The interconnected *Satochi*, *Satoyama*, and *Satoumi* in Noto Peninsula sustain traditional forms of agriculture, forestry, and fisheries as part of the region's semi-farming, semi-fishing lifestyle, through which its diverse wildlife, traditional knowledge, and culture are also being maintained.

Introducing Noto's *Satoyama* and *Satoumi* at CBD COP 10 made the people of Noto reconfirm the qualities of their hometown, which motivated them to ensure that their natural environment could be passed on to the next generations. In response to this enthusiasm, the UNU recommended related stakeholders in Ishikawa Prefecture to apply for listing in the Globally Important Agricultural Heritage Systems (GIAHS²⁾) by the Food and Agriculture Organization of the United Nations. The “Noto's Satoyama and Satoumi” was subsequently designated as a GIAHS, along with “Satoyama in Harmony with Japanese Crested Ibis” of Sado Island, Niigata Prefecture, in June 2011. These were the first sites to be designated as GIAHS in Japan, and also the first for a developed nation.

United Nations University “Noto Satoumi Movement”

In its definition of *Satoumi*, the Ministry of the Environment places emphasis on these areas' ocean-based ecosystems and the spaces they contain, describing them as “an important sea-area which has been supporting culture and cultural exchanges through such things as fisheries and the distribution of products. It is an area which includes both Nature and human-beings, as well as an area in which both high biological productivity and biodiversity are expected.”

Echoing the vital role of humans when considering how to create and conserve *Satoumi*, UNU further expands the *Satoumi* creation concept, proposing the need for a comprehensive consideration of factors relating to the ecosystem in both the ocean and on the land, as well as economic and societal factors.

Although from Singapore, I have a deep interest in the concepts of *Satoyama* and *Satoumi*, and since 2014 have been involved in research at the UNU-IAS Operating Unit



The “Noto Satoumi Seminar” Series covers a range of topics of interest to the local people



A conversation with the "Ama" female skin diver, Chiharu Hayase, at a Noto Satoumi Seminar held at Monzen Junior High School in Wajima city in February 2017

Ishikawa-Kanazawa (UNU-IAS OUIK) related to the GIAHS "Noto's Satoyama and Satoumi."

My interview surveys conducted three years after the GIAHS designation showed that although the GIAHS designation had led to conservation being actively conducted on *Satoyama* (terrestrial) landscapes throughout Noto, there was some confusion regarding *Satoumi*. In response to the local people's want in knowing more about their *Satoumi* (marine) seascapes, UNU-IAS OUIK organized a "Noto Satoumi Open Seminar" in Kanazawa City in March 2015, marking the start of the "Noto Satoumi Movement." The movement aims for deeper awareness both locally and internationally of the concept of *Satoumi*, its charms the work of people who are involved with *Satoumi*, and the importance of conserving these areas. This movement also aims to make the Noto region a leading hub for *Satoumi* research and conservation based on the Sea of Japan side of the country through disseminating information nationwide and worldwide. It also hopes to raise the public awareness of the Noto region, thereby contributing to the livelihoods of people who work within it.

The movement consists of three main pillars: 1) A series of *Satoumi* seminars, 2) Disseminating information on *Satoumi* research both locally and internationally, and 3) cooperating in *Satoumi* conservation activities.

The *Satoumi* seminar series involved inviting specialists (one national expert and two from the prefecture) to share experience on various themes of the seminar which were decided by consulting with the local governments in Noto.

The seminars proceed in the form of a study meeting, where the discussion sessions were also joined by a local stakeholders such as fishermen, inn owners and representatives from citizen groups. A total of six seminars have been held³⁾ in Noto region, including in Nanao city, and Anamizu town.

The second pillar involves conducting research to investigate the socio-economic linkages amongst agriculture, forestry, and fisheries in Noto's *Satoyama* and *Satoumi* sustained by the semi-farming/semi-fishing lifestyles of the people. It also aims to identify and propose model cases

and core areas for Noto GIAHS. The third pillar aims to cooperate with and share information on *Satoumi* conservation activities that are carried out by the municipalities and citizen groups in the Noto region. This also includes events that provide the opportunity to come into contact with *Satoumi*, as well as exhibits and meetings.

The Noto Satoumi Movement has the overall goal of enhancing the understanding of the importance of conserving *Satoumi* and appealing the charms of Noto's *Satoumi* both locally and further afield, while also creating opportunities to cooperate with local people to help conserve and utilize *Satoumi*. I hope that people can become aware that protecting the *Satoumi* is not just the responsibility of fishermen alone; anyone, local or foreign, can have a role and play a part in supporting the creation of *Satoumi* by utilizing and consuming resources in a sustainable manner.

Informing the World about *Satoumi* from Noto

The symposium titled "Supporting the creation of *Satoumi* through various occupations" was held on June 10, 2017 at the UNU headquarters in Tokyo. Two years and mid-way through the Movement, this symposium was also held in conjunction with the the UN's "World Oceans Day," celebrated annually on June 8. Discussions focused on conservation of *Satoumi* in relation to and the Sustainable Development Goals (SDGs), in particular related to achieving SDG 14: Life Under Water. Sustainable use of ocean resources does not necessarily limit to restrictions on fish catches, but also involves ensuring the fishing industry works in a way that conserves and sustains the marine ecosystems, thereby enhancing sustainability of resource management. Most fish are raised in the coastal seas, i.e. in *Satoumi*. This means that ensuring the health of *Satoumi* is pivotal to nurturing the marine life of the oceans around the world. This also means that the concept of *Satoumi* (that stresses the connections between the land and the sea in sustaining the ocean environment and managing resources for sustainable livelihoods) can potentially contribute to achieving SDG 14 and provide insights of local knowledge in resolving global issues related to fishery resources management.

In recent years it seems there has been increased international interest in *Satoumi*, as well as *Satoyama*. I want to continue the Satoumi Movement, providing knowledge on *Satoumi* conservation domestically and internationally. ■

1) The "Satoyama Initiative" which is to promote biodiversity conservation through the *Satoyama-Satoumi* concept was later adopted at the same meeting. The "International Partnership for the Satoyama Initiative" (IPSI) was established with the UNU-IAS acting as its secretariat.
2) Globally Important Agricultural Heritage Systems (GIAHS) is a designation programme of the Food and Agriculture Organization of the United Nations (FAO) to ensure traditional agriculture systems of sustainable farming methods, culture, and biological diversity that are of global importance can be passed on to future generations.
3) The seminars conducted up till FY 2015 are documented in the publication "Noto Satoumi Movement – Passing on Wisdom of Living with the Sea - UNU-IAS OUIK" published in 2016 and edited by Evonne Yiu and Mikiko Nagai. An electronic version is available on the United Nations University OUIK website.

The Roadmap to Oceans and Climate Action Initiative

[KEYWORDS] role of ocean / ROCA / climate change policies

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(Ocean Newsletter No. 424, 5 April 2018)

The international community is increasingly recognizing the importance of the ocean in regulating climate as well as the dramatic impact climate change has on ocean ecosystems. In recognition of this, the Roadmap to Ocean and Climate Action (ROCA) initiative was founded to promote the implementation of sustainable, science-based climate change policies that adequately consider ocean and coastal issues. There is a great deal of work left to do on ocean and climate problems, and the ROCA initiative exists to ensure that the momentum created by the Paris Agreement does not slow down.

Founding of the ROCA Initiative

The international community is increasingly recognizing the importance of the ocean in regulating climate, as well as the dramatic impact climate change has on ocean ecosystems. The Roadmap to Ocean and Climate Action (ROCA) initiative was founded to further the awareness of the relationship between the ocean and climate, as well as promote the implementation of sustainable, science-based climate change policies that adequately consider ocean and coastal issues. Prior to the Paris Agreement in 2015 at the 21st Conference of the Parties (UNFCCC COP 21), the ocean was rarely mentioned in UNFCCC outcome documents and discussions. Terrestrial ecosystems, particularly forests, received the bulk of attention related to mitigation policies. Omission of ocean issues from climate change policies ignores the nexus between the ocean and the climate, and comprehensive mitigation and adaptation policies should necessarily consider oceans and coasts.

Role of the Ocean

The central role of the ocean in climate is clear. The ocean is the primary regulator of the climate; it has absorbed 28% of anthropogenic carbon dioxide emitted since the late 1800s, and produces over half of the world's oxygen. At least 10% of the world population depends on healthy fisheries and aquaculture for their livelihoods, and hundreds of millions of people depend on fish as their primary source of animal protein. The 183 coastal and island nations face unique challenges such as negative impacts from warming and acidification on fisheries, changing and eroding coastlines due to sea level rise, and increasingly frequent and intense tropical cyclones. Japan, for example, expects that 46% of its population will be impacted by sea level rise and coastal erosion in a status quo emissions scenario. These concerns are particularly dire for Small Island Developing States (SIDS), some of which face the possibility of losing their entire terrestrial territory without drastic

emission cuts that limit warming to less than 1.5°C.

Developments in Recent Years on Ocean Policy

A growing coalition from the international ocean policy community organized at UNFCCC COPs in the last several years to bring attention to the importance of considering the ocean in climate change policies. This group had a large showing in Paris in 2015, where 46 partner organizations organized the Oceans Day at COP 21, which was attended by over 400 participants. Speakers highlighted the central importance of the ocean in regulating climate, as well as the dire need to address the impacts of climate change on communities that depend on healthy oceans to survive. Following the strong showing at Oceans Day and other ocean-related events, ocean ecosystems were mentioned in the preamble to the Paris Agreement, and the UNFCCC High-Level Climate Action Champions included the ocean as one of its priority action areas going forward.

Experts attending the Oceans Day at COP 21 drafted policy recommendations to provide a vision for action regarding oceans and climate in the five years following COP 21, with a sense of urgency in carrying forward the ambition of the Paris Agreement. 37 authors collaborated to write the *Strategic Action Roadmap on Oceans and Climate Action: 2016-2021*, which divided the policy recommendations into six interconnected themes: the central role of oceans in climate, mitigation, adaptation, displacement, financing, and capacity development. Each section discusses the current state of play both within and outside of the UNFCCC, financial considerations related to the issue, and possible opportunities to further sustainable, science-based policies within and outside of the UNFCCC.

Following the production of this Roadmap, members of this effort formed ROCA, launched at the Ocean Action Day at COP 22 in Marrakech, Morocco. The ROCA initiative's mission is to further the implementation of the recommendations in the Roadmap through the collabora-



The Strategic Action Roadmap on Oceans and Climate: 2016-2021
<https://globaloceanforum-dotcom.files.wordpress.com/2013/03/strategic-action-roadmap-on-oceans-and-climate-november-2016.pdf>

tion of its partner organizations, which include Parties to the UNFCCC, NGOs, academic institutions, civil society groups, and philanthropic organizations. The actions of the ROCA initiative are coordinated by the Global Ocean Forum, the Intergovernmental Oceanographic Commission of UNESCO (IOC-UNESCO), the Ocean Policy Research Institute of the Sasakawa Peace Foundation (OPRI-SPF), the Oceano Azul Foundation, Portugal, and the University of Delaware.

The ROCA initiative is preparing four reports to further its mission. The first, an annual report on *Measuring Progress on Ocean and Climate Action*, will review major developments on each of the 6 major themes taking place since the previous COP, and will be presented at the Oceans Action Day at COP 23 in Bonn, Germany, on 11 November 2017. The second will be a review of the Nationally Determined Contributions (NDCs) submitted by SIDS and coastal nations that have included adaptation or mitigation actions related to the ocean or coasts. The review will provide guidance on how these actions can be supported and realized and is being prepared in collaboration with the Scripps Institution of Oceanography. The third will be a report tracking public climate investments in ocean actions, prepared with Duke University. The fourth will explore the development of a knowledge management or clearing-house mechanism to exchange knowledge and best practices in the 6 major themes of the Roadmap.

In addition to the production of reports to support the implementation of the Roadmap recommendations, the ROCA initiative is active in organizing the international community around various events. The initiative had a strong showing at the high-level United Nations Conference to Support the Implementation of Sustainable Development

Goal 14, also known as the UN Oceans Conference. ROCA partners organized a side event emphasizing the strong linkage between the ocean and climate. Dr. Keita Furukawa, Director of the Research Department of OPRI-SPF, and Dr. Yoshihisa Shirayama, Executive Director of JAMSTEC, highlighted the particular challenges to Japanese fisheries and the efforts of their organizations to address threatened food security across the region. The overall message taken from the side event was that ocean and climate issues must be discussed as a package, and that only ambitious, urgent action will adequately support adaptation.

Sustainable Initiatives for the Ocean in the Field of Climate Change Policy

There is a great deal of work left to do, and the ROCA initiative exists to ensure that the momentum created by the Paris Agreement does not slow down. The record sea surface temperatures, massive coral bleaching events, and stronger, wetter storms of 2016 and 2017 have added even more urgency to this mission. By maintaining the visibility of ocean issues in the climate change policy sphere, the ROCA initiative has already seen progress in the appropriate inclusion of ocean issues in the UNFCCC and beyond. COP 23 in Bonn will be led by the Fiji Presidency, which has announced its intention to foster an “ocean partnership pathway” that will support a call for a Programme of Work on Oceans and Climate Change by 2019. Going forward, the ROCA initiative hopes to see continued and increasing ambition from international, national, and local climate change policymakers that consider the sustainable management of oceans and coasts as a key component of comprehensive climate change mitigation and adaptation. ■

Drug Resistant Bacteria in our Oceans: Where did they come from and where will they go?

[KEYWORDS] drug resistant bacteria / drainage water / marine environment

Satoru Suzuki

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(Ocean Newsletter No. 427, 20 May 2018)

Drug resistance genes can be found even in the ocean, which are derived from humans and other animals, as well as remaining ones in aquaculture sites. In addition, it is now thought that drug resistance genes unique to the ocean may also exist. The ocean has become a massive depository for resistance genes. How much of a risk is this? Much remains to be solved.

The Drug Resistant Bacteria Problem and the Oceans

The recent threat of drug resistant bacteria is becoming a huge problem around the world. The 2015 Elmau G7 Summit included strategies relating to how G7 countries can cooperate to combat drug resistant bacteria. In addition, the WHO resolved that “All countries must, within two years of the global action plan being adopted, create their own national action plans, and act based upon this plan.” This led to an acceleration in research that covers multiple fields related to humans, animals, and the environment based on a One Health Approach¹⁾.

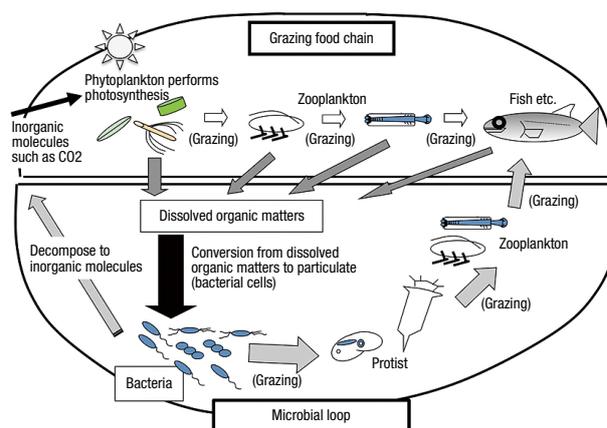
In Japan, drug resistant bacteria are mainly seen to be a problem related to healthcare-acquired infections, but the farming industry’s usage of antibacterial drugs is more than double that used in human healthcare, making farms a hotspot for outbreaks of these bacteria. Antibacterial drugs and drug resistant bacteria are released into wastewater treatment plants from human and animal healthcare facilities. Although they are broken down to a certain extent, large amounts still make their way into aquatic environments. As well as in rivers and streams, residual antibacterial medicine and genes that lead to resistance in bacteria (drug resistance genes) can also be found in the oceans.

In 2010, nine people died at a university hospital in Japan of opportunistic infections caused by acinetobacter, a bacterium commonly found in aquatic environments. This is just one example of a bacteria that lives in aquatic environments entering a human environment and causing problems. Researchers in the United States and Japan, including ourselves, are continuing to provide insights into the spread of resistance genes in rivers, oceans, and other aquatic environments throughout the world.

Microbial Ecosystems in the Oceans

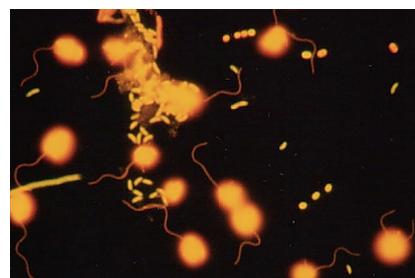
The ecosystems in the oceans consist of a food chain based around predation (see the upper-half of Diagram 1) beginning with phytoplankton and ending with fish. This fundamental concept is commonly taught in high school. As well as typical food chains, ecosystems also have a food chain consisting of microorganisms known as a microbial loop (see the lower half of diagram 1). The remains and

■ Diagram 1: The two food chains within ocean ecosystems



■ Diagram 2

Bacterial cells (smaller cells) consumed by flagellates (larger cells with flagellum)
(Photographer: Shin-ichi Nakano)

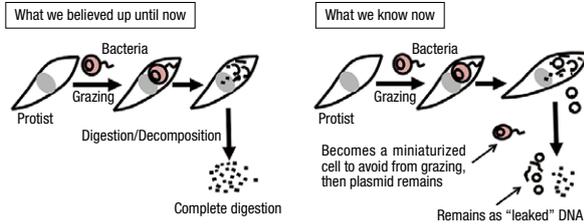


excrement of living things are broken down by bacteria and become hyperfine dissolved organic compounds. The recycling of these compounds by bacteria is the start of the microbial loop. Bacteria become food for protists, are consumed, and digested (Diagram 2).

Regardless of its purity, 1 mL of ocean water contains approximately 1 million bacteria. These bacteria are approximately 0.2 to 1 micrometer in size, whereas protists are some tens to hundreds of micrometers in size, so when bacteria are consumed by protists, organic substances are gradually converted to larger and larger particles. These protists are then consumed by zooplankton such as small shrimp and juvenile fish. This leads to them gradually ascending the food chain.

There’s an old saying in Japan: “Water that travels three shaku becomes clean water” (a shaku is an old unit of measurement in Japan roughly equivalent to 30.3 cm). This saying also applies to the self-purification functions of water environments, where protists consume, digest, and break-

■ **Diagram 3: Resistance genes (and gene transfer factors) that remain in the ocean**



down bacteria living in rivers and oceans, leading to the decomposition of organic matter. However, drug resistance genes cannot be broken down so easily.

When we performed an experiment where protists were made to consume bacteria containing resistance genes, it was discovered that these genes are released into the water and can remain there for up to one week. These drug resistance genes may then be incorporated into other bacteria, creating a new character of drug resistance, which then spreads. There may also be other ways for resistance genes to persist within ocean ecosystems besides the process (Diagram 3) we discovered.

Resistance Genes in Ocean Bacteria

I mentioned previously that 1 mL of ocean water contains 1 million cells; however, only 100 to 1,000 of these can be cultured in agar mediums. This means that approximately 99.9% of these bacteria cannot be cultured. Therefore, when attempting to discover drug resistant bacteria through culturing, only around 0.1% of ocean bacteria can be examined. Metagenomics, a method for sequentially analyzing all present DNA, has progressed greatly in recent years. Applying this method to environmental DNA allows us to understand genetic configurations, but does not allow us to discover what kinds of bacteria possess them.

The authors of this article are performing research using agar culturing and genome analysis. Interesting results from this research are being seen in the Philippines. A large freshwater lake called Laguna de Bay exists to the east of Manila, the nation's capital. When water that flows from the lake via the Pasig River to the Manila Bay was examined, in most locations two types of sulfadrag-resistance primary genes that were already known of clinically were discovered in bacterial groups that were able to be cultured. However, amongst groups of marine bacteria that can not be cultured, there were high concentrations of gene type 3 that had only been rarely detected up until now, as well as clinically dominant types of resistance genes. The rare gene type 3 was not possessed by bacterial groups that were able

to be cultured. This result reminds us of the possibility that besides resistance to sulfa drugs, ocean bacteria may contain resistance genes that are as yet unknown in human and animal clinical settings. Recently there have been reports of resistance genes originating from the oceans. This means that the oceans may act as a source of resistance genes, as well as a warehouse of them.

If resistance genes originating from the land are transmitted to bacterial groups in ocean environments, they may be spread and maintained in forms that we cannot detect. The risk of these resistance genes coming into contact with humans through the use of water, marine products, and water-based recreational activities needs to be examined.

Suggestions for Reducing Risk

In 2012, 40 researchers who are at the forefront of research related to bacterial resistance in the world's environments, gathered in Montebello, Canada, to hold a week-long workshop related to countermeasures for this resistance. The author of this article was the Japanese representative at this conference. We were able to write a number of policy recommendation papers as a result of this workshop. I primarily wrote about reducing outflow of antibacterial drugs and resistance genes in fish farming sites (<http://dx.doi.org/10.1289/ehp.1206446>). The details are in the papers, but as well as proposals related to reducing the usage of antibacterial drugs, I also made several risk reduction proposals related to preventing eutrophication of aquatic environments through reducing feed amounts, and hygiene management of feed to prevent burdens related to land-based resistant bacteria.

Countermeasures unrelated to ocean environments that include human and animal medical treatment involve the development of laws to prevent the abuse of pharmaceuticals, monitoring countermeasures, and regulation of waste water. They also involve technical improvements related to the efficiency of processing waste water from homes, industry, hospitals, and pharmaceutical plants. Metallic elements and antibacterial drugs such as triclosan have the effect of causing resistance to multiple drugs. Countermeasures related to resistant bacteria are therefore urgently needed for chemical substances other than antibiotics, along with evaluations related to their toxicity amongst aquatic organisms. From a research perspective, monitoring of resistance genes within the environment is also needed, and communicating risk to create awareness of this issue in society at large would be a valid countermeasure. ■

1) It is presumed that more than half of all infectious diseases in humans originated from animals (anthropozoonosis). In order to protect the health of humans, increased attention needs to be paid towards animals and the natural environment.

Guideline for Consensus Building Regarding Use of the Oceans: Towards the Creation of “Marine Spatial Planning”

[KEYWORDS] consensus building processes / marine spatial planning / offshore wind farms

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(Ocean Newsletter No. 428, 5 June 2018)

Consensus building on ocean use has grown in importance with the diversification of ocean use through efforts such as the development of offshore wind farms. The University of Tokyo Ocean Alliance published its own guideline on this topic in October 2017, based on the outcome of research conducted with a grant from The Nippon Foundation. This article will introduce the background for creating the guideline followed by its main contents.

What Is Consensus Building for Ocean Use?

Ocean usage is becoming increasingly diverse. Ocean users include the fishing industry – the original users of marine areas - as well as maritime trade, the tourism industry, and in recent years test facilities for offshore wind farms. Coastal zones are used in a variety of ways as they are close to human habitats.

However, in order to plan to use them, a major problem must be addressed; it is not always possible to meet the demands of all stakeholders, including those who make direct use of the ocean.

If we want to use the ocean in a way that is acceptable to all stakeholders, we should have discussions with them. However, a number of problems arise when we attempt to do this, namely: who are among them in the first place, what procedures should be taken to hold these discussions, and what should be the basis of decisions. In addition, repeating these discussions for each new demand for ocean usage requires a great deal of time and effort.

Then, what kind of discussions are required to build a consensus regarding ocean usage that is acceptable to all stakeholders in the future, and what precautions need to be taken? “Marine spatial planning” is one answer to these problems and provides a standardized method of proceeding with these discussions. Countries such as the United States, Britain, and France are now beginning to use this method to create usage plans.

The University of Tokyo Ocean Alliance has been working on developing a method for consensus building since 2014 thanks to a fund from The Nippon Foundation. What should we focus on so as to introduce these plans in Japan following this worldwide trend? We have been trying to find the answer to this question through methods such as domestic and international surveys, as well as detailed examinations of previous research on the topic. The results were compiled into the “Guideline for Consensus Building regarding Use of the Oceans,” released in October 2017.¹⁾

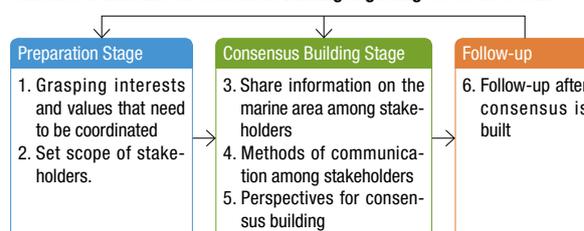
We intended that the primary readers would be local government officers. These institutions are directly involved

in coordinating interests related to ocean use, and make decisions relating to actual plans for the development of renewable energy sources such as offshore wind farms. We referred to the UNESCO Intergovernmental Oceanographic Commission’s (UNESCO-IOC) manual²⁾ and combined the concrete case studies of this project.

Structure of the Guideline and Primary Content

The guideline consists of six chapters, along with six columns compiled from the results of each part of research, and two sets of materials. The structure of these six chapters and their relationships is summarized in Diagram 1.

■ Diagram 1:
Structure of Guideline for Consensus Building Regarding Use of the Oceans



1) Characteristics of consensus building processes for ocean use

Consensus building processes for ocean use have the following characteristics compared to those for land use.

- There are no legally authorized owners of marine areas. Each law and regulation for ports, coastlines, and fishing ports define managers of these designated areas, but there is no general law or regulation for marine area management.
- Information required for consensus building is usually insufficient, and it is often difficult to acquire this information.
- Stakeholders involved in this consensus building are usually professional bodies such as fishery operators, maritime operators, and producers of electricity.
- Ordinary citizens have smaller interests compared to that of land usage, which makes it difficult to grasp their demands.

Putting "Dreams and Spirit" into Shrimp Crackers

[KEYWORDS] shrimp / confectionery / fishing industry

Toshio Mitsuda

President and Representative Director, Keishindo Corporation
(Ocean Newsletter No. 428, 5 June 2018)

Since the founder of the Keishindo Corporation, Keisuke Mitsuda, perfected the first shrimp cracker (ebi senbei) in Japan more than 150 years ago, the company has continued to refine its flavor. The company has always placed importance on nature and the changing seasons, the Japanese spirit of valuing each of the four seasons, and the native traditions and culture cultivated by preceding generations. Through creating flavorful shrimp crackers, we hope to contribute to lasting prosperity in the shrimping industry, and also communicate the Japanese spirit to future generations.

The Shrimping Industry's Lack of Successors

An explanation of Keishindo's background is required to discuss this problem. When our company was initially founded, the waters around Chita Peninsula in Aichi Prefecture contained so many small Akasha shrimp that it was as if the sea was boiling with them when they were caught. These shrimp were cooked with minced fish, then dried in the sun to create a form of preserved food known locally as Chinkara. When Keisuke Mitsuda, the company's founder, moved to the area from Mino (current-day Gifu Prefecture), he began to improve on this recipe to make it tastier, but it was nothing like a confectionery at the time. Thinking about it, having a confectionery that uses seafood as a raw ingredient is a rarity throughout the world. Even in Japan, Aichi Prefecture is responsible for about 95% of the production of shrimp crackers, making them a highly localized food item.

To return to the topic of the current state of the shrimping industry, in 2005 1,114t of shrimp were caught in Aichi Prefecture. In 2015, this had dropped to 815t, reduced to approximately 73% of its former value. By comparison, although there were 5,304 individuals involved in the fishing industry in 2003, by 2013 the number had dropped to 4,319, reduced to approximately 80%. Looking at a breakdown of ages, approximately 70% of workers were 50 or older, with 25% aged older than 70. This aging in the fishery industry is becoming a serious problem. In Yoi-ichi, Hokkaido, one of our primary areas of supply for raw ingredients, the lack of workers means that more and more deep-water shrimping boats are going out of business. The aquaculture industry is also seeing similar issues. The peak of kuruma shrimp production in Japan was 3,000t in 1988. This has now shrunk by approximately 47%.

Keishindo has been in business for seven generations, or more than 150 years, thanks to the blessings of Japan's bountiful seas, and the support of fishermen. Our company uses approximately 300t of shrimp every year. We place a great deal of importance on our relationship of trust with fishermen, and hope that a spirit of mutual support will ensure that both our business and the shrimping industry

continue into the future.

Meeting the Demands of the Ingredients

Keishindo makes a confectionery called "Ama Ebi Odoriyaki" (lit. live baked deep-water shrimp). The name comes from the concept of eating live seafood (known as "odorigui" in Japan). Our company invented the product to see if we could create a form of confectionery with the same beautiful and colorful shape as the deep-water shrimp. The product is only available during the winter months. Our company had been producing a similar product for several years based on the kuruma shrimp, and we had collected information about how the product should be baked. We therefore believed that producing a confectionery based on the deep-water shrimp would be relatively



Ama Ebi Odoriyaki



Deep-water shrimp: The raw ingredients

simple. However, experimental production showed that there were issues with the required feel, color, and texture. We attempted to work out the possible causes, including size, sex, and area of production of the raw ingredients, but could not find anything definitive. The only other possible cause we could think of was freshness, but the deep-water shrimp were transported by air in temperature-controlled conditions from Hokkaido to Nagoya. This meant that all possible consideration had been taken in regard to this factor. In addition, there were no problems with K values, breaking strength, color tone, and other indices relating to the freshness of seafood when they were compared to our company's standards. With the factory being in Nagoya and the area of production being Hokkaido in the north or in the Hokuriku region, it seemed like there wasn't really anything else that could be done. Just as we were about to give up, one of our staff members came up with an interesting proposal: "Why don't we make a factory in the area of production?" We immediately requested that a small amount of still living deep-water shrimp be sent to Hokkaido from Hokuriku, and began performing baking experiments under the assumption that the factory would be situated in the area of production. These experiments led to the conclusion that the shrimp still being alive was the most important factor. We built our deep-water shrimp processing plant in Yoichi-cho, Yoichi-gun, Hokkaido, nine years ago.

This may be a slightly different concept from that of "locally produced for local consumption," but it is an excellent example of the importance of meeting the demands of the ingredients as opposed to having the ingredients meet the demands of production.

A variety of limited edition products are planned per season. The previously sold "Summer Festival" product.

The Change from Shrimp Crackers to Shrimp Confectionery

At our company, we call our confectionery "works" not "products." That is because we place importance on the story behind each item, and the thoughts of those who actually made them. This change in thinking began when we could not come up with an idea for a new product to sell in one of our new stores. This change also helped us escape from our preconceived notions regarding what shrimp crackers are. Despite producing multiple trial products based on the desire to create a delicious shrimp cracker, we were not able to come up with a satisfying result. We were looking for some kind of a hint. When an individual in charge of department store sales asked us for a report on our development status, he commented that, "Just attempting to create a delicious product won't lead to any changes. Why not try adding a sense of seasonality or some kind of narrative to the product?" This caused the scales to fall from our eyes.

This idea, to use an analogy, was a form of evolution similar to when sea creatures evolved into amphibians that could live on land. In addition to delicious flavors, we needed to aim for additional factors such as appearance, ingredients, and a sense of seasonality. This led to us evolving from being a shrimp cracker manufacturer to a shrimp confectionery manufacturer, and is what put Keishindo on its current path.

Darwin's theory of evolution states that, "It's not the strongest or smartest creatures that survive, instead it's the creatures that are most able to adapt to their environments." We will continue to protect our traditions as a long-standing company, without fearing change, and produce confectionery most suited to the current era.

To conclude, I would like to express my gratitude to Japan's beautiful changing seasons and its bountiful seas. ■

