

Tohoku University Reconstruction Action

Seeking to play a leading role in
“the reconstruction of Tohoku and the revitalization of Japan”



Message from the President

The Great East Japan Earthquake, which occurred on March 11, 2011, caused high-intensity ground shaking, a massive tsunami and a serious nuclear power plant accident, resulting in a disaster of a scale unprecedented in the history of Japan.

Tohoku University is well aware that its mission as a general university located at the center of the affected area is to fully commit itself to recovery from the disaster. It is our aim to create new wisdom so as to strongly support the rebirth of the region. Efforts will be focused on establishing new industries through cooperation with businesses and government agencies to increase employment and revitalize the Tohoku region. The university hopes that these efforts will also serve as a driving force or an engine to stimulate the stagnant Japanese economy.

The “Tohoku University Reconstruction Action” presented in this brochure is the prototype of the engine that we propose. To start this engine, cooperation between universities, businesses and local governments not only in the affected areas but throughout Japan and also abroad is essential. We believe that we can create a sustainable, energetic, affluent society through combining the results of research and education to date, cutting-edge technologies, and the know-how to apply these results and technologies in practical settings, in such a way so as to provide maximum benefit to society.

To overcome this difficult situation, efforts by a single university alone would be insufficient. It is essential to build a cooperative system involving the whole of Japan and additional global resources. Your support in these efforts would be highly appreciated.

May 2012



Susumu SATOMI
President ,Tohoku University



What happened on March 11, 2011?

Earthquake, Tsunami, Nuclear Power Plant Accident ... Double trigger, Triple Disaster

On March 11, 2011, at 14:46, an earthquake of magnitude 9.0 occurred and the intense shaking lasted about three minutes. The hypocenter was located off the coast from Iwate to Ibaraki. About 30 to 60 minutes after the earthquake, a massive tsunami hit a wide area along the coast of the Pacific Ocean extending from Aomori to Chiba Prefectures. With the wave runup height exceeding 40 m in some places, the tsunami caused devastating damage to coastal areas. In Fukushima, a nuclear power plant was destroyed by the earthquake and tsunami, cutting off the external power source and resulting in the failure of the cooling system. This eventually led to the meltdown of a number of reactors.

The earthquake and tsunami caused 15,858 deaths, with 3,021 people still listed as missing, and completely or partially destroyed 387,594 buildings. (Source: "Koho Shiryo (Publicity Bulletin)" dated May 9, 2012 issued by Emergency Disaster Countermeasures Headquarters, National Police Agency of Japan). The total number of evacuees, including those who had to evacuate or relocated due to the nuclear power plant accident, reached about 344,000. (Source: Data dated on April 11, 2012 provided by the Reconstruction Headquarters in response to the Great East Japan Earthquake of the Reconstruction Agency).

In the midst of this unprecedented disaster, people in the affected areas acted in a moral, orderly manner, which attracted high praise from around the world. On the other hand, however, the fragility of the infrastructure for risk management and security maintenance was revealed. The urban functions of the affected areas were paralyzed by the disaster to a far greater extent than expected. More than one year passed since the earthquake, while there are some signs of recovery thanks to the untiring efforts of many people, full-scale reconstruction is still at an early stage.



The tsunami generated by the Great East Japan Earthquake caused devastating damage to the coastal area along the Pacific Ocean in the Tohoku region. (Source provided by Kahoku Shimpō)



In Fukushima Prefecture, a nuclear power plant was hit by the tsunami, magnifying the disaster. (Source provided by the Fukushima Prefecture Police Department)

What can the university do? – Efforts by Tohoku University

Under these circumstances, Tohoku University, despite damage to research facilities and laboratories, has made rapid progress along the road to recovery and has initiated the “Brand New Tohoku University” project.

How can the university best serve, with its academic resources, efforts to recover from the disaster, and prevent or mitigate future disasters? As probably the only university in the world that has experienced a disaster of this scale, what can Tohoku University do? We should contribute to the rebirth of Japan by creating new values and also contribute to addressing issues of post-disaster reconstruction, which are common to all mankind. These are the concepts behind our efforts in post-disaster reconstruction.

Major Efforts by Tohoku University toward Recovery and Reconstruction from the Disaster

2011

March Various post-disaster recovery and reconstruction activities (Reconstruction Action started by individual departments)

April Tohoku University Institute for Disaster Reconstruction and Regeneration Research established under the concept of major post-disaster reconstruction and regional regeneration research projects

July Seven projects organized

October Research Organization of Electrical Communication established

2012

January Comprehensive Training Center for Community Medicine established

February Tohoku Medical Megabank Organization established

March Spirit of Tohoku University 2011 (Various international symposiums organized)

April International Research Institute of Disaster Science established

May The seven projects are reorganized into eight projects (Radioactive Decontamination Project added)



The Tohoku University Regional Reconstruction Project “HARU,” a volunteer group mainly consisting of students, is also engaged in the conservation of cultural properties.



Tohoku University Hospital focused all its efforts on receiving patients immediately after the disaster in cooperation with affected municipalities. Detailed information on its activities is presented in a book entitled “Lives saved by Ishinomaki Red Cross Hospital, Kesen-numa City Hospital and Tohoku University Hospital” (Published by Aspect).

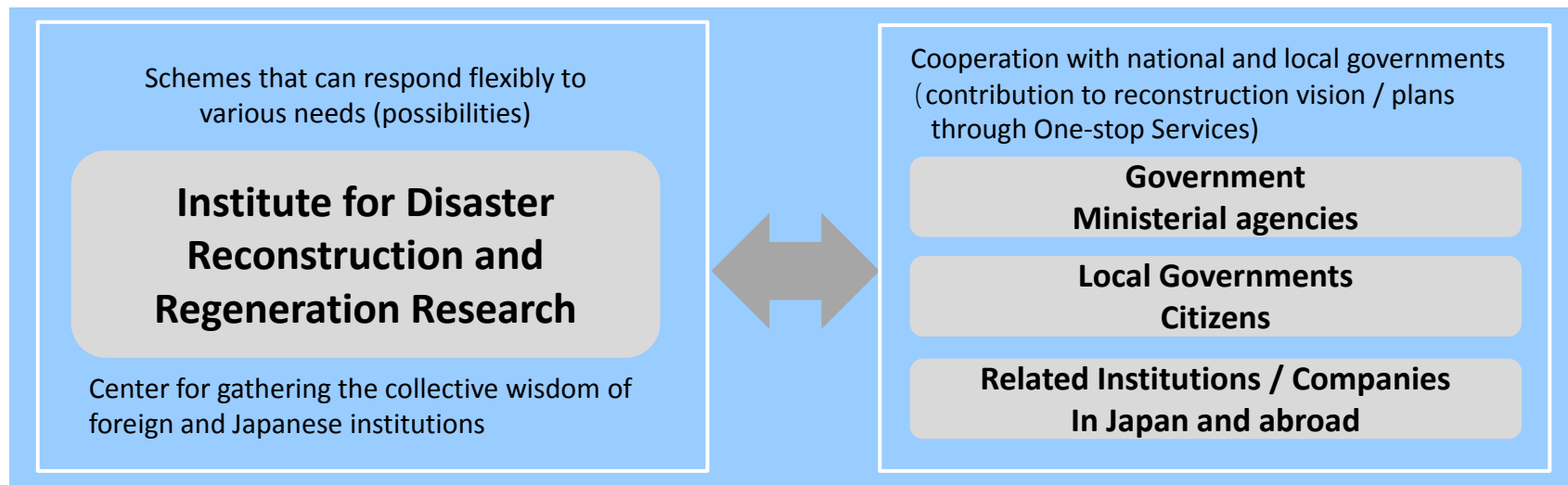
Institute for Disaster Reconstruction and Regeneration Research

As the core university in the area affected by the Great East Japan Earthquake, Tohoku University will lead the post-disaster reconstruction and regional regeneration.

To accomplish the aim, Tohoku University established in April 2011 the Institute for Disaster Reconstruction and Regeneration Research, which was positioned as an organization to be engaged research, education and societal contribution strategically and systematically and communicate results of its activities to the public and apply them in practical settings. It is our aim to make one-stop services available to implement reconstruction visions and plans in cooperation with government and ministerial agencies, local governments and citizens, and related institutions and companies in Japan and abroad. To fulfill our aim, we have promoted eight “Institute-initiated projects,” and promoting and supporting “member’s proposed projects (Reconstruction Action 100+)” through flexible operation and participation by the entire university in line with the three missions.

Missions

- Mission1** Contributing to post-disaster reconstruction and regional regeneration
- Mission2** Creating a multidisciplinary center of excellence for post-disaster reconstruction
- Mission3** Establishing a cross-disciplinary research organization to conduct problem-solving projects



Eight Projects/Reconstruction Action 100⁺

Eight Projects

Project1 International Research Projects on Disaster Science P.6-7

Project2 Project for the Reconstruction of Community Health Care P.8-9

Project3 Project for Environmental Energy P.10

Project4 ICT Reconstruction Project P.11

Project5 Tohoku Marine Science Project P.12

Project6 Radioactive Decontamination Project P.13

Project7 Regional Industries Restoration Support Project P.14

Project8 Industry-University Collaboration Development Project for
Reconstruction P.15

Reconstruction Action 100⁺

Relief activities for affected people
Recovery and reconstruction activities
Survey and understanding extent of damage
Disaster prevention and mitigation measures
Improvement of infrastructure and other facilities
Industrial reconstruction and research and development

P.16-24

International Research Projects on Disaster Science (1)

Establishment of the International Research Institute of Disaster Science(IRIDeS) to take the initiative in bringing about a paradigm shift in emergency preparedness and risk management to address “ low frequency great disasters”

Creation of “the action-oriented disaster science”

Based on the lessons from the 2011 Great East Japan (Tohoku) earthquake and tsunami disaster, IRIDeS aims to become a world centre for the study of the disasters and disaster mitigation, learning from and building upon past lessons in disaster management from Japan and around the world. Throughout, IRIDeS will contribute to on-going recovery/reconstruction efforts in the affected areas, conducting “action-oriented research”, and pursuing effective disaster management to build sustainable and resilient societies, IRIDeS innovates the past paradigm of Japan’s and world’s disaster management to catastrophic natural disasters, hence to become a foundation stone of disaster mitigation management and sciences. IRIDeS creates a new academia of disaster mitigation that subsumes the lessons from the 2011 Tohoku earthquake and tsunami disaster and the findings of the world-leading research into our societies with the aim of establishing the social systems responding promptly, sensibly and effectively to natural disasters, withstanding the adversities with resiliency, passing and exploiting the lessons to the forthcoming disaster management cycles.

IRIDes Logo

The IRIDeS logo means the deformed image of the Japanese character of disaster (災) turned upside down, based on the idea of Japanese saying “Turn your misfortune to good account.” It represents our mission of learning the Great East Japan Earthquake and pursuing effective disaster management to build sustainable and resilient societies. The name of the institute is abbreviated as IRIDeS and pronounced ee-ree-dis based on irides, the plural of iris, which symbolizes “hope and integrity.”



IRIDeS Logo

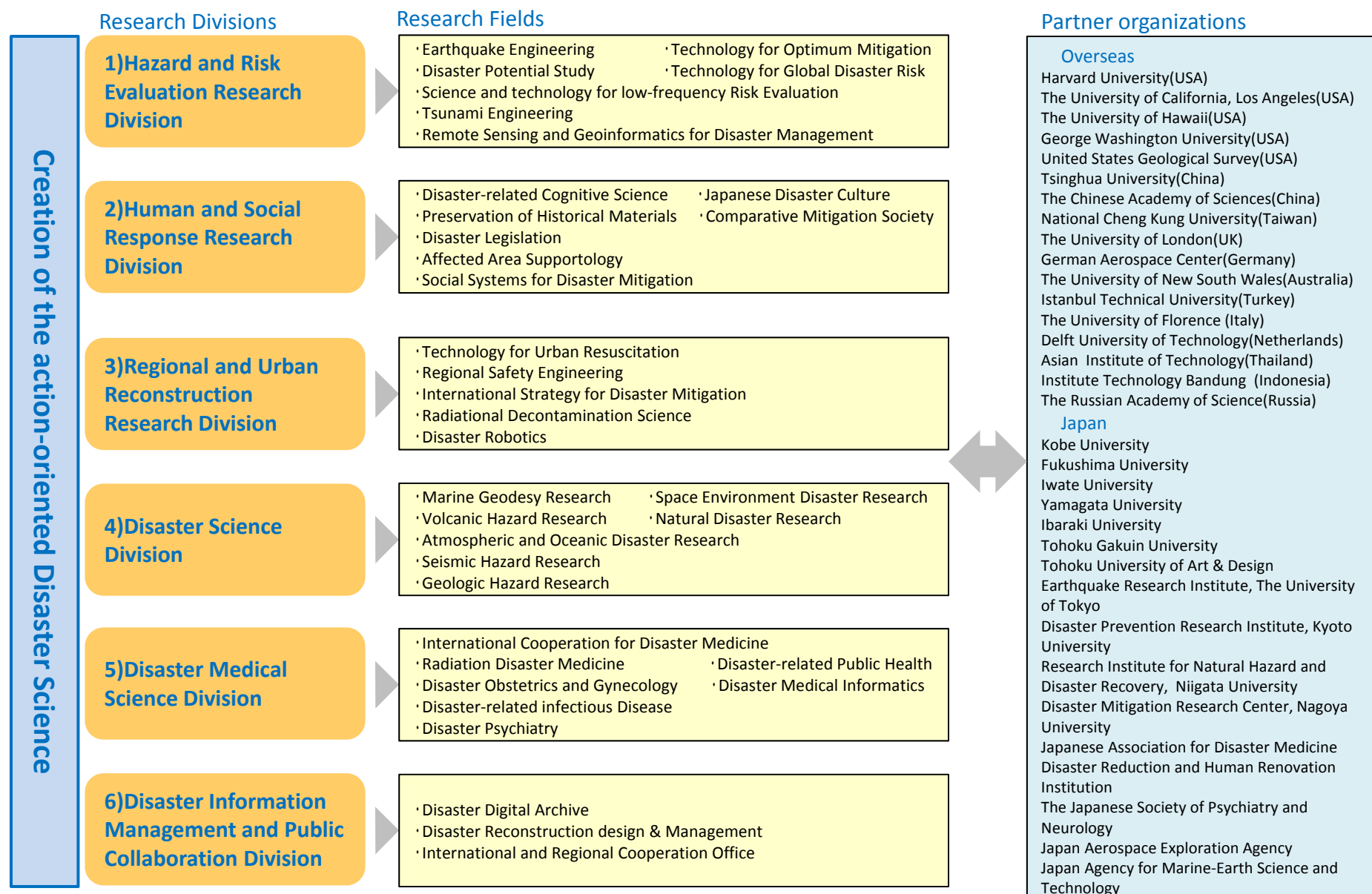


Name sign posting ceremony,
at Aobayama campus on Apr.4, 2012.



Cooperation between IRIDes and other organizations in Japan and abroad.
A joint declaration on international research for disaster science was
signed and announced on Mar.11, 2012.

International Research Projects on Disaster Science (2)



Project for the Reconstruction of Community Health Care (1)

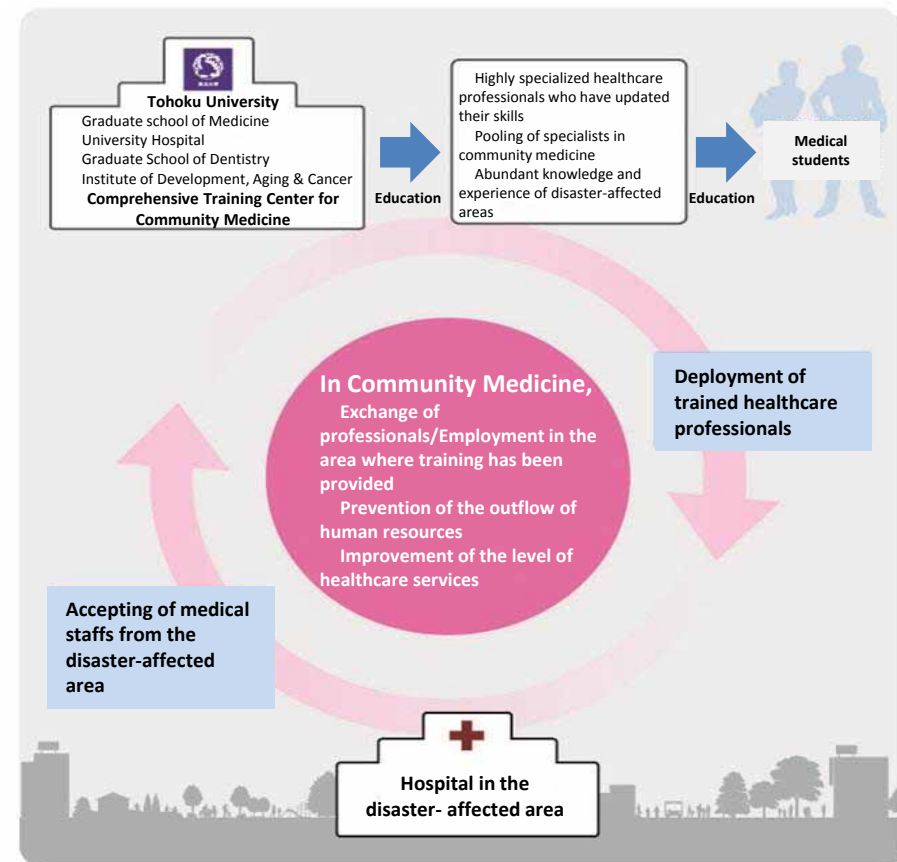
Two major missions: development of healthcare professionals providing local health care services and establishment of a Biobank

When the Great East Japan Earthquake hit the Tohoku region, many medical facilities in coastal areas were lost due to the tsunami. While many affected people were left untreated, the number of healthcare professionals who lost their jobs increased. In addition, valuable medical information, including patients' medical records, was also lost. Our efforts will be focused on contributing to improve the system of educating healthcare professionals with Tohoku University Hospital as its core. We also aim to contribute to reconstructing local healthcare networks to provide affected people with healthcare services, establishing an advanced medical system, including use of a database of medical information, and creating industries in the Tohoku region.

(1) Establishment of Comprehensive Training Center for Community Medicine

The Comprehensive Training Center for Community Medicine 1) employs healthcare providers, who were affected by the Great East Japan Earthquake by offering positions related to advanced medicine at the Tohoku University Hospital and runs a training center equipped with cutting-edge simulators to offer them opportunities for continuous training; and has developed a self-contained system under which healthcare professionals who have improved their knowledge and skills through training are offered an opportunity to work in local health care settings.

2) invites healthcare professionals who are engaged in disaster medicine in the disaster-affected area to provide students with lectures on practical disaster medicine covering an extensive range of fields to develop professionals who will be engaged in community/disaster medicine.



Project for the Reconstruction of Community Health Care (2)

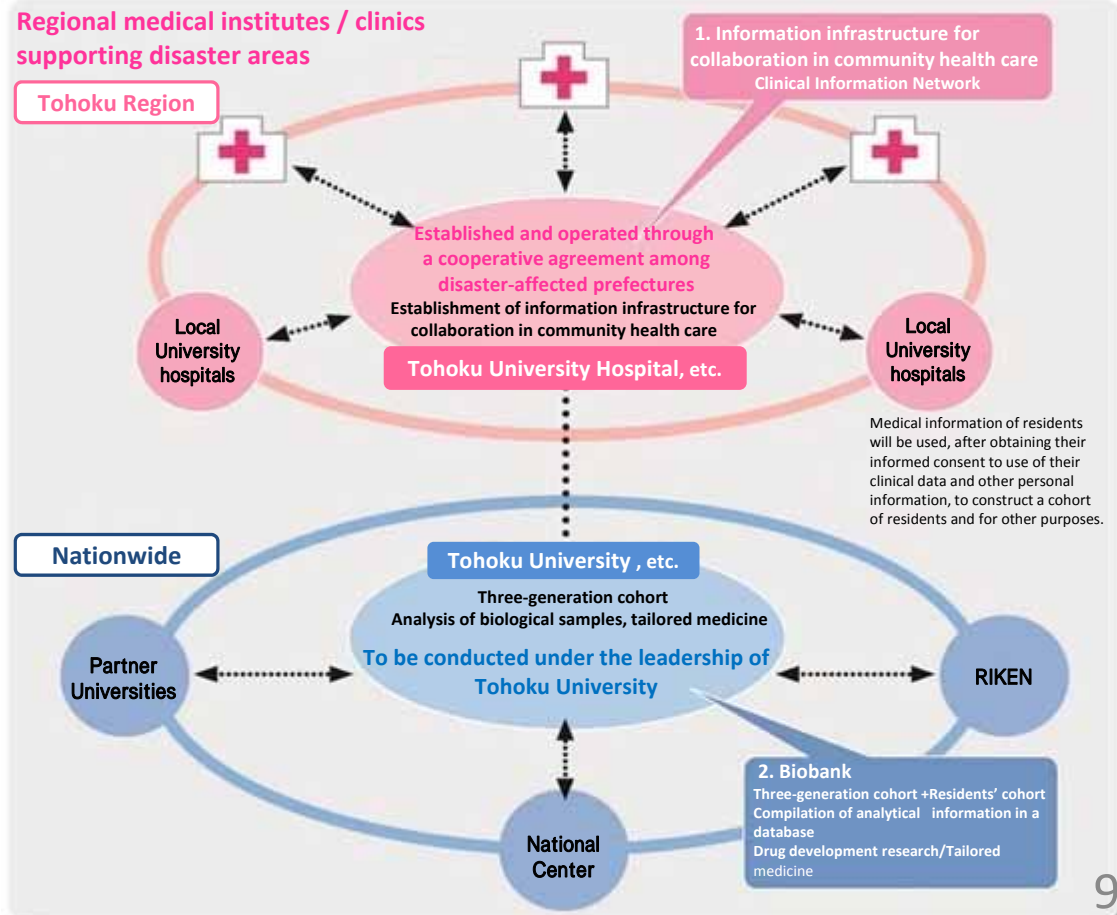
(2) Establishment of Tohoku Medical Megabank Organization

Tohoku University has established the Tohoku Medical Megabank Organization to promote the Tohoku Medical Megabank project that consists of 0) reconstruction of community medical institutions, 1) establishment of information infrastructure for collaboration in community health care, and 2) Biobank Project.

In the Biobank Project, a long-term health survey is conducted in residents in the disaster-affected area. Data obtained from the cohort studies will be used, in cooperation with leading research institutions in Japan, to form a global research center for genomic medical care, genomic preventive medicine, drug development, and translational research.



Tohoku Medical Megabank Organization Logo
ToMMO(pronounced toe-mow) means -“friends” and “together” in Japanese
Tohoku Medical Megabank Organization will continue to
work closely with regional communities.



Project for Environmental Energy

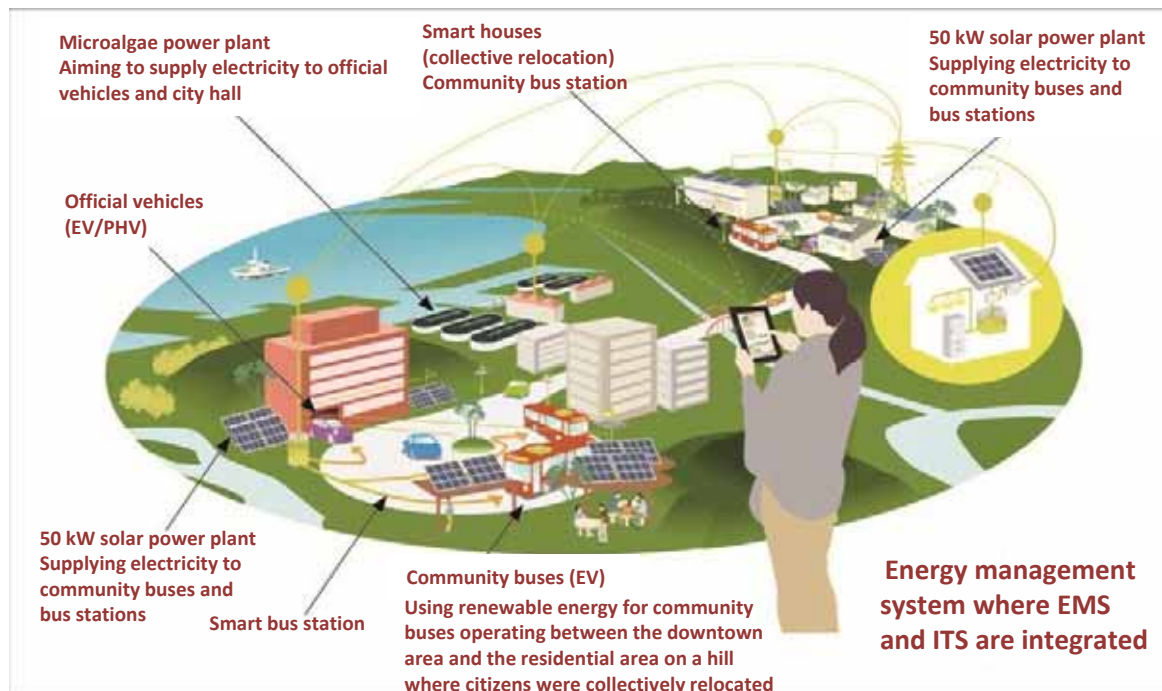
As part of the reconstruction of the Tohoku region, building advanced communities which are disaster-resistant, through R&D into next-generation energy sources

The energy supply systems in the Tohoku region, and indeed the whole of Japan, were significantly damaged due to accidents at nuclear power plants, disruption of operation at thermal power plants, and other problems caused by the tsunami. This has focused attention on energy security in the event of disasters, particularly from the perspectives of planning reconstruction and promoting industry. For example, Miyagi Prefecture and other municipalities affected by the disaster include an eco-town plan using clean energy sources in their reconstruction plan.

In this context, what can Tohoku University do to contribute? In response, researchers in the environmental energy field gathered and developed an environmentally-friendly energy vision. The university aims to communicate results from projects and proposals in line with this vision in order to help promote the reconstruction of the Tohoku region in the field of energy, which will include the development of disaster-resistant energy systems and the promotion of a clean energy industry.

Building an energy management system by combining community energy systems using primarily renewable energy and vehicles (conceptual drawing)

The conceptual drawing below is an example of a next-generation energy system planned to be incorporated in the recovery/reconstruction plan for Ishinomaki City. In this project, it is planned to establish an energy management system where EMS (energy infrastructure) and ITS (transportation/communication infrastructure) are integrated. (Joint group from Tohoku University and the University of Tokyo)



Examples of research issues

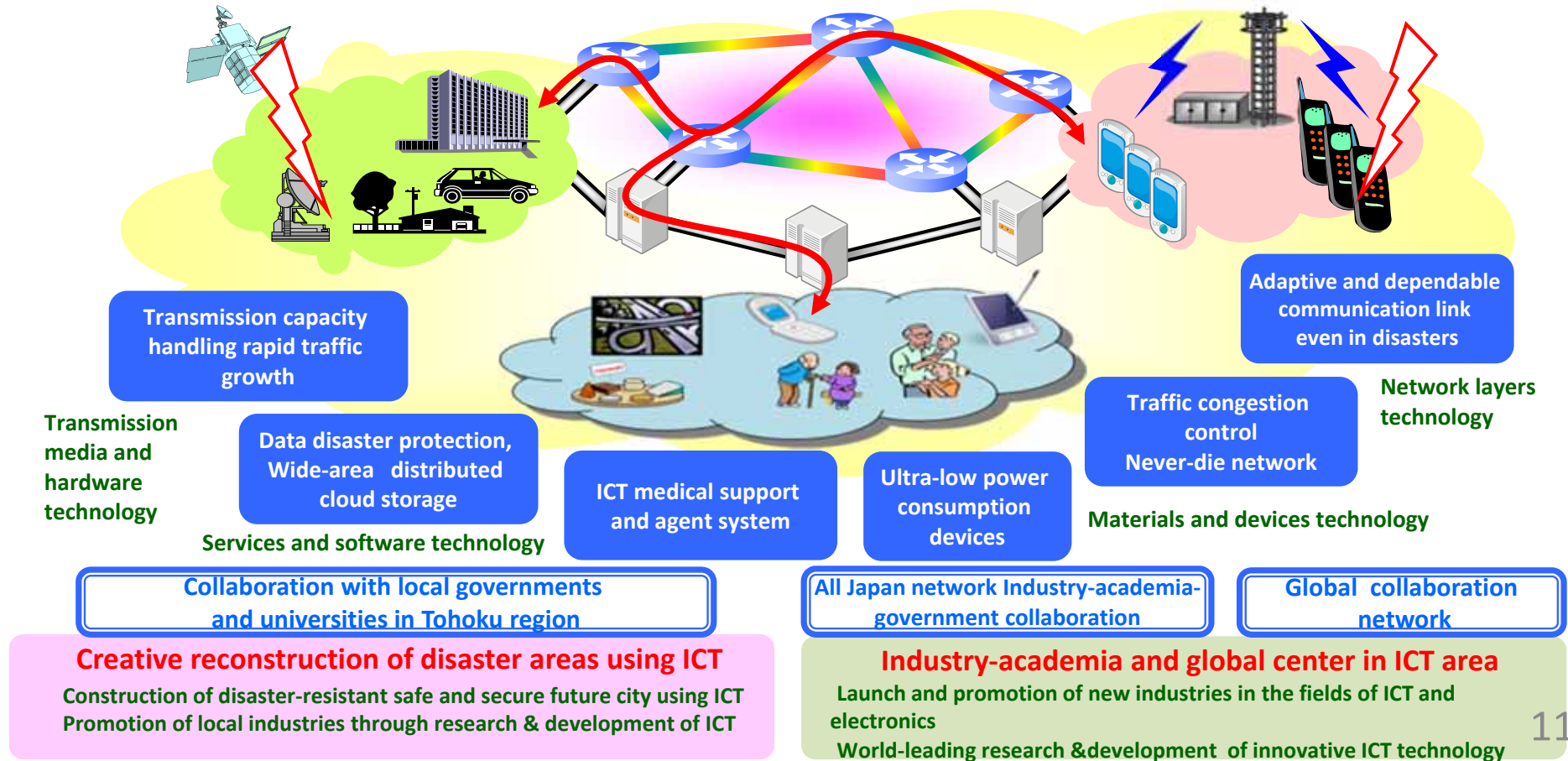
- ◆ Renewable energy from waves and other ocean currents, which is expected to be used in areas along the Sanriku Coast
- ◆ Use of microalgae as an energy source
- ◆ Establishment of an energy management system by combining community energy systems relying mainly on renewable energy and vehicles

ICT Reconstruction Project

Resolving issues and concerns associated with ICT infrastructure that have been revealed following the Great East Japan Earthquake through the efforts of Tohoku University and the NICT Center of Research and Demonstration of Disaster-Resistant ICT Infrastructure

Following the Great East Japan Earthquake, the vulnerability of our information communication technology (ICT), which could be seen in the disruption of communication lines, the failure of information gathering, and the insufficiency of information, was revealed, exposing issues that need to be addressed. How should we address these issues? In response, Tohoku University established in October 2011 the Research Organization of Electrical Communication and, in January 2012, the University's Research Institute of Electrical Communication and the National Institute of Information and Communications Technology (NICT) took the initiative in establishing the Center of Research and Demonstration of Disaster-Resistant ICT Infrastructure, a collaborative organization between government, business and academia. These organizations have been making steady progress in addressing the issues which were exposed. Tohoku University, in line with their activities, will aim to develop and verify disaster-resistant information communication infrastructure.

Establishment of a center for development and demonstration of disaster-resistant ICT infrastructure



Tohoku Marine Science Project

Launch of the Tohoku Ecosystem-Associated Marine Sciences(TEAMS)

The great earthquake and massive tsunami that occurred on March 11 affected and significantly damaged the marine environment, which provides us with the ocean's bounty. At present it is totally unknown how seriously the marine ecosystem and environment have been affected by the pile-up of a large amount of debris, loss of seaweed beds and tidelands, which serve as habitats for organisms, sand and mud deposited on reefs, destruction of transitional zones between land and sea due to ground subsidence, and spread of heavy oil and radioactive substances.

To achieve recovery of the fishing industry and reconstruction of the affected areas, it is essential to conduct surveys to identify the damage and to launch new industries.

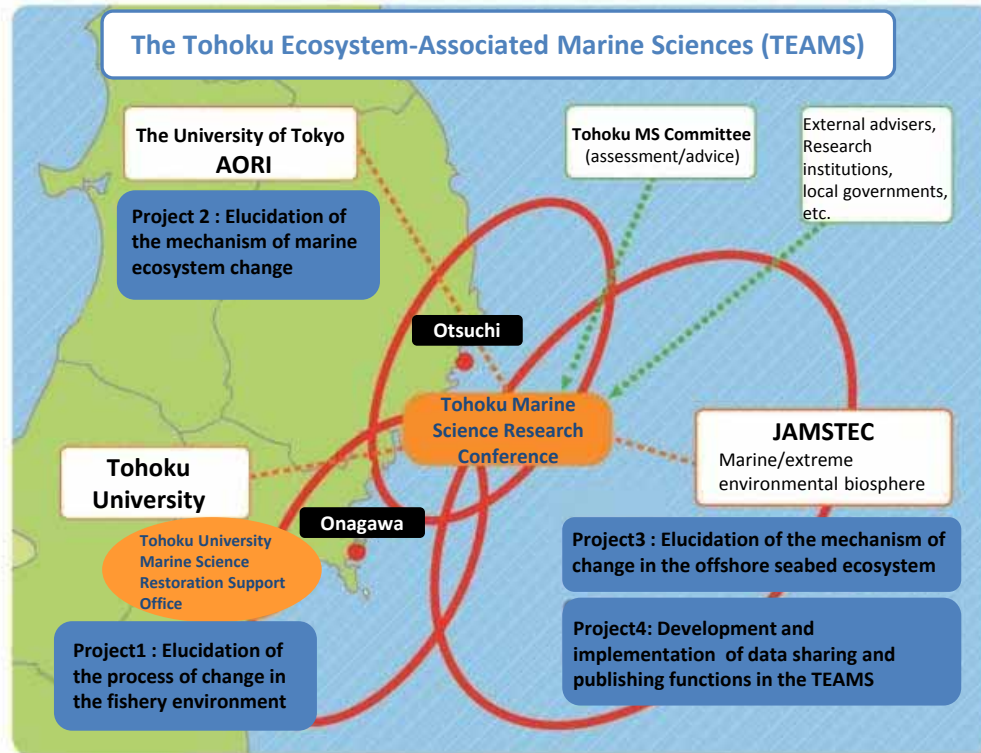
The TEAMS is conducted with Tohoku University as its representative and the University of Tokyo's Atmosphere and Ocean Research Institute (AORI) and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) as deputy representatives, with the collaboration of Kitasato University, Tokyo University of Marine Science and Technology, Iwate University, and Tokai University. Under the collaboration of these research institutes, the "Tohoku Marine Science Research Conference" was established to conduct the following four research projects to survey the impacts of the disaster on the marine environment and ecosystem.

Project 1: Elucidation of the process of change in the fishery environment (in cooperation with Kitasato University)

Project 2: Elucidation of the mechanism of marine ecosystem change (in cooperation with Iwate University and Tokyo University of Marine and Technology)

Project 3: Elucidation of the mechanism of change in the offshore seabed ecosystem (in cooperation with Tokai University)

Project 4: Development and implementation of data sharing and publishing functions in the TEAMS



The drawing on the left shows debris mapping using a side scan sonar. The picture on the right shows debris on the bottom of the sea carried by the tsunami.
(© JAMSTEC)

Radioactive Decontamination Project

Recovery of the living environment from contamination by radioactive substances

The spread of radioactive substances caused by the accident at TEPCO's Fukushima Daiichi Nuclear Plant resulted in serious radioactive contamination. Concerns associated with the contamination, such as the public anxiety over the ecosystem and the health effect caused by exposure to radioactive substances remain unresolved not only in the areas adjacent to the plant but throughout Japan.

What do we need to remove radioactive substances, restore living conditions, and dispel unfounded rumors? What is basically needed is to investigate the impact of radioactive substances and provide the public with accurate and useful findings and data based on science.

(1) Development of technology to restore the living environment contaminated by radioactive substances

The Living Environment Early-Restoration Technology Research Center was established to initiate in fiscal year 2012 the three technologies shown below. Detailed methods for these technologies will be determined in the latter half of the project period. A branch office was established in Fukushima City to, in cooperation with Fukushima University and Fukushima Medical University to identify technologies needed by municipalities. The results will be reflected in technology development.

Three objectives of technology development

- 1) Development of new technologies to extract and concentrate radioactive cesium contained in contaminated soil and to use collected radioactive substances effectively
- 2) Development of cultivation methods to grow radiation-free agricultural products
- 3) Development of large-aperture gamma ray detection technology for rapid contamination detection

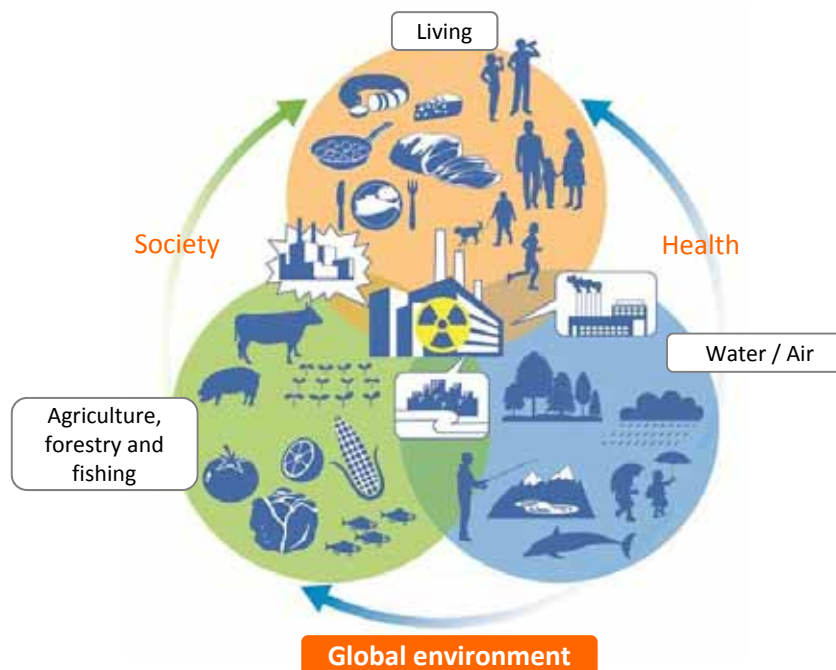


Food contamination testing
at Tohoku University

Contamination removal from a playground
of a nursery school in Fukushima City

(2) Establishment of animal archives contaminated by radioactive substances

There are concerns about the influence of the spread of radioactive substances on ecosystems. The objective of the project is to set up an organ bank with data on radionuclides and radioactivity deposited in the internal organs of farm and wild animals together with the water and the soil in the evacuation area surrounding the power plant. Organs are collected from disposed animals that were exposed to radiation due to the nuclear power plant accidents. Based on the results, researchers will assess how much radioactivity has been deposited via environmental media and in which organs of the body, with the aim of providing basic information for further research on biological influence.

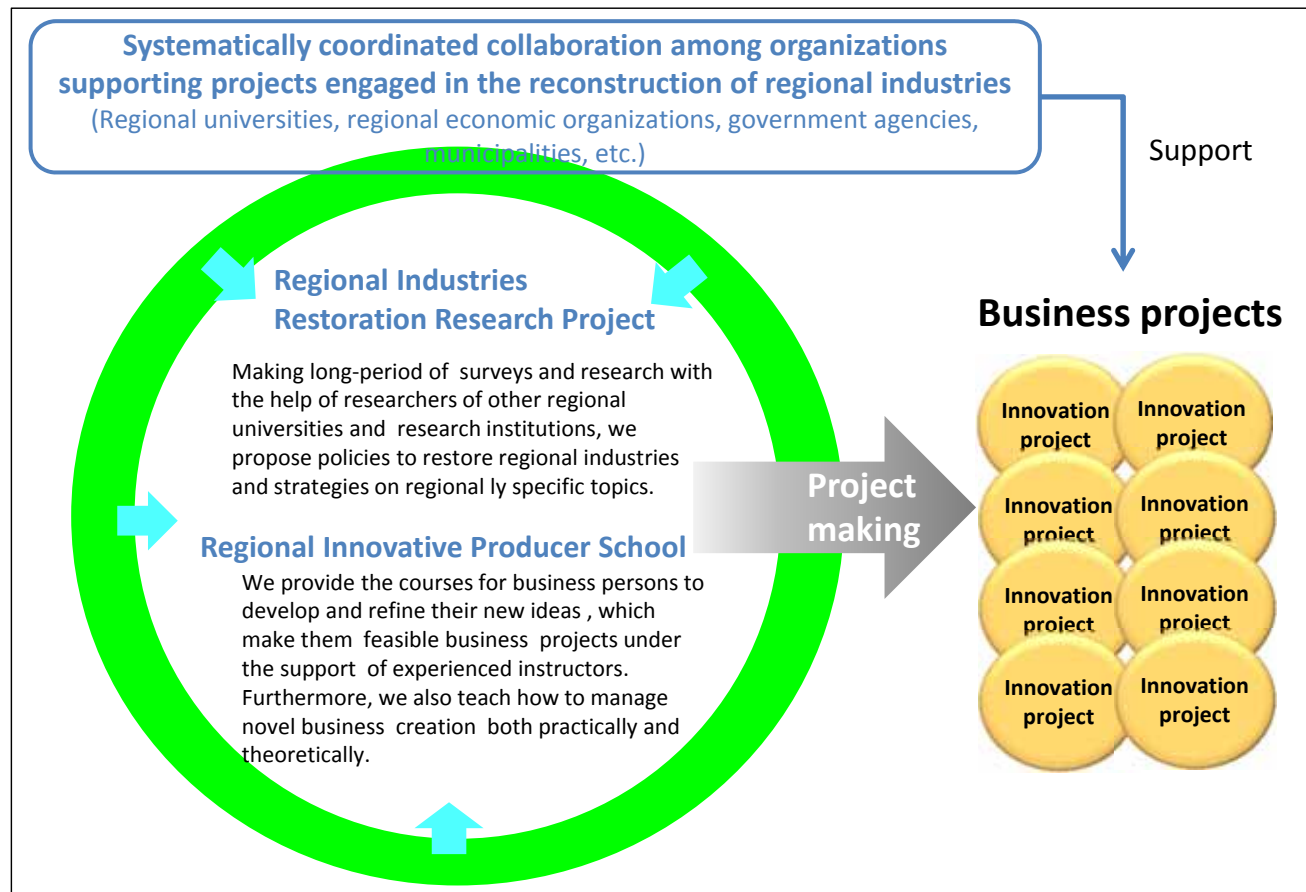


Regional Industries Restoration Support Project

To provide continuous supports to the restoration of industries and communities in the Tohoku region

In order not only to restore the stricken areas to pre-disaster situation, but also to prosper those more than what they were, it is not insufficient to reconstruct buildings and infrastructures. There are lots of social problems which cannot be solved by buildings. We aim to provide knowledge and wisdom and nurture the leaders who deal with them.

Our project consists of two parts: the first is the Regional Industry Restoration Research Project, in which researchers continuously investigate the progress of reconstruction and contemplate what kind of industries and communities should be desired in the new Tohoku region. Based on the research, the policy proposals and information will be published from the perspective of the disaster-affected areas. The second is the Regional Innovative Producer School. It provides training programs designed for executives, successors of local companies and next-generation of business persons in order to develop their abilities of making innovation happen. In the school, we develop human resources that can contribute to the revitalization of the regional industries and create new value and jobs in the Tohoku Region.



Regional Industry Restoration Research Symposium in October, 2011



Publications of research results in March, 2012



Industry-University Collaboration Development Project for Reconstruction

To achieve practical application of science and technology innovations developed in the Tohoku region

Many companies in the Tohoku region have been facing financial, technological, human resource-related and various other kinds of difficulties since the Great East Japan Earthquake. With the aim of fostering innovation and strengthening the industrial infrastructure, which serves as the basis for the economic revitalization of the disaster-affected areas, our efforts in this project are focused on contributing to the revitalization of the regional economy through effective use of technological intellectual property ("IP") owned by Tohoku University, promotion and strengthening of cooperation between industry and the university to support the regional economy, and commercialization of products jointly developed through cooperation between companies and university researchers.

To achieve the above objective, Tohoku University will further strengthen the cooperative relationships with industrial organizations (Tohoku Economic Federation, Miyagi Industrial Association, etc.) and municipalities in Miyagi Prefecture and make full use of the reconstruction policies of the Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Economy, Trade and Industry, and other government agencies so that the university can devote more effort to producing technological IP and promoting the transfer of its technology to companies in the disaster-affected areas. It is our final goal to commercialize our innovative technological IP in companies in the disaster-affected areas in such a way as to contribute to the revitalization of these areas.

Example of reconstruction efforts (JST)

Supporting innovative concepts for the reconstruction of the region to help create innovative technology that can play a leading role in achieving the rebirth of Japan

Supporting a model of regional development implemented under the leadership of the region using science and technology as an engine for the reconstruction of the disaster areas

Achievement of practical applications of science and technology innovations developed in the Tohoku region

Reconstruction Promotion Programs

Industry-university cooperative support using matching planners (Promotion of matching)

Development of technological IP of universities and other institutions in response to the needs of the disaster areas (A-STEP)

Resolution of technological issues in Tohoku Industrial circles (Industry-academia collaboration)

Contribution to building a model of regional development by supporting the commercialization of innovative technology

Step-by-step achievement of what Tohoku University can do

One of the specific efforts by Tohoku University is a project where intellectual resources are used effectively to support the clustering of automobile-related industries and the advanced electronic machine industry to create globally competitive industrial areas. One of the most noteworthy projects is the "Tohoku University Technological Seeds & Needs Matching Project," where, since September 2011, "Matching Conferences" for "food and agricultural fields," "IT field" and "manufacturing and medical engineering fields" and "Mono-zukuri (product manufacturing) Individual Counseling Meetings" in cooperation with financial institutions, support organizations, and large manufacturers of automobiles and advanced electronic machinery have been organized.

Specific examples of major Tohoku University business projects

- Provision of free public access to the university's devices
- Tohoku University Technological Seeds & Needs Matching Project
- Cooperation in Reconstruction Fund Projects
- Establishment of the industry-university-government cooperative Open Innovation Center in the material field (METI)
- Tohoku-Originated Material Technology Project (MEXT)
- Reconstruction Promotion Program (JST)

Reconstruction Action 100⁺

Relief Activities for Affected People

- Prevention of panic and unfounded rumors (Graduate School of Arts and Letters)
- “Hello! at Porches” Project (Graduate School of Arts and Letters)
- Disaster-affected children support office (Graduate School of Education)
- Clinical psychology counseling services (Graduate School of Education)
- Improved Q&A for disaster-related legal consultation (Graduate School of Law)
- Legal consultation services by students (Graduate School of Law)
- Disaster theories: Lecture sessions for citizens (Graduate School of Science)
- On-site, on-demand classes for the purpose of restoration of schools (Graduate School of Science)
- Practical training seminar for radiation measurement (Graduate School of Science)
- Center for Community Health (Graduate School of Medicine)
- Mental care for people with anxiety over radiation and radioactivity (Graduate School of Pharmaceutical Science)

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“Hello! at Porches” Project



Practical training seminar for radiation measurement



Center for Community Health

Reconstruction Action 100⁺

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- Assistance for foreign residents in disaster-affected areas (Graduate School of International Cultural Studies)
- Educational Support Programs for students in disaster-affected areas (Graduate School of Life Sciences)
- Donation of school supplies (Graduate School of Environmental Studies)
- Supply of electric power sources to evacuation shelters (Graduate School of Environmental Studies)
- Cooperation in the restoration of healthcare services in the Sanriku coastal region (Graduate School of Biomedical Engineering)
- Assistance in preventing sudden deaths at evacuation shelters and temporary housing units (Institute of Development, Aging and Cancer)
- Assistance to health care services at evacuation shelters and temporary housing units by reconstructing information and communication systems (Institute of Development, Aging and Cancer)
- Disaster Health and Medical Care Office (International Research Institute of Disaster Science)



Donation of school supplies



Supply of electric power sources to evacuation shelters

Reconstruction Action 100⁺

Recovery and Reconstruction Activities

- Support for the reconstruction of the regional culture in the disaster recovery phase (Graduate School of Arts and Letters)
- Natural disasters and religion (Graduate School of Arts and Letters)
- Project to support life with a dialect in areas affected by the Great East Japan Earthquake (Graduate School of Arts and Letters)
- “Concept for Community Building” in areas devastated by the disaster (Graduate School of Law)
- Support for volunteer students (Graduate School of Law)
- Rescue activities for disaster-affected museums (Graduate School of Science)
- Restoration activities for earthquake/crustal movements observation networks (Graduate School of Science)
- Activity to supply scientific experiment instruments damaged by the disaster (Graduate School of Science)
- Support for pharmacies in the affected areas (Graduate School of Pharmaceutical Science)
- Support project for recovery and reconstruction of disaster-affected building (non-wooden buildings), measurement methods for the level of damage and the possibility of recovery (Graduate School of Engineering)
- Continuous Workshops by Sendai School of Design “Redesign toward Reconstruction” (Graduate School of Engineering)
- Application of extreme robotics to the Great East Japan Earthquake and the Fukushima nuclear power disaster (Graduate School of Engineering)
- Comprehensive Cooperative Agreement with Ishinomaki City (Graduate School of Engineering)
- Archi-Aid (Restoration support network of architects) (Graduate School of Engineering)



Rescue activities
for disaster-affected museums



© Archi-Aid

Archi-Aid (Restoration
support network of architects)



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Reconstruction Action 100⁺

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- Food-Agriculture-Village Restoration Support Project (Graduate School of Agricultural Science)
- Regional Restoration/Urban Planning (Graduate School of Agricultural Science)
- Restoration of agriculture, forestry and fisheries industry (Graduate School of Agricultural Science)
- Food and environmental education support (Graduate School of Agricultural Science)
- Nano-hana (rape blossom) Project (Graduate School of Agricultural Science)
- Development of global human resources by the disaster-affected area contribution ICT project (Graduate School of Information Sciences)
- Provision of free access to facilities and experiment instruments of the Asamushi Research Center for Marine Biology to the public (Graduate School of Life Sciences)
- Kinetic analysis and removal of radioactive substances in soil (Graduate School of Environmental Studies)
- Removal of toxic substances from tsunami sediment (Graduate School of Environmental Studies)
- REDEEM: Recurrent Education for the Development of Engineering Enhanced Medicine (Graduate School of Biomedical Engineering)
- Joint use of advanced facilities, etc. (Institute for Materials Research)
- Project of development, collection and supply of resources to support regenerative medicine research and gene function analysis research (Institute of Development, Aging and Cancer)
- Medium- to long-term proposals for nuclear power plants (Institute of Fluid Science)
- Technological support project in relation to the Fukushima nuclear power plant accident (Institute of Multidisciplinary Research for Advanced Materials)
- Regeneration of rural coastal areas using iron and steel slag (Institute of Multidisciplinary Research for Advanced Materials)
- Project for radiation contamination removal using radiation-resistant polymer separation membrane (Institute of Multidisciplinary Research for Advanced Materials)



Food-Agriculture-Village Restoration Support Project



Nano-hana (rape blossom) Project



Reconstruction Action 100⁺

Survey and Understanding Extent of Damage

- Record of damage and recovery from the Great East Japan Earthquake (Graduate School of Arts and Letters)
- Socio-economic analysis of the damage extent and restoration process of the 2011 earthquake off the Pacific coast of Tohoku (Graduate School of Economics and Management)
- Promotion of observation of ocean bottom earthquakes and ocean crustal movements (Graduate School of Science)
- Effective provision of information on the disaster recovery situation at education and research sites to various kinds of mass media (Graduate School of Science)
- International Information-Sharing Network on Disaster Situations (Graduate School of Science)
- Prompt reporting on the current situation of the Great East Japan Earthquake and worldwide communication of information on geographical analysis results (Graduate School of Science)
- Restoration and minerals, removal of radioactive contaminants and minerals (Graduate School of Science)
- Long-term monitoring of environmental radioactivity in disaster-affected areas (Graduate School of Science)
- Identification of victims' bodies (Graduate School of Dentistry)
- Monitoring of radiation and radioactivity in the air, seawater, soil and plants (Graduate School of Pharmaceutical Science)
- Measurement of radiation doses in residents in Miyagi Prefecture and conduct of a survey of health effects following the nuclear power plant accidents (Graduate School of Pharmaceutical Science)
- Joint survey of the environment of fishing grounds along the coast in Miyagi Prefecture (Graduate School of Agricultural Science)
- Assessment of the biological environmental impacts of the tsunami and radiation leakage, and proposals for reconstruction and industrial revitalization (Graduate School of Life Sciences)
- Green Restoration Project in the Sea and Rice Fields (Graduate School of Life Sciences)
- Radiation measurements in agricultural and marine products, soil, and wastes in Miyagi Prefecture (Graduate School of Environmental Studies)
- Survey of new contamination of groundwater and soil following the earthquake and tsunami (Graduate School of Environmental Studies)
- Assistance to radiation measurements (Institute for Materials Research)
- Project regarding comprehensive dose assessment for disaster-affected animals (Institute of Development, Aging and Cancer)
- Great East Japan Earthquake archive project "Michinoku-Shinrokuden" (International Research Institute of Disaster Science)



Identification of victims' bodies
Presentation of a certificate of gratitude
from Miyagi Prefectural Police



Green Restoration Project in the Sea
and Rice Fields



Disaster Prevention and Mitigation Measures

- A study on the mechanism of the 2011 earthquake off the Pacific coast of Tohoku and application of study results in practical settings (Graduate School of Science)
- Designing earthquake-resistant chemical laboratories (Graduate School of Science)
- A study on the construction of infrastructure to build a society equipped with a multi-layer fail-safe system (Graduate School of Engineering)
- Establishment of a sensor communication society for the purpose of disaster prevention and mitigation (Graduate School of Engineering)
- Analysis of the criteria for demolishing disaster-affected buildings and establishment of design guidelines for the strengthening of existing structures and improving their reliability (Graduate School of Engineering)
- Comprehensive understanding of damage in areas affected by the wide-area tsunami and monitoring of restoration with remote sensing and spatial information processing, and development of a next-generation tsunami-disaster prediction technology (Graduate School of Engineering)
- Research and development of high-reliability dispersive energy supply system and disaster prevention system based on crustal movement information (Graduate School of Engineering)
- Establishment of methods to secure energy supplies in an emergency when electricity is not available (Graduate School of Engineering)
- Verification of effects of renovation to improve the disaster resistance of existing steel framed gymnasiums that fail to meet the requirements based on a survey of damage caused by the 2011 Great East Japan Earthquake and identification of issues that need to be addressed (Graduate School of Engineering)
- A study of measures to reduce health impacts associated with disaster-related housing units (Graduate School of Engineering)
- Development of disaster education programs and educational support services (Graduate School of Information Sciences)
- Time-space modeling of disaster and restoration based on video records of disaster-affected areas (Graduate School of Information Sciences)
- Disaster information verification project (Graduate School of Information Sciences)
- Development of disaster prevention technology (Institute of Fluid Science)
- Elucidation of the mechanism of earthquakes (Institute of Fluid Science)
- Research Promotion Concept “New comprehensive approach to the dispersion and control of tsunami energy and reduction of the maximum wave heights” (New Industry Creation Hatchery Center)

Improvement of Infrastructure and Other Facilities

- Re-evaluation of disaster laws and regulations (Graduate School of Law)
- Exploration of mathematical models to build a safe and secure society (Graduate School of Science)
- Basic research to form a sustainable spatial structure in the Tohoku region (Graduate School of Science)
- Global network to elucidate the mechanism of 1000-year cycle massive earthquakes and tsunamis (Graduate School of Science)
- Formation of a network between designated regional hospitals and Tohoku University to re-establish dental care systems in disaster-affected areas (Graduate School of Dentistry)
- Re-establishment and improvement of oral care service systems for the elderly and the handicapped, or those most vulnerable to natural disasters (Graduate School of Dentistry)
- A survey of the needs for oral care in disaster-affected residents and establishment of a system to provide oral care services (Graduate School of Dentistry)
- Establishment and improvement of a system for identity confirmation (autopsy) in large-scale wide-area disasters (Graduate School of Dentistry)
- Establishment of a system for providing dental supplies and emergency dental care services in disasters (Graduate School of Dentistry)
- A regional self-medication support system (Graduate School of Pharmaceutical Science)
- Clarification of factors required for developing recovery and reconstruction plans for a wide-area massive disaster (Graduate School of Engineering)
- A regional design for a smart energy system that can achieve both social security and low-carbon energy supply (Graduate School of Engineering)
- Reconstruction of an inherently safe system for nuclear power plants (Graduate School of Engineering)
- Establishment of a regional autonomous energy supply system (Graduate School of Agricultural Science)
- Designing and establishment of a highly reliable, disaster-resistant, comprehensive information system for the purpose of reconstruction (Graduate School of Information Science)
- Effective use of new public systems in disaster reconstruction and verification of election administration procedures (Graduate School of Information Science)
- Project for decentralized autonomous green iron manufacturing adaptable to the regional environment (Institute of Multidisciplinary Research for Advanced Materials)
- Super high performance, large scale information processing infrastructure center project for Tohoku reconstruction (Cyberscience Center)
- Establishment of a disaster-resistant network center (Cyberscience Center)
- Assisting disaster-affected area with telemedicine: ICT system for comprehensive support to home visit healthcare services (Cyberscience Center)

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Industrial Reconstruction and Research and Development

- Regional Industry Restoration Survey Research Project (Graduate School of Economics and Management)
- Regional Innovative Producer Development Project (Graduate School of Economics and Management)
- Region-originated Innovative Cases Survey Research Project (Graduate School of Economics and Management)
- Development and deployment of disaster-resistant dental instruments (Graduate School of Dentistry)
- Development of methods to use biological resources as drugs (Graduate School of Pharmaceutical Science)
- Provision of free-of-charge access to micro fabrication facilities to disaster-affected institutions and support to research and development (Graduate School of Engineering)
- Industry-university-government cooperative support project for disaster-affected manufacturers (Graduate School of Engineering)
- Global center for next-generation magnetic electronics materials (Graduate School of Engineering)
- Green Energy Harvesting Materials Research Center (Graduate School of Engineering)
- Concept for reconstructing new-industry-creation-oriented regional advanced industry (manufacturing/IT) (Graduate School of Engineering)
- An agreement on industry-university cooperative support for matching and other programs for regional restoration (Graduate School of Engineering)
- Non-invasive determination of the degree of venous blood aggregation in disaster-affected people at evacuation shelters (Graduate School of Engineering)
- Development of new technology that can be used for regional industries (Graduate School of Agricultural Science)
- Development of turbine power generation technology and education on the technology (Graduate School of Information Sciences)
- Support for the development of the medical and healthcare devices industry in Miyagi Prefecture (Graduate School of Biomedical Engineering)
- Project for supporting the creation of Iwate-originated medical-use cobalt alloy businesses (Institute for Materials Research)

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Industrial Reconstruction and Research and Development

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- Development of high-performance devices to address nuclear power accidents and analysis of radiation samples (Institute for Materials Research)
- Development of safe and secure, high-temperature-steam-resistant, high-oxidation-state materials for nuclear reactors (Institute for Materials Research)
- Elucidation and control of the localized state of elements in iron and steel (Institute for Materials Research)
- Industry-university cooperative creation of Tohoku-originated innovations using new nanocrystal soft magnetic materials as the core materials (Institute for Materials Research)
- Development of emergency medical technology (Institute for Fluid Science)
- Development of alternative energy sources (Institute for Fluid Science)
- Support program for basic research of renewable energy materials (Institute of Multidisciplinary Research for Advanced Materials)
- Strategic basic research of green materials to achieve significant improvement of the use efficiency of solar energy (Advanced Institute for Materials Research)
- Designing and development of earthquake-resistant materials in compliance with international standards (Advanced Institute for Materials Research)
- Development of green power integration devices to achieve highly efficient supply of electric energy and energy-saving electric systems (Center for Interdisciplinary Research)
- Enhancement of high performance and optimization of new energy creation with highly multidisciplinary expertise (Center for Interdisciplinary Research)
- Creation of new disciplines and highly multidisciplinary research with the aim of achieving post-disaster restoration and developing new industries (Center for Interdisciplinary Research)
- Promotion of "Mg-Soleil" (a powerful card in ending dependency on nuclear power generation) Project to save the world (New Industry Creation Hatchery Center)

* The activities listed above include projects that have already been completed.

Institute for Disaster Reconstruction and Regeneration Research
Tohoku University

2-1-1 Katahira, Aoba-ku, Sendai 980-8577 JAPAN

E-mail: skk-som@bureau.tohoku.ac.jp

<http://www.bureau.tohoku.ac.jp/president/open/idrrr/> (Japanese)

