

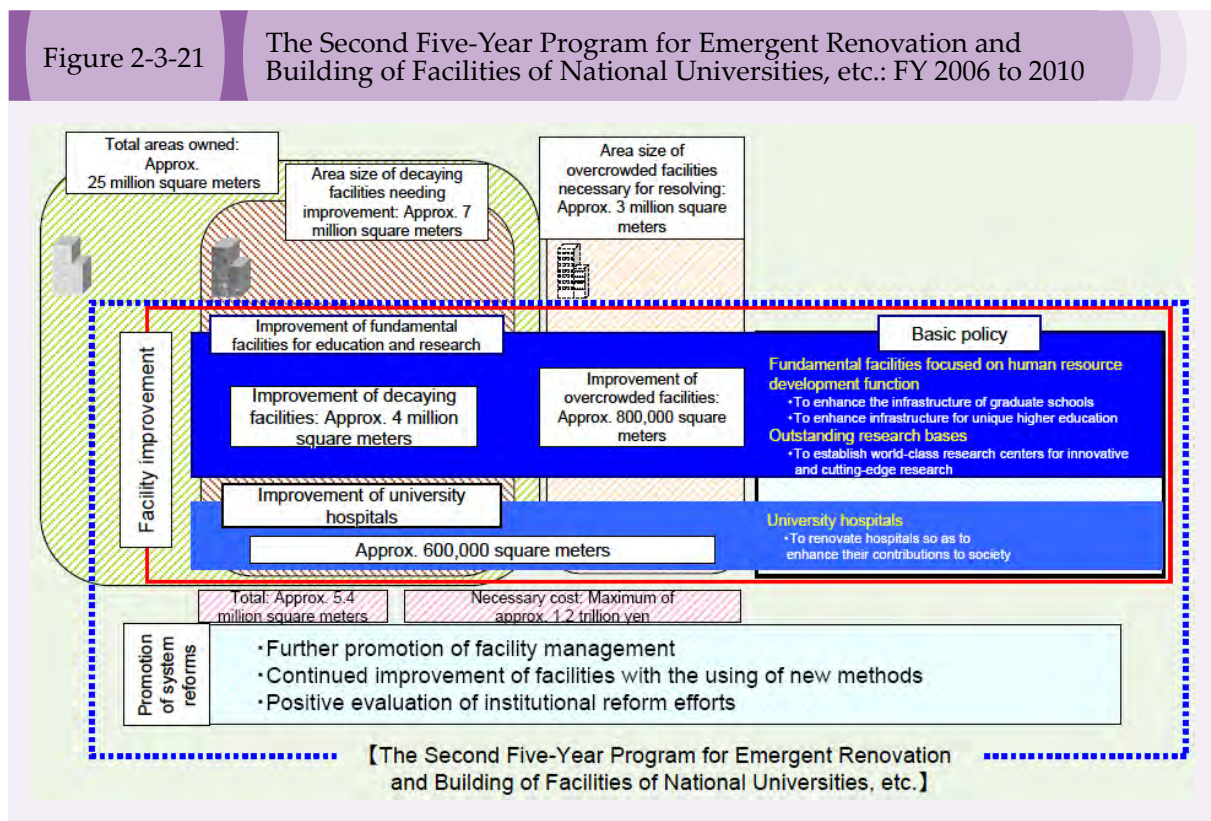
3 Reinforcing the Platform for the Promotion of Science and Technology

1 Strategic and Prioritized Improvement of Facilities and Equipment

(1) Improvement of facilities at national universities, etc.

Facilities of national universities are centers of activities for unique and state-of-the-art academic R&D of human resources rich in creativity, and constitute an essential foundation of Japan's aim to become an advanced science and technology-oriented nation by developing world-leading competent persons and promoting creative and cutting-edge R&D.

Based on the Basic Plan, MEXT in April 2006 established the Second Five-Year Program for Emergent Renovation and Building of Facilities of National Universities, etc. (hereinafter referred to as the Five-Year Program), which specified the facilities that should be improved over the five-year period between FY 2006 and 2010 as an emergency measure, with a view to promoting the prioritized and systematic improvement of national universities' facilities (Figure 2-3-21).



The Five-Year Program places the refurbishment of deteriorated facilities as the top priority task: it seeks to regenerate facilities that form the platform of the development of excellent personnel and outstanding research centers where world-class advanced research is conducted by improving deteriorated facilities and resolving the cramped conditions of facilities. This program also seeks to improve about 5.4 million square meters of facilities that need urgent improvement in national universities, and such work was implemented for about 3.03 million square meters by FY 2008.

Furthermore, along with the above facility improvement, MEXT decided to further promote system reform using new methods including facility management that seeks for efficient and flexible use of facilities, and improvement of facilities by accepting donations.

In addition, MEXT conducted study in February 2009 on the expected facility improvement results after the Five-Year Program to compile basic opinions, including middle- and long-term measures for future facility improvement.

(2) Improvement of facilities at national university corporations, etc.

In order to promote basic research, it is essential to improve facilities that form the platform of research activities. With regard to the improvement of research facilities, MEXT held discussions to improve academic research facilities at national, public and private universities at the working group for academic research facilities, which was established under the Council for Science and Technology, and subsequently issued a report in June 2005.

In light of the report, the government endeavors to provide more effective support for projects to improve facilities that are planned as research platform from mid- to long-term perspectives and those that are necessary for promoting unique research based on facility master plans of national university corporations.

(3) Improvement of facilities and equipment at private universities

It is critical for Japan to improve the research environment, such as facilities and equipment, necessary for promoting advancement of academic research. Private universities, which account for about 80% of Japan's higher education, have been greatly contributing to the advancement of higher education by serving as a diverse source of researchers and by actively engaging in unique research activities, and expectations for their role are growing.

In light of this situation, MEXT endeavors to enhance the platform of private universities' research by implementing the Program for Establishing Strategical Research Centers at Private Universities [literal translation], which provides comprehensive support to research facilities and equipment related to excellent research projects.

(4) Promotion of improvement and shared use of R&D facilities and equipment

The R&D facilities and equipment that serve as the basis for S&T promotion (referred to as "R&D facilities and equipment") are indispensable for the support of the full range of S&T activities, from basic research to innovation creation. Therefore, it is necessary to improve and effectively utilize R&D facilities. The Act to Strengthen R&D Capacity by Advancing R&D System Reform and Promote R&D Efficiency [literal translation] (Act No. 63 of 2008) (R&D-Capacity Strengthening Act [literal translation]), which was enacted in June 2008, also specifies that the government should implement the necessary measures to promote the shared use of R&D facilities and equipment owned by independent administrative agencies, universities, and other organizations.

In this context, pursuant to the Act on Promotion of Shared Use of Specified Large-Scale High Technology Research Facilities (Act No. 78 of 1994) (hereinafter referred to as "Shared Use Act"), MEXT promotes shared use by researchers of industry, academia and the government through the support of necessary expenses for facility improvement and shared use of specified large-scale high technology research facilities [that is, next-generation supercomputers, large radiation facilities (SPring-8), and X-ray Free Electron Laser (XFEL)]. Furthermore, in order to position the neutron ray facilities at the Japan Proton Accelerator Research Complex (J-PARC) as specified large-scale high technology research facilities, MEXT has submitted an amendment to the Shared Use Act to the 171st ordinary Diet session.

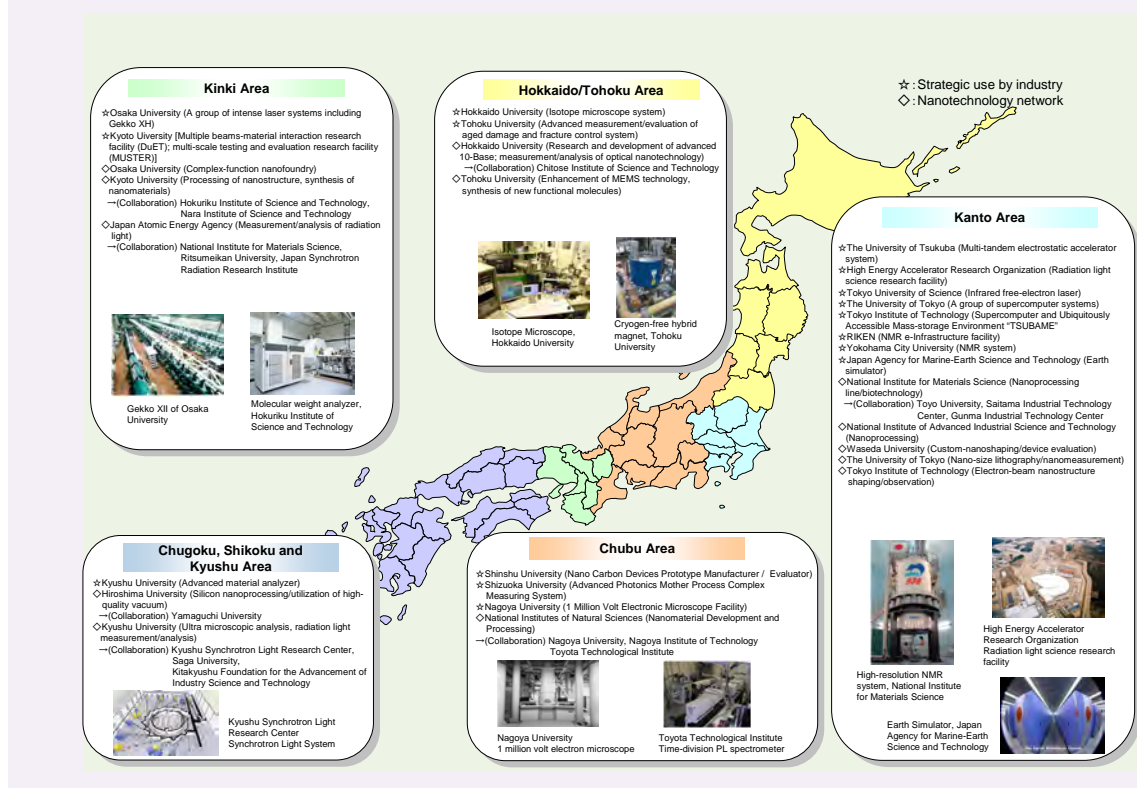
At SPring-8, JASRI, as an organization for the promotion of utilization of registered facilities, adopted about 1,400 research topics for shared use of beam lines in FY 2008, bringing significant results with regard to subjects such as the world's first identification of the atomic structure of

phytohormone “gibberellin” signal receptors, and the world's first discovery of physical evidence indicating the large-scale mass transfer that occurred in the solar system 4.5 billion years ago.

In addition, in order to promote the shared use of R&D facilities and equipment other than specified large-scale high technology research facilities which are owned by other independent administrative agencies, universities, and other organizations, MEXT implemented its Open Advanced Facilities Initiative for Innovation program in FY 2007. Moreover, as basic information on utilization (location, utilization purposes, usable time, etc.) is insufficient to promote shared use of these facilities and equipment for the creation of results, MEXT opened its Kyoyo Navi (General navigation site for shared use of research facilities [literal translation]) as a general window through the internet (Figure 2-3-22).

Figure 2-3-22

Funded Organizations under the Open Advanced Facilities Initiative for Innovation



2 Enhancement of the Intellectual Infrastructure

In order to reliably and effectively promote research, development and other related activities, it is necessary to undertake efforts such as ensuring the stable provision in quality and quantity, as well as ensuring the safety and reliability, of materials, standards, techniques, equipment, and other elements, that support fundamental activities for R&D, including experimentation, measurement, analysis, and evaluation. For this reason, it is necessary to promote organized development of an intellectual infrastructure that includes bio-resources and other research materials, measurement standards, advanced tools for measurement, analysis, and experimentation and evaluation, and databases. Also, the Second Science and Technology Basic Plan calls for improvements toward the attainment of the world's highest standards by 2010. Based on this, CST formulated its Intellectual Infrastructure Development Plan [literal translation] in August 2001.

Then, the Plan was reviewed in the Third Basic Science and Technology Plan in order to

improve infrastructure through the use of qualitative as well as quantitative indexes. The revised plan also specifies that the infrastructure should prioritize improvement to achieve the world's highest level in 2010, and that a system of core centers should be constructed in each intellectual infrastructure field. In response, in September 2007, the Technology and Research Foundations Section of CST finalized addition of matters on adoption of qualitative viewpoints to the strategic objectives, and positioning of institutions which assume core roles. In addition, the R&D-Capacity Strengthening Act [literal translation] was enacted, directing the government to implement the measures necessary for the promotion of shared use of intellectual infrastructure owned by independent administrative agencies, universities, and other organizations.

MEXT implemented the National BioResource Project (NBRP) and the Integrated Database Project to support research in the life sciences field [See Part 2, Chapter 2, Section 2, 1 (4)].

Independent R&D on measurement, analysis, experimentation and evaluation, and on the state-of-the-art technologies and instruments for them, is not only the basis that upholds the R&D activities. Supported by the fact that the many researches and developments of these kinds themselves receive the Nobel Prize, it is an extremely important task for our country to serve as one of the world's front-runners in the S&T fields. However, the degree of dependence on foreign countries for advanced measurement and analysis instruments in Japan is high, and almost all of these instruments rely on foreign companies (Figure 2-3-23). In light of this situation, Japan has implemented projects for the development of advanced measurement/analysis techniques and equipment, which will contribute to the promotion of world-leading technologies and equipment that meet the needs of researchers engaged in state-of-the-art research and at manufacturing site. In FY 2008, to promote measures for practical application, MEXT also promoted demonstration experiments of prototype devices and application developments, in cooperation with top-level users throughout the world.



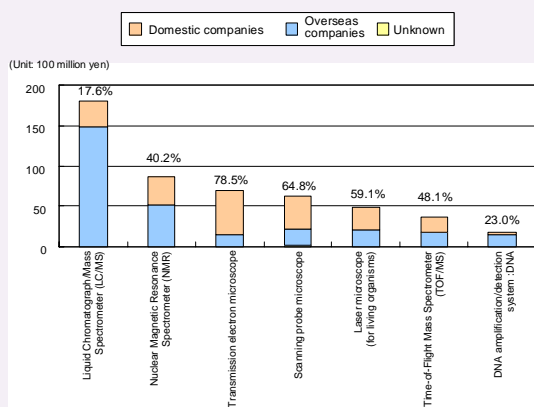
**Advanced measurement/analysis instrument
(Three-dimensional fundus seismic tomography instrument)**

Seismic tomography instrument for noninvasive measurement of internal structure of a biological body by applying light

Photo: Japan Science and Technology Agency

Figure 2-3-23

Sales of Major Advanced Measurement/Analysis Instruments, by Domestic /Overseas Companies (FY2007)



Note 1. Domestic companies: produce and sell instruments in Japan.
Overseas companies: sell instruments produced abroad.

2. Figure shown with "%" in the table shows the share of domestic companies in the domestic market.

Source: Prepared by MEXT, based on *Scientific Instruments Almanac 2008*, published by R&D Co., Ltd.

MHLW established the “master banks” at the National Institute of Biomedical Innovation (NIBIO), in order to collect and store cultured cells and genes from humans and animals that are necessary for research in the life sciences, particularly in the fields of medicine and pharmacology. The ministry furnishes these cultured cells and genes to researchers and other experts through the Japan Health Sciences Foundation (JHSF). Also, in line with the conclusions reached in the State of Research and Development Using Human Tissue Obtained During Surgery [literal translation], a recommendation on human tissue issued by the Health Science Council’s Advanced Medical Care Technology Evaluation Committee on December 16, 1998, the Japan Health Sciences Foundation obtained the cooperation of medical institutions to collect human tissue for research use, doing so in careful consideration of bioethical issues, and commenced activities to dispense the tissue as necessary to researchers. Elsewhere, on the issue of plants having medicinal value, as it has become difficult to secure good quality ones, the NIBIO’s Research Center for Medical Plant Resources is engaged in research into technologies for the propagation (micropropagation) of cloned plants having the same characteristics as the plants they are cloned from, and also systematically collects, preserves, and supplies medicinal plant resources. Moreover, at the NIBIO’s Tsukuba Primate Research Center, the Ministry breeds Crab-eating Macaques, and furnishes them for research use to researchers in Japan using joint facilities.

MAFF conducts collection, classification and identification, characteristic evaluation, breeding and preservation of biological genetic resources including plants, animals, microorganisms, forest trees, fishery organisms related to agriculture, forestry and fisheries as the Genebank Project. The ministry also provides such biological genetic resources and characteristic information to research and experiment institutions of independent administrative agencies, private companies, universities, etc. Furthermore, the National Institute of Agrobiological Sciences (NIAS) has established the Rice Genome Resource Center to improve both the rice genome database, including all rice-genome DNA base sequence data decoded by Japan and the tools for using the database, and supplies them to private domestic and foreign companies, universities, and other organizations. Regarding the Agriculture, Forestry and Fisheries-related Genomic Information Integrated Database, the ministry endeavors to improve database convenience by building up a database that handles, in a unified manner, the genome information for agricultural plants and animals such as silkworms, pigs, etc. as well as the above-mentioned rice genome information, and by establishing a high-precision information search engine that links information such as information related to the genomes of other plants and animals.

At METI, the Special Committee on Measurement Standards and Intellectual Infrastructure, a joint body composed of the Industrial Technology Subcommittee of the Industrial Structure Council and the Japanese Industrial Standards Committee (JISC), revises the objectives for the development of intellectual infrastructure annually. The National Metrology Institute of Japan (NMIJ) of AIST improves and expands national measurement standards, and also makes efforts toward international mutual recognition. In total, 291 physical standards were established and 270 references were provided by the end of FY 2008. In addition, NEDO conducted R&D on remote calibration as part of a plan for the period from FY 2001 to 2008.

With regard to biological genetic resources information infrastructure, the Biological Resource Center of the Department of Biotechnology at the National Institute of Technology and Evaluation (NITE) in FY 2007 newly collected and preserved approximately 5,000 microbial strains (totaling approximately 45,000 microbial genetic resources). The center has dispensed the resources to researchers, has also integrated the databases of major domestic organizations that handle biological resources, has taken charge of operating and managing the integrated database, and has made it public. Furthermore, the NITE Biotechnology Development Center uses and utilizes microbial resources in accordance with the Convention on Biological Diversity, an example of which is the Center’s signing on memorandums of understanding with Asian

countries and establishes cooperation system to jointly explore microbes. The NITE Genome Analysis Center, with a view to promoting the utilization of biological resources, settles the base sequences of seven strains of microbes, which are useful for industrial applications, and conducts a gene analysis on the human influenza virus. The NITE Patent Microorganisms Depository implements the reception and subdivision of microbes, animal cells, and fertilized eggs related to patents. Furthermore, at the Asian Consortium for the Conservation and Sustainable Use of Microbial Resources, which is the world's first framework for government-level multilateral cooperation in Asia for joint management and utilization of microbial resources, NITE promotes establishment of networks of information on microorganism cultures of participated countries by building an integrated database, and newly establishes a taskforce for preparing common guidelines concerning transfer of microbes, thus contributing to establishing of international rules concerning improvement of infrastructure for effective utilization or use of biological resources in Asian countries. Furthermore, AIST enhances its database by utilizing information related to genomes and proteomes, including newly public release of the Human Gene and Protein Database, and addition of a lectin database and a glycoprotein database to the GlycoGene DataBase. In addition, the International Patent Organism Depository of AIST receives and provides microbes and animal and plant cells related to patents.

In terms of chemical safety management infrastructure, the ministry collects and coordinates data of hazardous chemical substances. The ministry also develops simplified testing methods to evaluate the chemical safety, as well as screening test methods for endocrine disruptors. In addition, the ministry carries out R&D regarding risk assessment methods of chemical substances at NEDO.

For development of infrastructure for quality life and welfare, NITE enhances, updates, maintains, and controls data related to basic human characteristics that contribute to safe and user-friendly designs of products, and develops evaluation methods concerning functions and performance of welfare equipment.

AIST, regarding geological surveys, produced eight new kinds of geological sheet maps in FY 2008. In addition, the Institute has created and updated various types of geological information databases, such as, the Integrated Geological Map Database (GeoMapDB), which integrates various types of geological maps already published. In addition, AIST is involved in the development of an advanced database of materials. An auger electron spectroscopy standard spectrum database has been released as a Research Information Database (RIO-DB). The Institute has already improved and updated various databases of more than 80 kinds, e.g., GlycoGene DataBase and the organic-compound spectra database and dispersion-type thermophysical-property database.

MLIT established and has supplied the infrastructure map information¹, which is the main result of the Basic Plan for the Advancement of Utilizing Geospatial Information (Cabinet decision: April 2008) based on the Basic Act on the Advancement of Utilizing Geospatial Information. Furthermore, the ministry implements research and studies concerning utilization of the national spatial data.

Table 2-3-24 shows the status for the development of facilities to preserve and provide intellectual infrastructure by the ministries and agencies.

¹ Infrastructure map information is the reference information for determining a national spatial data on an electronic map.

Table 2-3-24 The State of Development of Intellectual Infrastructures

Ministry	Fiscal Year developed	Name of facility	Intellectual infrastructures
Ministry of Internal Affairs and Communications	1940	National Institute of Information and Communications Technology	Frequency standards and standard time
Ministry of Education, Culture, Sports, Science and Technology	1980	RIKEN (The Institute of Physical and Chemical Research)	Preservation of microorganism strains
	1997	Center for Genetic Resource Information, at the National Institute of Genetics	Genetic resource database
	1997	Genetic Strains Research Center, at the National Institute of Genetics	Mice, rice plants, and Escherichia coli
	1997	Cell Resource Center for Biomedical Research, at the Institute of Development, Aging and Cancer, Tohoku University	Cells for medical use
	1997	Barley and Wild Plant Resource Center, at the Research Institute for Bioresources, Okayama University	Barley and wild plants
	1997	Institute of Genetic Resources, at the Faculty of Agriculture, Kyushu University	Silkworms
	1998	Institute of Resource Development and Analysis, at Kumamoto University	Genetically engineered animals
	1999	Drosophila Genetic Resource Center, at Kyoto Institute of Technology	Drosophila
	2000	RIKEN (The Institute of Physical and Chemical Research)	Cultured cell lines and genes of higher animals and plants
	2001	Laboratory Animal Resource Center, at the University of Tsukuba	Genetically engineered animals
	2002	Institutes participating in the national bioresource project (RIKEN (The Institute of Physical and Chemical Research))	Mice, arabidopsis thaliana, ES cells, etc.
Ministry of Health, Labour and Welfare	1922	Medicinal Plant Research Stations, at National Institute of Health Sciences	Seed and cultured cells, etc., of pharmaceutical Plants
	2005	Tsukuba Primate Research Center, National Institute of Biomedical Innovation	Primates
	2005	National Institute of Biomedical Innovation	Genes (bank)
	2006	National Institute of Biomedical Innovation	Cells (bank)

Ministry	Fiscal Year developed	Name of facility	Intellectual infrastructures
Ministry of Agriculture, Forestry and Fisheries	1985	National Institute of Agrobiological Sciences, etc.	Genetic resources of plants, microorganisms, and animals
	1985	Forestry and Forest Products Research Institute	Genetic resources of forest trees
	1985	Fisheries Research Agency	Genetic resources of fisheries organisms
	1995	National Institute of Agrobiological Sciences, etc.	DNA
	2003	National Institute of Agrobiological Sciences, Rice Genome Resource Center	Rice mutant lines, cDNA, etc.
Ministry of Economy, Trade and Industry	1882	National Institute of Advanced Industrial Science and Technology, Geological Survey of Japan	Geological data (about 96% of all 124 geological maps of the country at a scale of 1:200,000, and about 74% of all 1,274 geological maps at a scale of 1: 50,000)
	1903	National Institute of Advanced Industrial Science and Technology, National Metrology Institute of Japan	National measurement standards (271 physical standards, 260 reference materials)
	1993	National Institute of Technology and Evaluation, Department of Biotechnology	Genome information and biological resources, including microorganisms and DNA cloning of microorganisms for industrial use
	1996	National Institute of Technology and Evaluation, Chemical Management Center	Comprehensive chemical management information on about 4,600 substances
Ministry of Land, Infrastructure, Transport and Tourism	1970	Port and Airport Research Institute	Information concerning waves and tsunamis observed along Japanese coasts through a nationwide port and ocean wave information network
	1962	Port and Airport Research Institute	Information concerning strong earthquakes in coastal areas
Ministry of the Environment	1983	National Institute for Environmental Studies	Microorganism strains and endangered algae (about 2,000 strains)

3 Creation, Protection and Utilization of Intellectual Properties

In order to make unique and innovative achievements in research and feed them back to society and people, it is essential to revitalize the cycle of creation, protection and utilization of intellectual property, and proactive and various initiatives for the purpose.

CSTP examined a strategy considering the open innovation and innovative technologies of iPS cells, etc. as an S&T trend that was closely related to intellectual properties, and in May 2008, determined the Intellectual Property Strategy, which included various recommendations, such as “promptly launch a discussion on a desirable approach to providing appropriate intellectual property protection in the fields of cutting-edge medical technology and will draw a conclusion at an early date,” which were forwarded to the related ministries.

(1) Establishment of a system for the management of intellectual properties at universities

Under the University Intellectual Property Headquarters Development Project that was implemented for five years from FY 2003, progress in issues related to intellectual property such as the unification of the management of intellectual property organizations and the establishment of intellectual property rules has advanced, and the number of patent applications and licenses

has increased at universities, etc. year by year. Thus, the headquarters has been playing a more important role as an organization supporting industry-academia-government collaborations at universities, etc. (Tables 2-3-25 and 2-3-26). A report on the results of the project evaluation compiled by the Examination and Evaluation Subcommittee of the University Intellectual Property Headquarters, Committee on Promotion of Industry-Academia-Government Collaboration, Technology and Research Foundations Section of CST after the project terminated showed that some universities have advanced the system for organized industry-academia-government collaboration, allowing it to evolve into a system for multilateral industry-academia-government collaboration resulting in support for commercialization, the fostering of human resources, and technical guidance. Therefore, in FY 2008, the government initiated its Industry-Academia-Government Collaboration Strategic Development Project [literal translation] to support strategic intellectual property activities at universities and other organizations and promote the smooth feedback of research results from universities and other organizations to society (Figure 2-3-27).

Table 2-3-25

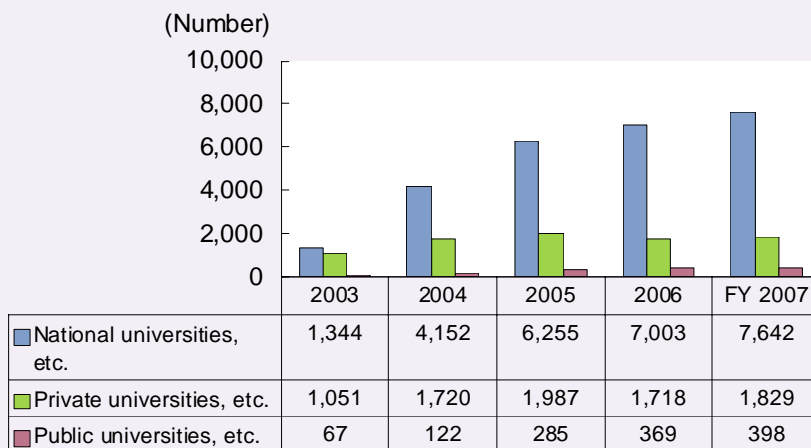
The Status of Development of System for Management/Utilization of Intellectual Properties (University Intellectual Property Headquarters, etc.) (FY 2007)

	Already developed	To be developed	Not to be developed	No. of respondents
	(Number)	(Number)	(Number)	(Number)
Total number	(161)	(133)	(267)	(561)
	173	172	453	798
National uni., etc.	(72)	(8)	(12)	(92)
	72	7	12	91
Private uni., etc.	(73)	(109)	(224)	(406)
	82	145	404	631
Public uni., etc.	(16)	(16)	(31)	(63)
	19	20	37	76

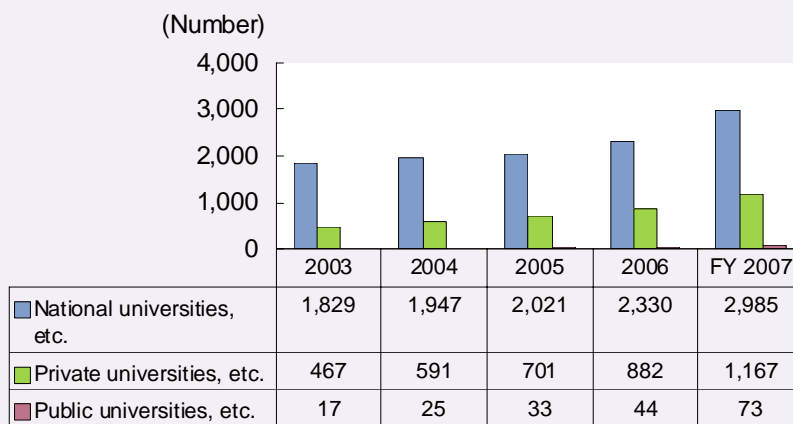
Note: Figures in parentheses refer to the previous year's numbers.

Figure 2-3-26 Creation, Protection and Utilization of Intellectual Properties by Universities

(1) Trends in number of patent applications by universities



(2) Trends in number of patents in force by universities



(3) Trends in number of patent licensing by universities

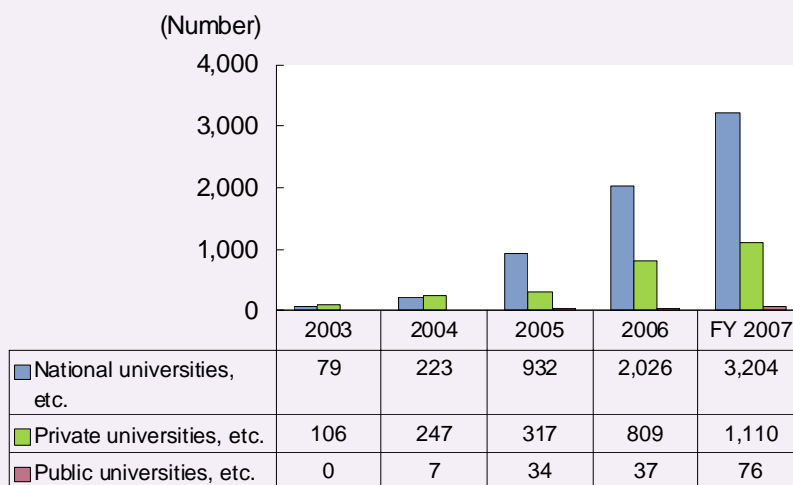
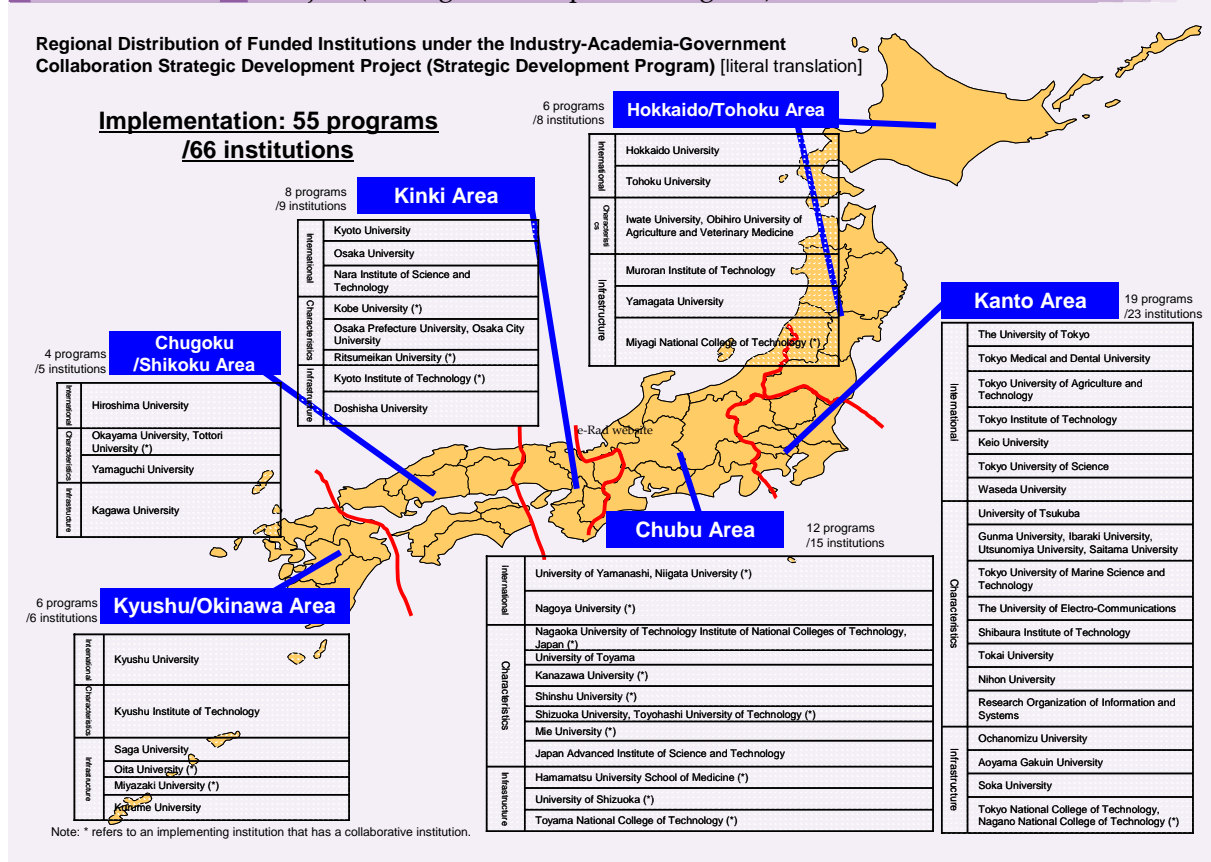


Figure 2-3-27 Regional Distribution of Funded Institutions under the Industry-Academia-Government Collaboration Strategic Development Project (Strategic Development Program)



METI has supported launching of technology transfer projects by authorized TLOs and applying for foreign patents related to university research results. From FY 2008 METI has supported wide-area TLOs, promoting the enhancement and unification of inter-organization cooperation and implementing the strategic and practical use and commercialization of university research results.

(2) Promotion of activities related to intellectual property

In order to enable universities to secure rights to their excellent intellectual property and exercise the rights, MEXT provides support to activities related to applications for foreign patents through JST's Technology Transfer Support Center.

In addition, JST, with a view to facilitating achievements of excellent research results, manages a database of information related to various R&D support measures and research results and distributes such information widely through the internet. Specifically, there are databases of information related to public research organizations including universities, researchers, research themes, and research resources (ReaD), and a database that connects research results achieved by public research organizations including universities with relevant patents (J-STORE), and a system that enables integrated searches of online information related to technology seeds made public by universities, and provides enterprises with direct access to researchers (e-seeds.jp).

In light of the advancement of economic globalization and open innovation, JPO has been taking initiatives to develop a new intellectual property system for the promotion of innovation.

First, as the number of patent applications throughout the world has increased rapidly over the recent years, JPO has promoted international harmony in the patent system and international

work sharing in patent examination so that new inventions can be protected with global patents. JPO launched the Patent Prosecution Highway (PPH) in cooperation with the US, the Republic of Korea, the UK, Germany, and Denmark so that an application judged to be patentable in the country in which the application was first made could be examined early through a simple procedure in other countries. JPO is attempting to further widen the PPH network through international conferences, etc.

In addition, to satisfy the various needs of applicants in relation to the timing of patent approval, JPO launched the Super Accelerated Examination System, in which each important application could undergo its first screening within one month, and implemented the system on a trial basis from October 1, 2008. Against the background of the globalization of corporate activities, the rapid development of other East Asian countries/regions and the proliferation of counterfeited products in recent years, Japanese companies face a need to reform their intellectual property management strategies. JPO endeavors to positively exchange opinions with corporate managers to enhance strategic intellectual property management from a global perspective and to encourage system improvement by providing information that contributes to further enhancement of the environment for preceding technology surveys and to formulation of intellectual property strategies of companies to cultivate an environment that facilitates such reform by encouraging them through their managers to enhance the relevant systems by further improving the environment for prior-art search and by compiling a collection of case studies related to drafting of intellectual property management strategies.

Next, universities and other organizations' activities related to intellectual properties have been revitalized in recent years. However, in order to make such activities more effective, it is important for universities to make further efforts to formulate strategies for actively acquiring foreign patents concerning critical inventions and exercising their intellectual property rights.

MAFF formulated the Intellectual Property Strategies of the Ministry of Agriculture, Forestry and Fisheries in March 2007. As for the R&D fields, the ministry promotes measures including creation of new demand and new industries, establishment of the intellectual property network for agriculture, forestry and fisheries, and the fostering of intellectual-property handling workers. The ministry also added a viewpoint on intellectual property in the examination items of competitive funds in FY 2008 based on the above strategies, and has implemented evaluation based on this viewpoint. Moreover, MAFF supports the activities of TLOs authorized by the Minister of MAFF by implementing the programs for promoting technology transfer of agriculture, forestry and fisheries in order to facilitate commercialization of research results achieved by independent administrative experimental research institutions.

JPO dispatches University Intellectual Property Advisors [literal translation], through INPIT, to universities in order to encourage universities to establish their own intellectual property management systems (advisors dispatched to 24 universities in FY 2008). In addition, in order to enable SMEs and venture enterprises to make effective use of patents acquired by universities and made available to others (licensable patents), JPO dispatches Patent Licensing Advisors (the number of such advisors dispatched totaled 106 as of March 2009.) to TLOs and local governments so as to match their needs and licensable patents offered by universities. In addition, JPO publicly disclosed information related to licensable patents through a patent licensing database, and established the Research Tool Patent Database¹ [literal translation] in order to encourage smooth use of research tool patents, etc. in the life sciences field.

On the other hand, the viewpoint of intellectual property is becoming important for advancing R&D, and it is important to secure intellectual property including peripheral

¹ The Research Tool Patent Database [literal translation] is the main database that constitutes the integrated database regarding research tool patents in the life science field, and registers research tool patents and the tangible entities regarding these patents.

technologies. To this end, it is demanded that collaboration should be established between the intellectual property measures and R&D, such as utilization of patent information in R&D strategies even in the drafting phase of policies on R&D.

JPO selects investigation themes mainly in the four priority fields to be promoted and in the four fields to be promoted under the Third Science and Technology Basic Plan, conducts technology trend surveys through the systematic analysis of patent application trends according to R&D trends and market trends, and publishes the results in order to contribute to R&D activities conducted by companies, universities, and other organizations and to their formulation of patent strategies.

Moreover, as a way to help companies and universities acquire and utilize patents based on their excellent research results, JPO, through INPIT, builds up and operates the Industrial Property Digital Library (IPDL), which allows users to search and browse necessary patent-related information, etc. through the internet. IPDL continuously improves user convenience and expands the range of its services every year. In FY 2008, to IPDL, JPO added the document-unit PDF downloading function, which has been implemented only in a part of services, to all the patent and utility model search services. On May 23, 2006, CSTP formulated the Guidelines for Research Licenses for Intellectual Property Rights Stemming From Government-Funded Research and Development at Universities, etc. in order to facilitate the use of intellectual property rights by universities as centers for knowledge creation, and promote free R&D activities by them. In addition, on March 1, 2007, CSTP also formulated the Guidelines for Facilitating the Use of Research Tool Patents in the Field of Life Sciences, which expresses basic ideas concerning the utilization by universities and private-sector companies in research of patents related to research tools such as genetically engineered animals and screening methods, with a view to promoting R&D in the advanced technology field of life sciences, leading research results to innovations and enhancing Japan's international competitiveness.

4 Active Efforts towards Standardization

According to the Strategy on R&D and Standardization of ICT for Enhancing Japan's International Competitiveness [literal translation] published by the Telecommunications Council in June 2008, the ICT Standardization and Intellectual Property Promotion Center was established in July as a center for the comprehensive handling of Japanese activities for international standardization in the ICT-field. The center analyzes standardization trends, and examines plans for the fostering of personnel engaged in standardization, etc.

MIC implements the international competitiveness strengthening-type R&D [literal translation] as public-offering research on the condition that the research should contribute to enhancement of international competitiveness in the future, e.g., reflection of research results in global standards. The ministry newly adopted two research projects in FY 2008. Furthermore, the International Telecommunication Union (ITU) contributes to standardization of home network, the Internet Protocol Television (IPTV), and the Next Generation Network (NGN) as the fundamental technology indispensable to a ubiquitous network society. The ministry also strengthens collaboration for standardization activities among Asian countries through the Asia-Pacific Telecommunity Standardization Program (ASTAP), in order to promote global-standard joint proposal to ITU.

In order to strategically achieve international standards by using Japanese technologies as a core, MEXT sets the strategic goal for international standardization, promotes the clear positioning of standardization strategy in the R&D project in order to promote R&D and standardization integrally, and selects themes to be emphasized from the fields in which Japan excels, such as, nanotechnology, robotics, and photocatalysts, thus implementing active, international standardization activities. Moreover, in order to promote the development and

dissemination of new technologies, etc., the ministry implements 45 standard-development themes for R&D for the purpose of standardization as of FY 2008 under the Standard Certification Research and Development Program [literal translation]. An example of these R&D themes is the Standardization on Characteristics Measurement Evaluation Method for Micro Electro Mechanical Systems (MEMS) Device Materials [literal translation]. NEDO implements follow-up research projects to steadily lead the R&D results to international standardization.

Regarding the development of personnel related to standardization, the ministry has developed education materials concerning standardization intended for broad use at universities (undergraduate and graduate schools) and in the field of education of private-sector companies, and has provided training programs to foster personnel with expertise who can take an active part in international standardization activities.

5 Improvement of the Research Information Infrastructure

The research information infrastructure is regarded as a critical life line for research activities. Therefore, improving it in response to the rapid progress in information and communications technology is essential for securing the international competitiveness of Japan's R&D activities. The government thus takes concrete actions such as the development and upgrading of networks between research institutions and the development and provision of databases.

(1) Improvement of networks

Computers and information networks are key systems in our modern society. These were first developed for R&D, and afterwards found a variety of different applications. In order to carry out cutting-edge R&D, performance enhancements are necessary for networks.

Using the Advanced Network Testbed for R&D (JGN2plus¹), which is operated by NICT, MIC promotes R&D and demonstration tests in the information and communication field for the purpose of improving Japan's technological capacity, industry-academia-government collaboration enhancement, the creation of new business and new industry, promotion of computerization in regions, the fostering of ICT-personnel, and the creation of a wide-range ripple effect.

MEXT, through the National Institute of Informatics (NII), established and operates the world's fastest-level research network "Science Information Network 3" (SINET3), which connects advanced research institutions at the world best maximum speed of 40 Gbps, as the core network for distributing research information required by researchers at universities, etc. As of the end of March 2009, 707 institutions are connected to SINET3.

MAFF established and operates the Ministry of Agriculture, Forestry and Fisheries Research Network (MAFFIN), which mutually connects research institutions related to agriculture, forestry, and fisheries. As of the end of March 2009, a total of 94 institutions are connected through MAFFIN. As MAFFIN is linked to the Philippines, this network is now used as a backbone for the distribution of research information among various countries.

(2) Creation and provision of databases

Perusal, copying, lending, and other clearing services for source materials for scientific papers, etc. (primary information) are being implemented at libraries and a variety of other information service organizations. In addition, constructing databases of excerpts and indexes

¹ JGN2plus: Provides R&D environment including nationwide IP network, light wavelength network, and optical test bed. In addition, it established communication lines to the US and Asia, and promotes R&D through collaboration with domestic and overseas research institutions.

(secondary information) by using computers enables the swift, accurate and easy search of increasingly large amounts of information.

In order to create a database of primary information, the National Diet Library prepares a database for collected materials that covers every publication issued in Japan and in the archives of the library.

MEXT creates and provides databases on titles and locations of academic books and magazines available at university libraries and other institutions through NII, with the cooperation of institutions nationwide such as national, public, and private universities. Furthermore, NII creates databases for academic research, and provides a database service.

From March 2009, JST established a basic information database of Japanese and overseas S&T documents, patents, researchers, etc., and initiated the J-GLOBAL service for providing mutually related information. JST also improved a database of Japanese-language abstracts, etc. of S&T documents, and provides a document information retrieval service [(JST Document REtrieval system for Academic and Medical fields II (JDreamII))] for a fee through the internet.

MAFF creates and offers information on documents related to the agriculture, forestry, and fisheries fields, as well as information on the locations of books and materials, such as providing the Japanese Agricultural Sciences Index (JASI) of articles published in academic journals related to the agriculture, forestry, and fisheries fields. Furthermore, the ministry builds up and provides databases including an agricultural information database that is a full-text information database integrating digitized research reports in the agricultural, forestry, and fisheries sector written by independent administrative institutions engaged in experiments and research, national and public research organizations, and universities; a database of Japanese and foreign agricultural research documents; a database of weather satellite images; and a database of themes of research conducted by research organizations.

Table 2-3-28 shows the outlines of major measures implemented in FY 2008 in relation to the research information infrastructure.

Table 2-3-28 Main Measures for the Research Information Infrastructure (FY 2008)

Ministry/ Agency	Organization	Subject
Diet	National Diet Library	- Acquisition and development funds for science and technology-related resources at the National Diet Library
Cabinet Office		- Strengthening the information collection function of R&D data funded through the government budget
Ministry of Internal Affairs and Communications	National Institute of Information and Communications Technology	- Establishment of advanced network testbed for research and development (JGN II plus)
Ministry of Education, Culture, Sports, Science and Technology	Japan Science and Technology Agency	- Establishment and Utilization Promotion of Basic Science and Technology Information (J-GLOBAL, etc.) - Development of engineer ability and operation of "failure knowledge database" ("Web Learning Plaza" etc.) - Operation of Institute for Bioinformatics Research and Development (BIRD, GBIF etc.) - Computerization and Internationalization of Science and Technology Papers (J-STAGE, etc.) - Providing document information on S&T (JDream II, etc.)
	Japan Agency for Marine-Earth Science and Technology	- Information infrastructure operating costs
	National Institute of Informatics	- Development of Scientific Information Network ("SINET 3")
Ministry of Health, Labour and Welfare	National Institute of Infectious Diseases	- Budget for the Infectious Disease Surveillance Center - Research project expenses for collecting, analyzing, and assessing safety data on biological drugs
Ministry of Agriculture, Forestry and Fisheries	National Agriculture and Bio-oriented Research Organization	- Agriculture, Forestry and Fisheries Research Information Technology Center (JASI, MAFFIN, etc.)
Japan Patent Office	National Center for Industrial Property Information and Training	- Operation of Industrial Property Digital Library (IPDL)
Ministry of Land, Infrastructure, Transport and Tourism	Hydrographic and Oceanographic Department, Japan Coast Guard	- Promotion of collection, management and provision of hydrographic and oceanographic data and information - Development of Geographic Information System (GIS) database for the coastal area
Ministry of the Environment		- Improvement Promotion Expenses of Japan Integrated Biodiversity Information System (J-IBIS)
Cabinet Office		- Improvement of a comprehensive search system for patent and document information
Ministry of Education, Culture, Sports, Science and Technology	Japan Science and Technology Agency	
Japan Patent Office	National Center for Industrial Property Information and Training	

Ministry/ Agency	Organization	Subject
Cabinet Office	National Center for Industrial Property Information and Training	- Development of Research Tool Database (RTDB)
Japan Patent Office		
Relevant Ministry/ Agency		

6 Promotion of the Activities of Academic Societies

Academic societies are voluntary organizations made up of researchers of organization such as universities. They play an important role in terms of research evaluation, and also information and personal exchange, beyond the framework of individual research organizations. Major contributions are made to the advancement of academic research through activities of academic societies, such as the dissemination of the latest exceptional research results via academic research meetings, lectures, and symposia, and through the publication of academic journals.

To support these types of activities by academic societies, MEXT supplies the Grant-in-Aid for Publication of Scientific Research Results, which is one of the categories of Grants-in-Aid for Scientific Research, in order to support activities such as international conferences held in Japan with the participation of overseas researchers; symposia that provide youths and adults with up-to-date information on research trends, and the publication of academic journals. SCJ continuously conducted deliberations on measures for promoting self-improvement of academic societies, and held the symposium titled “Symposium for Conforming to the New Act on Incorporated/Foundations – Towards Establishment of Public Interests of Academic Societies” [literal translation] - with participation from several areas including academic societies and researchers.

(Enhancement of international competitiveness of academic societies)

JST, with a view to enhancing Japan's capability to disseminate information concerning research results, supports globalization efforts related to academic journals and research papers by establishing the Japan Science and Technology Information Aggregator, Electronic (J-STAGE), which is a comprehensive system for transmission and distribution of S&T information that computerizes processes such as contributions of scientific papers to academic journals and examination/screening and disclosure thereof.

7 Promotion of Research and Development at Public Research Institutions

The Basic Plan states that independent administrative institutions should work on self-reliant and voluntary operations and reform, including flexible and resilient operation of research funds, as well as fair and highly transparent competitive personnel and salary systems through their own management efforts under the discretion of the director. The R&D-Capacity Strengthening Act [literal translation], which was enacted in June 2008, advocates the strengthening of nation-wide R&D capacity of public research institutes and universities including private sectors through the reform of the R&D system from resource distribution to research results development by the government, and specifies considerations for the handling of corporate personnel expenses

and income while defining R&D corporations

4

Strategic Promotion of International Activities

With the advent of an age of global fierce competition over knowledge of technology and human resources through the worldwide mobilization of personnel, international S&T activities became more important than ever.

For its part, Japan must promote international activities in the strategic S&T fields by contributing to the international community through efforts to tackle global problems and enhancing collaboration with other Asian countries.

From the viewpoint above, the government, in accordance with the Third Science and Technology Basic Plan (Cabinet Decision in March 2006) and the Toward the Reinforcement of Science and Technology Diplomacy (compiled by CSTP in May 2008), clarified its strategic vision of international activities and promotes collaboration with other Asian countries, fostering and procurement of global-level researchers, and international standardization efforts (See Part 2, Chapter 3, Section 3, 4) while striving to cultivate the environment for enhancing international activities that support these efforts.

1

Improvement of the Environment for the Enhancement of S&T Diplomacy and International Activity, and the Promotion of Researcher Exchanges

(1) Enhancement of S&T diplomacy

With further advancements in globalization in recent years, it is important to improve Japan's global presence through the promotion of S&T and international cooperation because global problems that are difficult to solve by a single country have been exposed and international intellectual competition has become fiercer. Under these circumstances, it is important for the government to focus on S&T diplomacy, which improves S&T cooperation through diplomacy and generates synergetic effects. In accordance with the report "Toward the Reinforcement of Science and Technology Diplomacy," compiled by CSTP in May 2008, MEXT is strategically promoting measures for (1) the enhancement of S&T cooperation with developing countries to solve global problems, (2) the enhancement of S&T cooperation utilizing Japan's advanced S&T, and (3) the enhancement of infrastructure for the promotion of S&T diplomacy. From FY 2008, MEXT initiated the Science and Technology Research Partnership for Sustainable Development for the promotion of S&T cooperation with developing Asian and African countries in order to solve global problems related to the environment, energy, disaster prevention, infection, and other fields, through a combination of Japan's excellent S&T and ODA. Thus, the ministry has promoted joint research between Japan and developing countries, through cooperation with MOFA, ODA support institutes, and other organizations.

(2) Promotion of international research activities

It is necessary to gather high-talent personnel and the cutting-edge information into Japan and promote the internationalization of S&T activities in order to respond to challenges facing human beings.

To this end, Japan launched the programs of the Science and Technology Research Partnership for Sustainable Development (by JST) and the Dispatch of Science and Technology Researchers (by JSPS), which linked ODA with Japan's excellent S&T, in FY 2008 and promotes international joint research and international conferences proactively through programs such as