

3.4 Promoting International Science and Technology Activity

3.4.1 Developing Leading Activities for International Cooperation

Science and technology creates intellectual assets that should be the common property of all mankind, and also contributes to the resolution of various global issues such as those related to the environment, energy, and resources. Science and technology also contributes to the promotion of industry and economy. To develop international science and technology activities positively in these areas is important to fulfill Japan's role in international society and to more fully develop science and technology in Japan. Based on the close scientific capability between Japan and Western countries, scientific and technological cooperation between Japan and the West continues to advance effectively through burden sharing and complementary work. At the same time, scientific and technological cooperation with developing countries leads not only to the transfer of technologies that serve as infrastructure for independent and sustained development and strengthening of human resources in those countries, but is also important to the resolution of global problems. Therefore, Japan is not only cooperating through multilateral frameworks, such as Asia-Pacific Economic Cooperation (APEC), but also by promoting bilateral cooperation according to the conditions, needs, and potential of each country.

3.4.1.1 Development of Frameworks for Multilateral Cooperation

3.4.1.1.1 Summit Meeting of Major Nations (G8 Summit)

First discussed at the 8th Versailles Summit at the proposal of French President Mitterrand, science and technology has subsequently been discussed frequently in summit meetings.

At the 29th Evian Summit, held in June 2003, members adopted the "Science and Technology for Sustainable Development – A G8 Action Plan." In

this plan, members agreed to develop an implementation plan for the next ten years of global observation by the spring 2004 Tokyo ministerial level meeting. The plan also noted the development of advanced nuclear technologies within the field of energy technology. The summit further issued the statement, "Securing Radioactive Sources – A G8 Statement," among others.

3.4.1.1.2 The United Nations (UN)

The United Nations utilizes various committees and organizations to address important issues related to natural resources, energy, food, climate, the environment, and natural disasters, since these problems require solutions from a global perspective.

Participants at the World Summit on Sustainable Development (WSSD), held between August and September 2002, adopted an implementation plan that included, among other proposals, the development of global observation technologies. In line with the WSSD implementation plan, the Japan Aerospace Exploration Agency (JAXA) (formerly the National Space Development Agency of Japan) held seminars for Asian countries in 2003.

Japan also actively participates in and cooperates with a broad range of programs and activities in science and technology fields that are initiated through the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

UNESCO has designated "water science and wetland ecosystems" as the principal priority in the natural sciences field, and is dealing with the water problem in the world through various programs such as the International Hydrological Programme (IHP). UNESCO announced the first World Water Development Report (WWDR) at the Third World Water Forum held in Japan in March 2003. In October of the same year, the 32nd session of UNESCO's General Conference adopted the International Declaration on Human Genetic Data, which lays down guidelines for the use of genetic data. Japan is a member of the IHP Intergovern-

mental Council and actively participates in and cooperates with UNESCO's activities.

3.4.1.1.3 The Organization for Economic Co-operation and Development (OECD)

The Organization for Economic Cooperation and Development (OECD) works through its Committee for Scientific and Technological Policy (CSTP), Committee for Information, Computer and Communications Policy (ICCP), Committee on Industry and Business Environment (CIBE), Agriculture Committee (AGR), Environment Policy Committee (EPOC), the Nuclear Energy Agency (NEA), the International Energy Agency (IEA), and others to engage in activities related to science and technology, including the exchange of opinions, experiences, information, and personnel between member countries, preparation of statistical information, and implementation of joint research.

The objective of the CSTP is to promote cooperation between member countries in the field of science and technology policy, in order to contribute to the economic and social development of member countries. In January 2004, a ministerial level meeting was held in Paris with the participation of science and technology-related ministers from each state. Discussions included the interface between science and innovation, fostering the development and mobility of human resources in science and technology, and international cooperation in science and technology, among other issues.

The Committee consists of the following four subgroups, which implement concrete activities in their respective fields.

(1) Global Science Forum (GSF)

The primary objective of the Global Science Forum (GSF) is to promote international science and technology cooperation that contributes to the resolution of issues on a global scale.

The forum was established in June 1999, in order to take over the activities of the Megascience Forum, and to serve as a forum for science and tech-

nology policymakers to exchange opinions about important issues within the science and technology sector that require international cooperation and concerted action. The forum is also intended to issue proposals that contribute to the determination of science and technology policies.

At the ministerial level meeting held in January 2004, ministers approved statements regarding the GSF proposals on neuroinformatics and a linear collider, and also approved the extension of GSF activities for the next five years. Based on these approvals, lively discussions were held at the 10th GSF meeting in February 2004, including the establishment of the International Neuroinformatics Coordinating Facility, the Consultative Group on High-Energy Physics, a task force on Near Earth Objects (NEOs), a task force on declining interest in science studies among young people, and GSF's future activities.

(2) Working Party on Innovation and Technology Policy (TIP)

The primary objective of the Working Party on Innovation and Technology Policy (TIP) is to clarify procedures and working methods in order to enhance productivity; facilitate the creation, diffusion and application of knowledge; and foster sustainable growth and the creation of a highly skilled work force.

Since its founding in 1993, TIP has discussed and evaluated technology policies, focusing in particular on the National Innovation System (NIS).

In recent years, TIP has engaged in studies related to the evaluation of innovation policy; case studies on innovation; micro-policies for growth and productivity; and public/private partnerships for innovation.

In line with the conclusions of a ministerial-level meeting of the CSTP held in January 2004, future discussions will include intellectual property rights, innovation, and diffusion of knowledge; and scientific innovation and interfaces.

(3) Working Party on Biotechnology (WPB)

The primary objective of the Working Party on Biotechnology is to support the promotion of safe and effective utilization of biotechnology.

The WPB held continued discussions on biotechnology for sustainable growth and development, among other topics. Ministers at the CSTP ministerial level meeting held in Paris in January 2004 agreed to build a framework for a Global Biological Resource Center Network (GBRCN) by 2006.

(4) Working Party of National Experts on Science and Technology Indicators (NESTI1)

The Working Party will monitor, oversee and advise on statistical work undertaken for the Committee for Scientific and Technological Policy (CSTP) taking into account the priorities established by the Committee.

At an NESTI meeting held in Paris in June 2003, participants discussed revising the Oslo Manual, an international standard for the collection and interpretation of data on innovation activities, as well as improving the Human Resources in Science and Technology (HRST) indicators.

3.4.1.2 Cooperation with Nations in the Asia-Pacific Region

3.4.1.2.1 Cooperation under the Asia Pacific Economic Cooperation (APEC) Forum

The Asia Pacific Economic Cooperation (APEC) forum was established in 1989 as a forum for economic cooperation, with the aim of achieving sustainable economic growth in the Asia Pacific region. APEC promotes open regional cooperation, and carries out cooperative activities in areas such as industrial science and technology, human resources development, and energy, with the aim of promoting the liberalization and smooth implementation of trade and investment and economic and technological cooperation.

In particular, the Industrial Science and Technology Working Group is promoting the dissemination of science and technology information, the mutual use of research facilities, and a variety of concrete cooperation projects. The theme of the 4th APEC Science Ministers' Meeting, held in Christchurch, New Zealand in March 2004, was "Enhancing the capacity of science, technology, and innovation to deliver sustainable growth across the APEC region."

3.4.1.2.2 Cooperation under the Asia-Europe Meeting (ASEM)

The Asia-Europe Meeting (ASEM) was established as a forum for frank discussions between Asia and Europe, in order to strengthen the relationship between the two regions, which had hitherto been weaker than the relationships between North America and Europe and between Asia and North America.

Reports on concrete cooperative activities in the water sector were presented at the Fourth ASEAM Summit held in Copenhagen in September 2002. Follow-up in 2003 sought promotion of cooperation in the science and technology sector.

3.4.1.2.3 Cooperation with the Association of Southeast Asian Nations (ASEAN)

The Association of Southeast Asian Nations (ASEAN) was established with the aim of accelerating economic growth, social progress, and cultural development in the region. Dialogues between ASEAN member countries and Japan, China, and the Republic of Korea take place within the framework of ASEAN+3. At the 1999 ASEAN+3 Summit, recommendations were made for strengthening cooperation in the science and technology area.

Based on recommendations from the ASEAN Committee on Science and Technology (COST), the second ASEAN / COST+3 meeting convened in Manila in April 2003 with Japan, China, South Korea, and other ASEAN countries.

3.4.1.2.4 Cooperation with Various Countries

In relations with China, in addition to cooperation based on a science and technology cooperation agreement¹, Japan's Ministry of Education, Culture, Sports, Science and Technology and China's Ministry of Science and Technology held intergovernmental talks in November 2003 between science and technology- administrative officials on the theme of collaboration among industry, academia, and government.

In trilateral relations among Japan, China, and Korea, the Second Japan-China-Korea Directors-General Meeting on Science and Technology Cooperation was held in Tokyo in March 2004. Each country introduced its science and technology policies, and discussions were held on roles of the three countries as the core Asian nations.

In relations with the Republic of Singapore, the first joint committee meeting on mutual recognition of science and technology and occupational skills (including professional engineer qualifications) was held in Singapore in November 2003, based on the "Japan-Singapore Economic Partnership Agreement (JSEPA)."

In relations with South Korea, Australia, Indonesia, India, and Israel, among others, under agreements for science and technology cooperation, cooperation is progressing in the form of information and research personnel exchanges, and the implementation of joint research.

Opinion exchanges on the possibility of future cooperation are also being pursued with other countries that have not signed science and technology cooperation agreements with Japan.

Furthermore, from a humanitarian viewpoint, Japan is working on the research and development of technologies for safer and more efficient detection and clearance of antipersonnel landmines, which stand as a significant impediment to reconstruction and development in Afghanistan and many other mine-affected countries.

Science and technology cooperation agreement: An agreement entered into between Japan and a foreign nation in order to promote cooperative relations in the science and technology sector for peaceful purposes. The agreement establishes the form of cooperative activities, the framework for intergovernmental discussions such as joint committees, and also how to handle intellectual property rights stemming from cooperation. Various cooperative activities are implemented under this agreement, including the exchange of R&D data, researcher exchanges, and joint research. Joint committee meetings are held every few years to report on cooperative activities up to those times, and to discuss future cooperative activities

3.4.1.3 Cooperation with Nations in Europe and North America

Cooperative activities such as holding joint committee meetings based on bilateral science and technology cooperation agreements among European and North American nations are actively being carried out in order to resolve common challenges faced by advanced countries, including those in the life sciences, nanotechnology, raw materials, the environment, nuclear energy, and space development (Figure 3-4-1).

Figure 3-4-1 Joint committee meetings and other activities held in FY2003 based on bilateral science and technology cooperation among Western nations

Nation	Name	Date	Location	Agenda
United States	Ninth Meeting of the Japan-U.S. Joint High Level Committee on Science and Technology	April 21, 2003	Tokyo	(1) Earth Science, the environment, and energy; (2) Life sciences; (3) Nanotechnology and advanced materials; (4) Science education; and (5) Science and technology for peace
	First Japan-U.S. Workshop on Science and Technology for a Safe and Secure Society	February 12-13, 2004	Tokyo	(1) Overview / roles of science and technology in supporting a secure and safe society (2) Intergovernmental coordination of science and technology to support a secure and safe society (3) Requirements for technological research, development, testing, assessment, and use, and the working out of priority lists (4) Matters of common concern: 1. Infectious diseases and the safety of agriculture and food 2. National borders and transportation safety 3. Safety related to important information infrastructure protection 4. Social infrastructure protection and analysis of interdependence 5. Science and technology for anti-crime and anti-terrorism measures
France	Fifth Japan-France Joint Committee on Science and Technology Cooperation	July 1, 2003	Tokyo	(1) Personnel exchanges; (2) Life sciences; (3) Space; (4) Oceans; (5) the Environment and new energies; (6) Resources; and (7) Information and communications technology
Canada	Eighth Japan-Canada Joint Committee on Science and Technology Cooperation	July 17, 2003	Tokyo	(1) Cooperation among industry, academia, and government; (2) Life sciences; (3) Research information networks; (4) Space; and (5) the Environment
Sweden	Second Japan-Sweden Joint Committee on Science and Technology Cooperation	October 27, 2003	Tokyo	(1) Researcher exchanges; (2) Life sciences; (3) Nanotechnology; (4) Climate issues (including research in the polar regions); (5) Industrial design; (6) Deep-sea drilling; and (7) Agriculture
Netherlands	Third Japan-Netherlands Joint Committee on Science and Technology Cooperation	December 15, 2003	Hague	(1) Internationalization of science and technology activities; (2) Researcher exchanges; (3) Multilateral science and technology cooperation; and (4) Agriculture, forestry, and fisheries
United Kingdom	Fifth Japan-United Kingdom Joint Committee on Science and Technology Cooperation	February 24, 2004	Tokyo	(1) Life sciences; (2) Earth observation and climate change; (3) Nanotechnology; (4) Particle physics and space; and (5) Researcher exchanges

In relations with the United States, the Ninth Meeting of the Japan-U.S. Joint High Level Committee (ministerial level) on Science and Technology was held in Tokyo in April 2003, based on the Japan-United States Science and Technology Cooperation Agreement. The Joint Committee exchanged opinions on individual areas of cooperation, including each nation's trends in science and technology policy, the global environment, energy, the life sciences, nanotechnology, science education, and science and technology for peace. The Joint Committee also agreed to implement an exchange program for young researchers in the nanotechnology field. Furthermore, in line with the agreement reached by the Joint Committee, the First Japan-U.S. Workshop on Science and Technology for a Safe and Secure Society was held in February 2004. Discussions at the workshop included the roles science and technology should play in protecting society from various threats and ensuring the safety and security of society, the two nations' common areas of concern, and the direction of future research cooperation.

In relations with Germany, in August 2003, Prime Minister Junichiro Koizumi visited Germany, where he held talks with German Chancellor Gerhard Schroeder. The two leaders agreed to strengthen exchanges of young researchers between Japan and Germany.

In relations with the United Kingdom, in July 2003, Prime Minister Tony Blair visited Japan, where he held talks with Prime Minister Koizumi. The two leaders were in agreement on strengthening cooperation in science and technology, the environment, and information and communications technology, about which they issued joint statements.

Elsewhere, there are joint committees on science and technology with the Germany, France, Italy, Finland, Russia, Poland, the Czech Republic, Hungary, and Rumania based on science and technology cooperation agreements. In relations with Switzerland, the two countries regularly have a Science and

Technology Roundtable to exchange information on current science and technology cooperation.

Furthermore, Japan entered into two new science and technology cooperation agreements: one with Norway in May 2003, and one with the Republic of South Africa in August 2003. With the conclusion of these new agreements, Japan is implementing wide-ranging bilateral science and technology cooperation based on international agreements, such as science and technology cooperation agreements with forty nations around the world, and promoting multilateral scientific, technological, and academic cooperation. Negotiations are also underway with the EU on a draft agreement.

3.4.1.4 Challenge for International Program

3.4.1.4.1 Promotion of the Human Frontier Science Program (HFSP)

The "Human Frontier Science Program (HFSP)" was proposed by Japan at the Venice Summit of June 1987, with the aim of promoting, through international cooperation, basic research focused on the elucidation of the complex mechanisms of living organisms. Members of HFSP include the G-7 nations (Japan, the U.S., Germany, France, the U.K., Italy, and Canada), the EU, and Switzerland. Based on the principles of "international cooperation among continents," an "interdisciplinary approach to the life sciences," and "youth-oriented" action, the International Human Frontier Science Program Organization (HFSP/O) provides research grants to subsidize international joint research teams, fellowships to subsidize travel expenses, accommodations, and other expenses for young researchers conducting research abroad, and implements international research workshops. With a total of nine grant recipients from the program having later been awarded the Nobel Prize, the program receives great acclaim all over the world. Japan has been actively supporting the program ever since it first proposed it.

3.4.1.4.2 Cooperation under the International Science and Technology Center (ISTC)

In March 1994, the United States, the EU (then EC), and the Russian Federation established the International Science and Technology Center (ISTC) in order to provide an opportunity for scientists and engineers from the former Soviet Union, who possess knowledge and skills related to weapons of mass destruction, to engage in peaceful activities and to contribute to the resolution of technology issues, both internationally and within the nations of the former Soviet Union.

To date, a total of approximately 600 million dollars has been approved to initiate specific projects aimed at achieving the goals of the organization. Furthermore, over 51,000 researchers have been engaged in research activities.

The number of projects supported by private-sector corporations as partner projects has also been increasing due to the high caliber and originality of science and technology in the former Soviet Union.

Additionally, Japan is actively involved in the expansion of the number of new participants, including corporations, and in the implementation of projects that contribute to the resolution of global issues.

3.4.1.4.3 International Space Station (ISS) Program

Fifteen countries, including the five partners of Japan, the United States, the European Union, Canada, and Russia, participate in the International Space Station (ISS) program based on the Agreement concerning Cooperation on the Civil International Space Station. The aim of the ISS program is to develop infrastructure that makes possible full-fledged utilization of the space environment and manned space activities by constructing a manned space station in low orbit about 400km above the Earth.

Assembly of the International Space Station in orbit commenced in November 1998, and the first long-term crew stay on the space station began in

November 2000. Japan is participating in this project with its own experiment module, the Japanese Experiment Module (JEM) "Kibo," the development of which is nearly complete. Japanese astronauts are scheduled to stay for a long period of time at the space station in the future. However, following the Space Shuttle Columbia accident in February 2003, deliberations are being held among the concerned parties as to how to proceed in the future.

3.4.1.4.4 International Thermonuclear Experimental Reactor (ITER) Project

The goal of the International Thermonuclear Experimental Reactor (ITER) project is to develop a tokamak experimental fusion reactor through international cooperative efforts, in order to demonstrate the scientific and technological feasibility of fusion energy, which is expected to become one of the future permanent energy sources for humanity. The project originated in 1985 from proposals by leaders of the United States and the former Soviet Union to promote international cooperation for research and development on nuclear fusion for peaceful purposes. Intergovernmental negotiations on matters including a joint implementation agreement, site selection, and cost sharing have been taking place between the six involved parties of Japan, China, the European Union, South Korea, Russia, and the United States. Negotiation Meetings have been held nine times to date, at which Rokkasho (Japan) and Cadarache (France) have been proposed as potential sites. Japan's basic policy is to push ahead with the ITER project through international cooperation, based on the conclusions laid down by the Council on Science and Technology Policy. The Cabinet consented to the presenting of Rokkasho-mura, Kamikita County, Aomori Prefecture as the candidate site for consideration at the Intergovernmental Conference.

3.4.1.4.5 The Large Hadron Collider (LHC) Project

The Large Hadron Collider (LHC) is a project to

construct a proton-proton colliding particle accelerator proposed by the European Organization for Nuclear Research (CERN). Construction is proceeding under international cooperation between the CERN member nations, Japan, the United States, Russia, Canada, and India, aiming for the commencement of experiments in 2007.

The LHC is a large circular accelerator with superconducting magnets placed in an underground tunnel 27 km in circumference. It will accelerate protons to nearly the speed of light, in opposite directions, to enable proton collisions. The ultra-high energies generated by these proton collisions make it possible to create previously undiscovered particles that will be useful in exploring and revealing the internal structures of matter.

In Japan, the LHC project is reviewed by the Ministry of Education, Culture, Sports, Science and Technology, which contributes to promoting the project with funds for construction of the particle accelerator, anticipating both its scientific significance as well as its potential to lead to the creation of new industries.

3.4.1.4.6 Integrated Ocean Drilling Program (IODP)

The Integrated Ocean Drilling Program (IODP) is an international research program involving joint

operation of a Japanese riser drilling vessel capable of deep drilling as deep as 7,000 meters below the seafloor to reach the mantle, and a U.S. non-riser drilling vessel.

On April 22, 2003, the Ministry of Education, Culture, Sports, Science and Technology and the United States' National Science Foundation (NSF), which lead the project, signed a memorandum that got IODP underway in October of the same year. As IODP moves forward it is expected to further research into deep crustal and sedimentary strata, thereby contributing to the elucidation of the mechanisms for environmental change and the tectonic mechanism in earthquakes, as well as to the search for undiscovered life forms and new resources.

Basic design of the riser drilling vessel began in 1999, and construction was underway two years later. The vessel was named "Chikyu," and a launching ceremony was held in January 2002 in Tamano City, Okayama Prefecture.

3.4.2 Promoting International Research Exchanges

3.4.2.1 Promotion of International Research Activities

Working with top rank researchers and gathering the latest scientific information enables Japan to yield world-class outcomes, which are expected to resolve global problems. Therefore, internationalization of our Science and Technology environments is recognized as an essential mission.

For this purpose, through the “Leadership for International Scientific Cooperation” program, supported with the Special Coordination Fund for Promoting Science and Technology, and the “Strategic International Cooperative Program,” run by the Japan Science and Technology Agency, Japan promotes the convening of international forums and the conducting of surveys and research, for Japan’s proactive promotion of international cooperation on important research issues and creation of sustainable cooperative relationships in the international community.

In addition, through its Global Network of Advanced Research Program and its Core University Program, the Japan Society for the Promotion of Science (JSPS) is promoting multilateral joint research with Western and Asian nations.

3.4.2.2 Promotion of Researcher Exchanges

Considering the importance of enhancing international openness in the research environment in Japan, and accepting more first-rate foreign

researchers into Japan in order to develop scientific and technological research, a number of researcher exchange programs are being implemented, such as the JSPS’s Invitation Fellowships Programs for Research in Japan.

The facilitation of international exchange among young researchers is particularly important from the views of developing international joint research in the future, and of fostering researchers with international perspectives. For this reason, the Ministry of Education, Culture, Sports, Science and Technology is promoting the JSPS’s “Postdoctoral Fellowships for Foreign Researchers,” a program for inviting first-rate young researchers from abroad to Japan’s universities and experimental research institutions, and providing an opportunity for them to conduct joint research with Japanese researchers. Another program being promoted is JSPS’s “Postdoctoral Fellowships for Research Abroad,” a program for sending young Japanese researchers to overseas universities or research institutions to devote themselves to research.

Moreover, efforts are being made to improve and expand housing for foreign researchers and services to support foreign researchers’ daily lives in Japan.

As a result of these measures, the number of foreign researchers invited, and Japanese researchers dispatched overseas, has been rising at Japan’s universities and experimental research institutions (Figure 3-4-2). By region, there are active researcher exchanges with Asia, Europe, and North America. In terms of the acceptance of researchers from abroad, nearly half are from the Asian region (Figure 3-4-3).

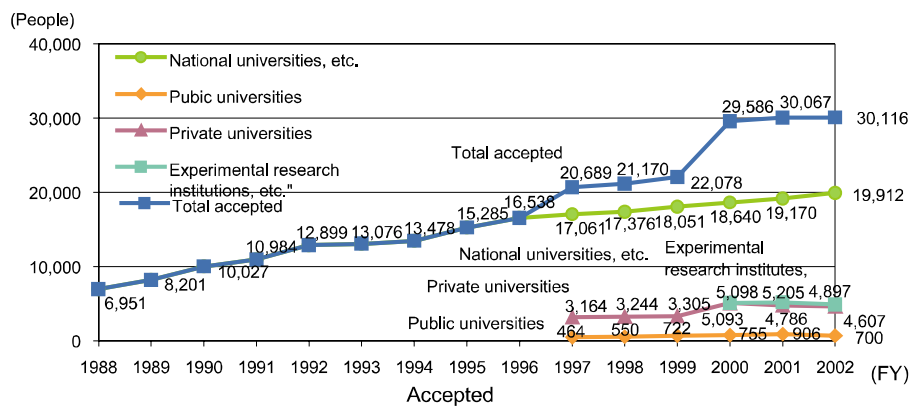
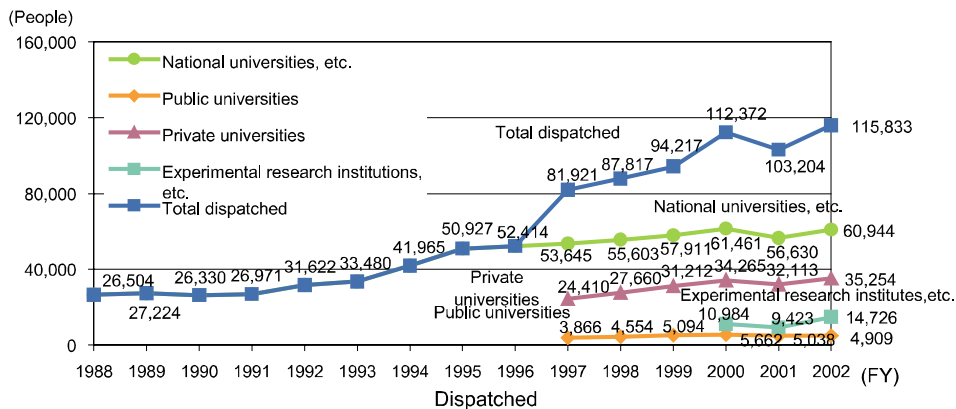


Figure 3-4-2 Progress of researcher exchanges in universities, research institutions, etc.

Note: "National universities, etc." indicates national universities, inter-university research institutes, national junior colleges, and national technical colleges. "Experimental research institutions, etc." indicates national experimental research institutions, incorporated administrative agencies, and public research and development corporations. Public and private universities and national junior colleges have been included in this research since FY1997. National technical colleges, national experimental research institutions, and public research and development corporations have been included since FY2000.

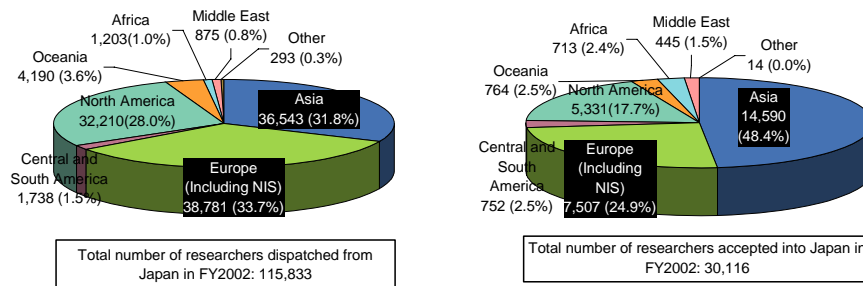


Figure 3-4-3 Researcher exchanges (dispatch and acceptance) by region

Source: MEXT. "Survey of International Exchange (FY2002)"