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 for fulfilling Japan's role in international society and for more fully developing science and technology in Japan. Based on the close scientific capabilities 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 not only leads 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 the Asia-Pacific Economic Cooperation (APEC), but also promoting bilateral cooperation according to the conditions, needs, and potential of each country.

3.4.4.1 Development of Frameworks for Multilateral Cooperation

(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 30th G8 Summit at Sea Island held in June 2004, members adopted the "Science and Technology for Sustainable Development – A G8 Action Plan." At the summit, Prime Minister Koizumi stressed the importance of environment issues, such as forest protection and new energy resources and proposed the "3R" Initiative aimed at creating a recycling-oriented society (through the promotion of Reduce waste, Reuse and Recycle resources). The Initiative has gained support from other countries. Regarding climate control, the Prime Minister also stressed the importance of the early entry into force of the Kyoto Protocol.

In particular, the Earth Observation Summit, which was first held on the occasion of the Evian Summit in June 2003, held its second meeting in April 2004 and its third meeting in February 2005, adopting a 10-year implementation plan starting in 2006.

(The United Nations (UN))

At the United Nations, various activities, including intellectual forums for education, science and culture, creation of international norms, and development cooperation, are being implemented through the United Nations Educational, Scientific, and Cultural Organization (UNESCO).

UNESCO has designated "water and associated ecosystems" as the principal priority in the natural science field and is dealing with the water problem throughout the world through the International Hydrological Programme (IHP). Through this programme, preparations are now under way to establish the "International Center for Water Hazard and Risk Management" (ICHARM) in Japan as a hub for research, capacity-building and information network activities on water-related disasters and risk management. At the Intergovernmental Oceanographic Commission (IOC), oceanographic scientific surveys and research activities, such as oceanographic observation concerning global climate change and establishment of tsunami-warning systems, and regional cooperation projects are being implemented. Japan is cooperating in oceanographic surveys and education and training mainly in the western Pacific.

In the areas of human and social sciences, UNESCO elaborates the draft "Universal Declaration on Bioethics and Human Rights" to be adopted at the 33rd session of its General Conference in 2005.

(The Organisation for Economic Co-operation and Development (OECD))

The Organisation for Economic Co-operation and Development (OECD) works through its Comm-

ittee for Scientific and Technological Policy (CSTP), Committee for Information, Computer and Communication Policy (ICCP), Committee on Industryand Business Environment (CIBE), Committee for Agriculture (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 CSTP established of the following five subgroups, which implement specific activities in their respective fields.

(1) Global Science Forum (GSF)

The forum was established in June 1999, in order to take over the activities of the Mega Science Forum, and to serve as a forum for science and technology 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 design of science and technology policies.At the GSF meeting held in July 2004, an expert WG was established to hold a conference on declining student enrolments in science and technology. Japan is an active member in the WG. At the GSF meeting in February 2005, lively discussions were held under the strong initiative of Japan with two new activities – "WS on Science and Technology for a Safer Society" and "A Project on interdisciplinary issues" – approved.

(2) Ad Hoc Working Group on Steering and Funding of Research Institutions (SFRI)

Following a ministerial meeting of CSTP in January 2004, the first meeting of SFRI was held in October 2004. Japan has been actively participating in SFRI as a lead country of one of the three subgroups.

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

TIP is aimed to discuss the promotion of productivity, the creation and application of knowledge, the sustainable development and the creation of a skilled work force.

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

For two years from 2005 to 2006, TIP held discussions on such topics as the evaluation of innovation policies, globalization of R&D and innovation, diffusion of IPR, innovation and knowledge, and the NIS of China.

(4) Working Party on Biotechnology (WPB)

WPB is to support the promotion of safe and effective utilization of biotechnology.

Continued discussions were held on the establishment of a "Global Biological Resource Center Network (GBRCN)". It was reported that a task force bureau for the establishment of GBRCN was set up at a meeting held in Paris in December 2004.

(5) Working Party of National Experts on Science and Technology Indicators (NESTI[20])

At a NESTI meeting held in June 2004, participants discussed revising the Oslo Manual, an international standard in the collection and interpretation of data on innovation activities, as well as improving new indicators about the Human Resources for Science and Technology (HRST) and the globalization of R&D, etc.

20 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.

3.4.1.2 Cooperation with Nations in the Asia-Pacific Region

(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 promote 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." The follow-up to that meeting is being conducted at present.

(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 third ASEAN / COST+3 meeting convened in Pattaya (Thailand) in September 2004 with Japan, China, South Korea, and other ASEAN countries.

(Cooperation with Various Countries)

In relations with China, in addition to cooperation based on a science and technology cooperation agreement [21], the Japan-China seminar was jointly held in June 2004 with the Chinese Academy of Sciences, and Japan's Ministry of Education, Culture, Sports, Science and Technology and China's Ministry of Science and Technology held the third inter-government talks in November 2004 to promote exchanges of science and technology administrative officials between the two countries.

In trilateral relations among Japan, China, and Korea, as a result of an agreement at the Second Japan-China-Korea Directors-General Meeting on Science and Technology Cooperation held in Tokyo in March 2004, a ministerial-level meeting is slated for 2005.

In relations with Australia, the 11th meeting of the Japan-Australia Science and Technology Cooperation Joint Committee was held in Tokyo in August 2004 based on the Japan-Australia Science and Technology Cooperation Agreement. Participants in the meeting exchanged views on future cooperation between the two governments in various fields, such as science and technology policy, research cooperation activities, life science and earth science.

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 exchangesand the implementtation 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.

21 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.

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. Japan is also providing mine-clearing training to retired military personnel and other Afghan people.

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).

Table 3-4-1 Joint committee meetings and other activities held in FY2004 based on bilateral science and technology cooperation among European and North American nations

Nation	Name	Date	Location	Agenda
United States	Second Japan-U.S. Workshop on Science and Technology for a Safe and Secure Society	March 10-11, 2005	Honolulu	(1) Development of science and technology policies conducive to a safe and secure society (2) Prioritizing science and technology fields conducive to a safe and secure society (3) Review of current cooperative activities and identification of new opportunities 1) Infectious diseases 2) National borders and transportation safety 3) Safety related to important information infrastructure protection 4) Public-private technology partnership 5) Review of international dialogues on science and technology fields 6) the safety of food 7) Science and technology for anti-crime and anti-terrorism measures
Hungary	8th Japan-Hungary Science and Technology Cooperation Conference	May 24, 2004	Tokyo	About joint research projects
Finland	3rd Japan-Finland Science and Technology Cooperation Joint Committee	June 17, 2004	Helsinki	(1) Researcher exchanges (2) Signing of a memorandum between the New Energy and Industrial Technology Development Organization (NEDO) and the Finnish National Technology Agency (TEKES). (3) Bilateral cooperative activities (4) Technology forecasting (5) Multilateral cooperative activities
Norway	1st Meeting of Japan-Norway Science and Technology Cooperation Joint Committee	June 21, 2004	Oslo	(1) Existing cooperative activities (2) Materials and nanotechnology (3) Energies and the environment (4) the safety of food
Switzerland	4th Japan-Switzerland Science and Technology Roundtable	July 8, 2004	Tokyo	(1) Bilateral cooperative activities (2) Cooperation in 2 prioritized areas (materials science and nanotechnology) (3) Improvement of research environment
France	6th Japan-France Joint Committee on Science and Technology Cooperation	November 17-18, 2004	Tokyo	(1) Researcher exchanges (2) Life sciences (3) Genome (4) Materials (5) Bioethics/humanities (6) Innovation and partnership (7) Space (Earth observation) (8) Energies and the environment (9) Information science
South Africa	1st Session of the Joint Science and Technology Committee Between Japan and South Africa	May 13, 2004	Pretoria	(1) New materials and nanotechnology (2) ICT (3) Biotechnology (4) Infectious diseases

In relations with the United States, as a result of an agreement reac hed at the Ninth Meeting of the Japan-U.S. Joint High Level Committee (ministerial level) on Science and Technology, which was held based on the Japan-United States Science and Technology Cooperation Agreement, the Japan-U.S. Workshop on Science and Technology for a Safe and Secure Society was held in Honolulu and the two countries discussed 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. Under the framework of the Workshop, exchanges of researchers between the two countries have been implemented in various fields, such as science and technology for the protection of important information infrastructure and for measures against crime and terrorism.

In relations with Canada, the "Japan-Canada Female Researcher Exchange Program" was created with the aim of promoting women's activities in a wide range of science, technology and academic fields through mutual visits of first-rate female researchers between the two countries. In March 2005, two Canadian female researchers visited Japan.

And, in May 2005, the Japan-South Africa Science Forum and the first meeting of the Science and Technology Joint Committee were held based on the Japan-South Africa Science and Technology Cooperation Agreement.

Elsewhere, there are joint committees on science and technology with Germany, France, Italy, Finland, Russia, Poland, the Czech Republic, Hungary, and Romania based on science and technology agreements. In relations with Switzerland, the two countries regularly have a Science and Technology Roundtable to exchange information on current science and technology cooperation. In September 2004, the Japan-Mexico Economic Partnership Agreement was signed (came into force on April 1, 2005). The agreement includes science and technology cooperation between the two countries. Japan is implementing wide-ranging bilateral science and technology cooperation based on international agreements, including science and technology cooperation agreements with forty-one nations around the world, and promoting multilateral scientific, technological, and academic cooperation. At present, Japan is at the final stage for negotiations with the EU for concluding the Japan-EU Science and Technology Cooperation Agreement and began negotiations with Switzerland to conclude a science and technology cooperation agreement.

3.4.1.4 Taking on International Programs

(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 (HFSPO) provides research grants to subsidize international joint research teams, fellowships to subsidize travel expenses, accommodation, and other expenses for young researchers conducting research abroad, and organizes meetings of HFSP grant recipients for presentation of their research results. In May 2004, the 15th anniversary celebration and 4th award-winners meeting was held in Hakone and attended by about 300 people, including former Prime Minister Nakasone, who is the proponent of the Program, HFSP officials and researchers.

With a total of 11 HFSP grant recipients having later been awarded the Nobel Prize as of FY2004, the Program has been highly acclaimed worldwide. Japan has been actively supporting the Program since its inception.

In 2005, South Korea and Australia joined the group of countries supporting the Program.

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

In March 1994, the United States, the EU (then the 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, possessing 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 58,000 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.

(International Space Station (ISS) Program)

The International Space Station (ISS) program participated by fifteen countries (Japan, the United States, the European Governments, Canada, and Russia,) based on the Intergovernmental Agreement, is the international cooperation project to construct a manned space facility at low Earth orbit with an altitude of approximately 400km. The aim of the ISS Program is to develop infrastructure enabling full-fledged space environment utilization and manned space activities. Some components of the Japanese Experiment Module (JEM) “Kibo” have been shipped to NASA Kennedy Space Center.

The first module of the ISS was launched in November 1998, and the first long-term crew stay on the ISS began in November 2000. To date, one Japanese astronaut has stayed at the ISS for a short period of time to conduct assembly work. Another Japanese astronaut Soichi Noguchi, who is to be on board the first space shuttle (around May 2005) since the accident of the Space Shuttle Columbia, is stayed at the ISS.

(International Thermonuclear Experimental Re-actor (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 parties of Japan, China, the European Union, South Korea, Russia, and the United States. 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 Rokkashomura, Kamikita County, Aomori Prefecture as the candidate site for consideration at the Intergovernmental Conference. Under this policy, the government has been pushing its bid to host the ITER.

(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, with experiments aimed to commence 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.

(Integrated Ocean Drilling Program (IODP))

The Integrated Ocean Drilling Program (IODP) is a multilateral cooperation project that began in October 2003 led by Japan and the United States and with the participation of Europe and China. The program aims at elucidating global environmental changes, the structure of the earth's interior, the biosphere of the earth's crust, etc. by drilling into deep seabeds primarily using Japanese riser drilling vessel "Chikyu," capable of deep drilling up to 7,000 meters below the seafloor 2,500 meters below the surface of the sea (in future: 4,000 meters) , and a U.S. drillship.

Prior to the commencement of the program, the Ministry of Education, Culture, Sports, Science and Technology and the U.S. National Science Foundation (NSF) signed a memorandum on April 22, 2003 for setting the framework of IODP.

The riser drilling vessel "Chikyu" is scheduled for completion in FY2005 followed by shakedown and training.

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 can be expected to resolve global problems. Therefore, internationalizetion 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

In order for Japan to develop scientific, technological, and academic research, it is necessary to attract many first-rate researchers at home and abroad by opening up Japan's research system to the world, and fostering Japanese human resources capable of demonstrating international leadership by encouraging them to study hard at an international level through promotion of researcher exchanges. From this standpoint, various researcher exchange programs have been implemented, including the foreign researcher invitation program by the Japan Society for the Promotion of Science (JSPS).

The facilitation of international exchange among young researchers is particularly important from the position 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 so that they can 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).

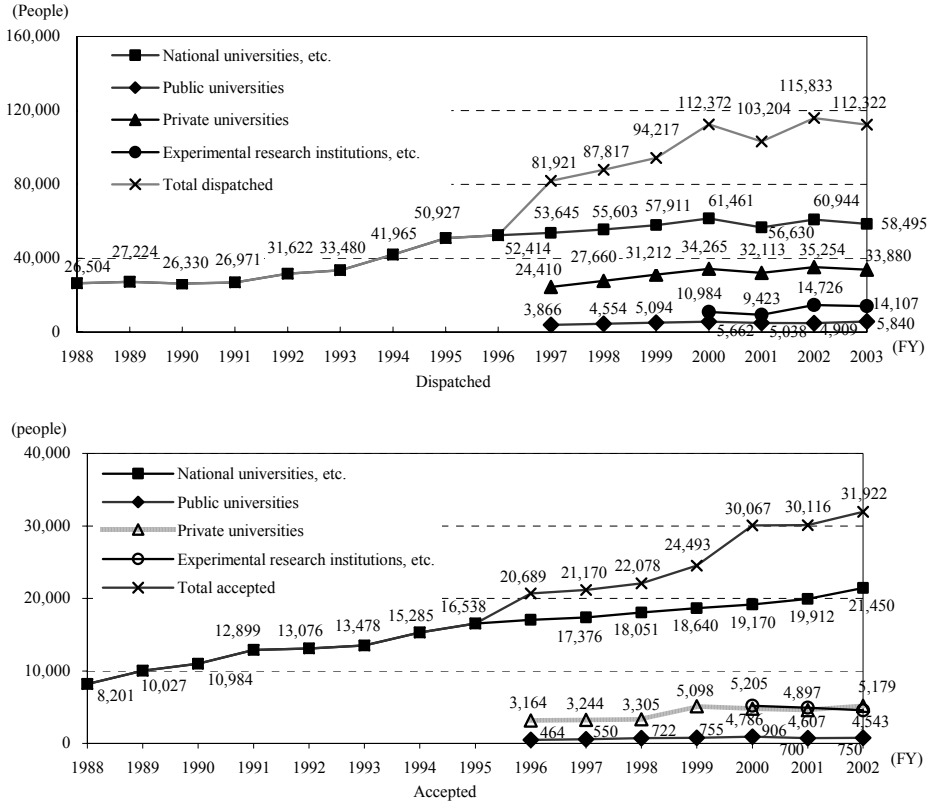

Figure 3-4-2 Progress of researcher exchanges in universities, research institutions, etc.

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.

Source: MEXT. "Survey of International Exchange (FY2003)"

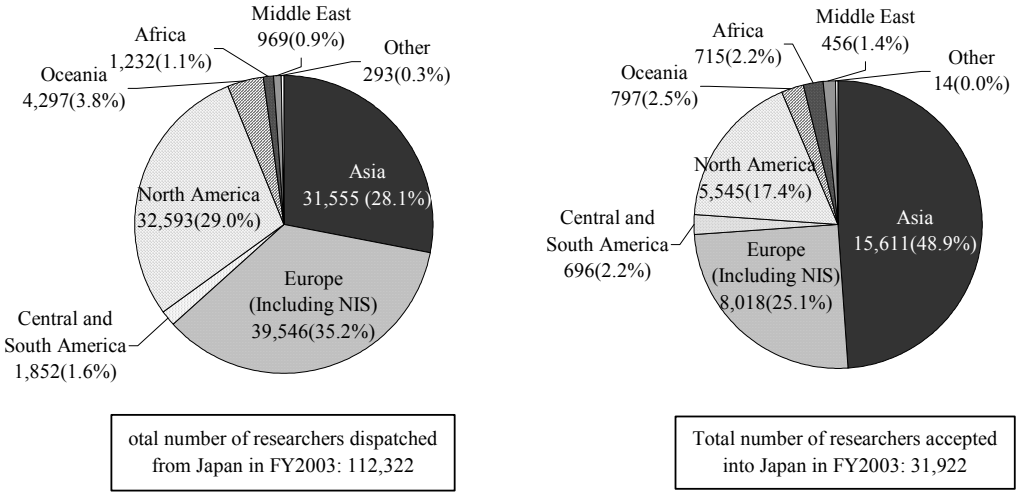

Figure 3-4-3 Researcher exchanges (dispatch and acceptance) by region

Source: MEXT. "Survey of International Exchange (FY2003)"