

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

the Program for Strategic Promotion of Asia-Africa Science and Technology Cooperation [literal translation] (funded by the Special Coordination Funds for Promoting Science and Technology) and the Strategic International Cooperative Program (by JST).

Furthermore, JSPS supports exchange between research centers with scientifically advanced countries (in Europe and North America) and Asian and African countries, and tries to establish scientific research networks and foster young researchers through the JSPS Core-to-Core Program, the Asian CORE Program, and the AA Science Platform Program in order to contribute to the enhancement of international competitiveness of Japan's scientific research and the fostering of researchers by using measures for the global development of scientific research activities. In addition, since FY 2005, the Strategic Fund for Establishing International Headquarters in Universities was implemented, and at the selected universities, the organizational structure has been modified to create interdisciplinary, cross-sectional bodies like an International Strategy Headquarters to coordinate the basis for promoting strategies for international activities.

### **(3) Promotion of researcher exchanges**

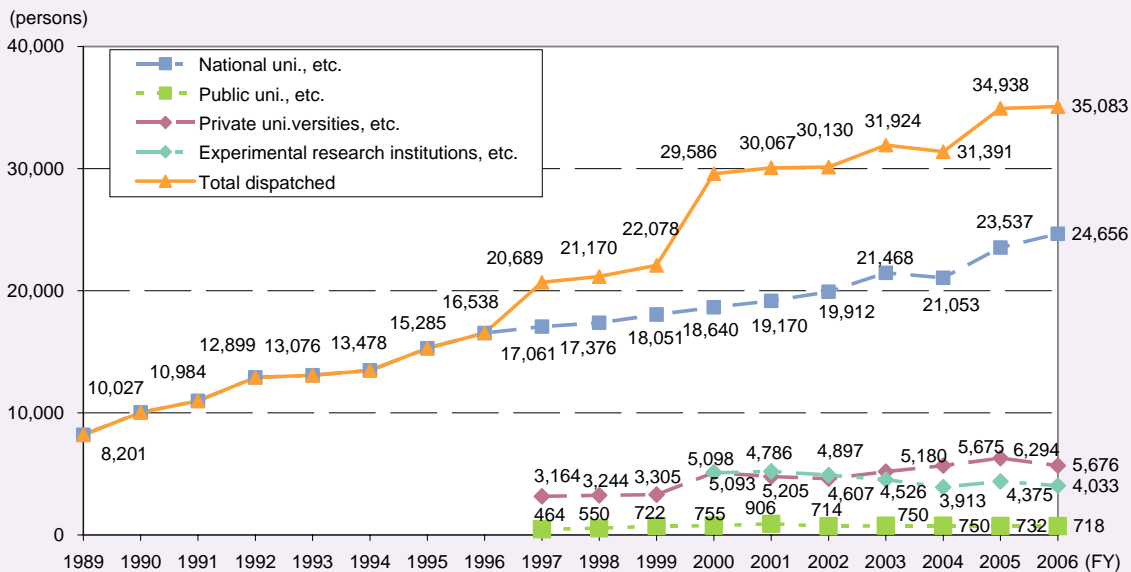
The number of overseas researchers received and the number of Japanese researchers sent abroad have increased generally at national, public and private universities, and experimental research institutions in Japan (Figure 2-3-29). Figure 2-3-30 shows region-classified researcher exchange status, in which the rate of researcher exchange with Asia, Europe, and North America is greater.

For further S&T and scientific research development, it is essential that Japan attracts many excellent researchers within and outside Japan and Japanese researchers compete at cutting-edge levels at the international standard. For this purpose, various researcher-exchange programs are being carried out.

JSPS implements various researcher invitation programs, such as, the Postdoctoral Fellowship for Foreign Researchers and the Invitation Fellowship Programs for Research in Japan, for various career stages and purposes to support researcher exchange. Thus, JSPS provides excellent foreign researchers with opportunities to engage in research at Japanese universities. In addition, to enhance training opportunities overseas for excellent Japanese researchers, JSPS sends young Japanese researchers abroad through the Postdoctoral Fellowships for Research Abroad and the International Training Program (ITP) so as to enable young researchers to engage in research at outstanding research organizations overseas and expand opportunities to mingle with foreign researchers.

Figure 2-3-29 Trends in Researcher Exchanges at Universities and Experimental Research Institutions, etc.

(1) Number of researchers received, by organization



(2) Number of researchers sent, by organization

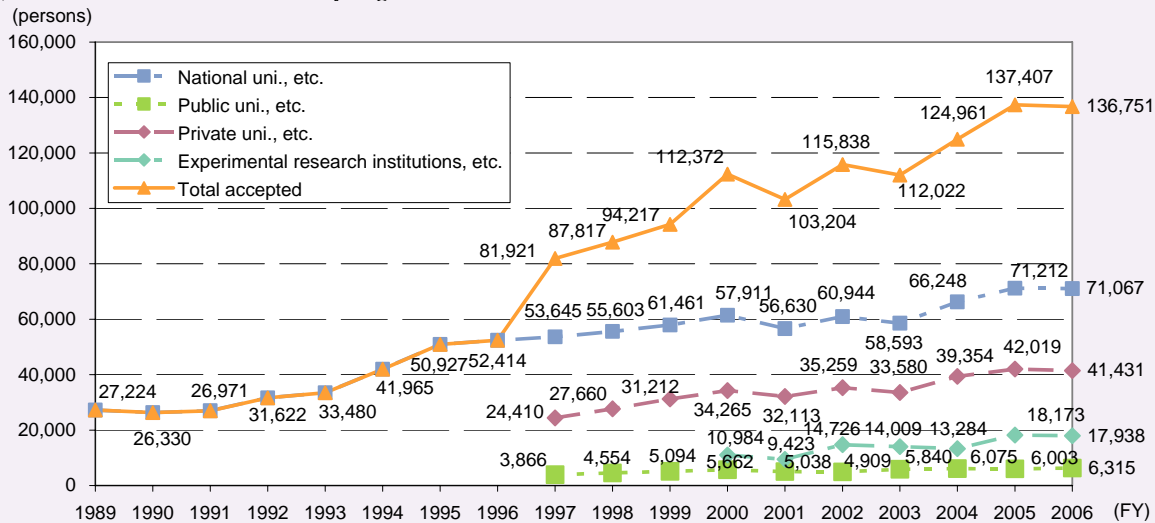
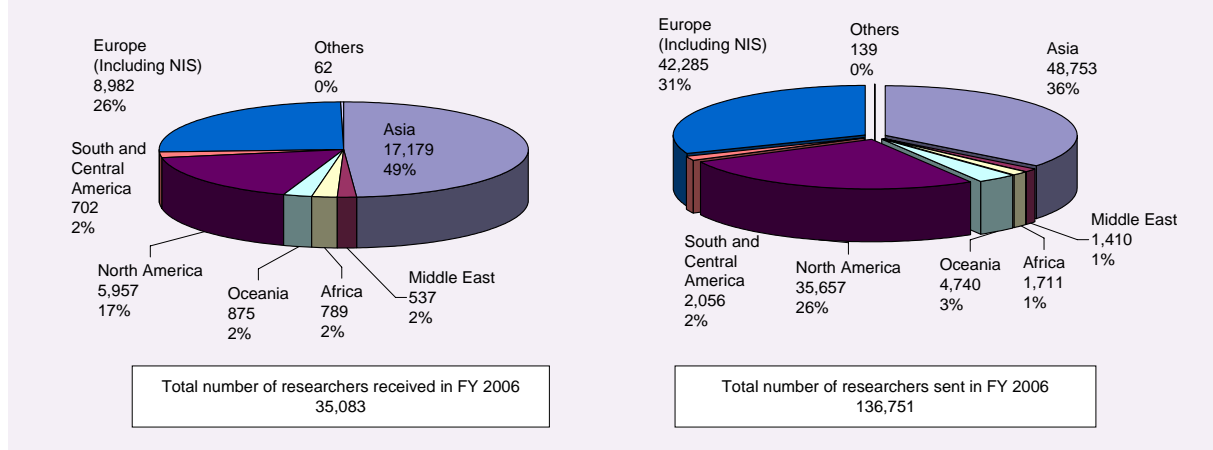


Figure 2-3-30 Researcher Exchanges, by Region



#### (4) Approaches to international projects

##### 1) International Thermonuclear Experiment Reactor (ITER)

The International Thermonuclear Experiment Reactor (ITER) project is a joint international project that aims to demonstrate S&T feasibility of fusion energy through the construction and operation of a nuclear fusion experimental reactor. Currently, seven countries and region are participating: Japan, the EU, US, Russia, China, the Republic of Korea, and India. For details, refer to Part 2, Chapter 2, 5 (1).

##### 2) International Space Station (ISS)

The International Space Station (ISS) project is an international cooperation project intended to construct manned space facilities in orbit around the earth by cooperation of five parties (Japan, the US, Europe, Canada and Russia). As part of this project, Japan develops, operates and utilizes the Japanese Experiment Module (JEM), also known as "KIBO," and develops an unmanned cargo transfer spacecraft H-II Transfer Vehicle (HTV). For details, refer to Part 2, Chapter 2, Section 2, 8 (1).

##### 3) Integrated Ocean Drilling Program (IODP)

The Integrated Ocean Drilling Program (IODP), launched in 2003, is an international program that led by Japan and the US, with 21 participating countries. The Program aims to elucidate earth's environmental change, internal structure of the earth's crust, and deep biosphere in the earth's crust by using multiple drilling platforms including Japan's Deep-sea Drilling Vessel "CHIKYU" which is capable of drilling from the deep ocean floor to 7000 m below the bottom of the ocean, partnered with the non-riser drill-ship supplied and operated by the US as the main drill-ship, with addition of Europe's "mission-specific" drilling technologies.

The "CHIKYU" which was completed in July 2005 implemented the research voyage mission from 2007 to observe the mechanism of causing gigantic Tonankai and Nankai earthquakes in the Sea of Kumano.

##### 4) Large Hadron Collider (LHC)

The Large Hadron Collider (LHC) project is implemented at the European Organization for Nuclear Research (CERN). In its accelerator, a huge circular accelerator whose circumference reaches 27 km, protons are accelerated from two directions almost to the speed of light. The Project aims to find unknown particles in the enormous energy area to be produced when protons

collide, thus exploring and clarifying the internal structure of substances. The construction of the accelerator was completed in 2008 through international cooperation among countries including the CERN member countries, Japan and the US., and its experiments from the fall in 2009 are now prepared.

Japan contributes to promotion of the project including funding for construction of the particle accelerator, anticipating its academic significance as well as its potential to lead the progress in advanced technology.

## 2 Cooperation with Countries Abroad

### (1) Cooperation with Asian countries

#### 1) Cooperation with China and the Republic of Korea

For collaboration with China and the Republic of Korea, the first Trilateral Japan-China-Korea Ministerial Meeting on Science and Technology Cooperation was held in Seoul in January 2007 (from Japan, the then Minister of MEXT, Ibuki attended the meeting). At this meeting, the three countries confirmed the basic principle of attaching importance to their science and technical collaboration in efforts to tackle regional challenges related to the environment, energy, disaster prevention, and infectious diseases.

In addition, with China, along with the visit of the then Prime Minister Fukuda in December 2007, the then Minister of MEXT Tokai and the Minister of the Ministry of Science and Technology (MOST) Wan signed the joint statement on further enhancement of science and technical cooperation intended for climate change issues by the Government of Japan and the Government of the People's Republic of China [literal translation] and the execution agreement on cooperation in the research fields related to magnetic fusion between the Ministry of Education, Culture, Sports, Science and Technology and the Ministry of Science and Technology [literal translation]. Furthermore, the 12th Japan-China Committee of Science and Technology (vice-ministerial-level) was held in Tokyo in February 2008.

Furthermore, with the Republic of Korea, the meeting of directors of Japan-Korea science and technology bureaus was held in Seoul in January 2008 and an agreement was made on collaboration in the life sciences field. The Japan-Republic of Korea Summit Meeting held in January 2009 agreed to enhance cooperation through the Japan-Republic of Korea Committee on Cooperation in Science and Technology. In the meeting between the Minister of State for Science, Technology and Innovation Policy, Noda, and the Minister of the Ministry of Education, Science and Technology (MEST), Ahn, in March 2009, an agreement was made on continuous policy dialogues between CSTP members and the National Science and Technology Council (NSTC).

#### 2) Cooperation with Association of Southeast Asian Nations (ASEAN)

In July 2008, the then Minister of State for Science, Technology and Innovation Policy, Kishida, exchanged views with ASEAN member states by participating in the Informal ASEAN Ministerial Meeting on Science and Technology (IAMMST), held in Manila, the Philippines.

In addition, cooperation among the ASEAN COST Plus Three, which combines ASEAN COST (ASEAN Committee on Science and Technology) with Japan, China, and the Republic of Korea, has been implemented mainly under MEXT's leadership. In November 2008, the 3rd Meeting of ASEAN COST Plus Three (vice-ministerial-level meeting) was held in Kuching, Malaysia and an exchange of opinions was made about future concept of S&T cooperation between Japan and ASEAN. At the same time, a preparatory meeting was held for the establishment of the Japan-ASEAN Cooperation Committee on Science and Technology [literal translation] and an agreement was made on the formal establishment of the committee.

### 3) Cooperation with Asia-Pacific Economic Cooperation (APEC)

With regard to the S&T field, information exchange on S&T project implementation and policies in each country is made at the APEC Industrial Science and Technology Working Group (ISTWG). MEXT participates in the project concerning fostering of S&T-related personnel, etc. which are implemented under the ISTWG framework.

### 4) Cooperation with various countries (major recent activities)

Regarding cooperation with India, support to Japan-India joint research in ICT fields was started in FY 2007 as a result of the Japan-India Science and Technology Initiative Meeting held in Tokyo in 2006 under the joint co-sponsorship of MEXT and MOFA.

Regarding the implementation of research exchange, the Japanese and Thai governments agreed in the field of biotechnology, and with Singapore, in the functional application-related field of physical science from FY 2009.

### 5) Project based cooperation

#### (Cooperation of the space field in the Asia region)

From FY 1993, Japan has hosted the Asia-Pacific Regional Space Agency Forum (APRSAF) for the purpose of promoting cooperation on the development and utilization of space technology and has implemented the various projects agreed upon in APRSAF.

In order to deal with the growing incidence of large-scale natural disasters in the Asia region, satellite-based disaster surveillance system that is not affected by ground-level conditions works effectively. To this end, the Sentinel Asia project provides and shares information on disaster-hit areas by using satellite images on the internet. Japan leads the project by executing emergency observation of disaster-hit areas by using the Advanced Land Observing Satellite "DAICHI" (ALOS) to provide images.

Under Japan's initiative, the two projects were agreed upon in December 2008: the Space Applications for Environment (SAFE) project to monitor the environmental change and the Satellite Technology for the Asia-Pacific Region (STAR) project to support satellite development to be implemented by developing countries in Asia and the Pacific Ocean region for the purpose of fostering personnel, thus expanding cooperation activities.

#### (Program to establish centers for research concerning emerging and re-emerging infectious diseases)

Japan promotes research concerning emerging and re-emerging infectious diseases at research centers established in countries where outbreaks of such diseases had occurred or are expected to occur (Thailand, Vietnam, China, Indonesia, and India), as well as at domestic research centers. Japan is also engaged in accumulation of knowledge and human resource development in this regard.

### (2) Cooperation with European countries and the US

Cooperative activities such as holding joint committee meetings based on bilateral science and technology cooperation agreements with European countries and North America are actively being carried out in order to resolve common challenges faced by advanced countries, including those in the life sciences, nanotechnology and materials, environmental sciences, nuclear energy, and space development. As for the US, in accordance with Agreement between the Government of Japan and the government of the US on Cooperation in Research and Development in Science and Technology, the 10th meeting of the Joint High Level Committee on Science and Technology

was held in May 2006. From Japan, the Minister of State for Science and Technology Policy and the Minister of MEXT attended this meeting. In addition, Japan sponsored the 12th meeting of the Japan-US Joint Working Level Committee in Tokyo in July 2007.

Elsewhere, there are joint committees and consultations on S&T with the UK, Germany, France, Italy, Sweden, Finland, Norway, Netherlands, Switzerland, Russia, Poland, the Czech Republic, Hungary, etc. based on science and technology cooperation agreements. (Japan concluded international agreements, including science and technology cooperation agreements, with 43 nations around the world.) In February 2009, the initialling of the Japan-EC<sup>1</sup> Science and Technology Cooperation Agreement took place after negotiating between them.

### (3) Cooperation with African countries

At the Japan-Africa Science and Technology Ministers' Meeting, held in October 2008, Japan and African countries reaffirmed that S&T was important in solving various problems facing African countries and decided to deepen mutual understanding in the S&T field and to expand S&T cooperation.

### (4) Cooperation with other countries

In relations with Australia, Israel, Republic of South Africa, Brazil, and other countries, under the science and technology cooperation agreements, partnership is enhanced 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 (e.g., New Zealand) with which Japan has not signed an agreement.

## 3 Systematic Efforts for International Activities

Science and technology create intellectual property that can be shared by humankind and contribute to resolving various global-scale problems. Conducting S&T activities across national borders is important for Japan as it seeks to play a proactive role in the international community and contribute to further development of the country's S&T. Therefore, the government promotes international collaboration both within multilateral frameworks, such as OECD, on a bilateral basis in light of the needs of the partner countries and the level of S&T.

### (1) The Group of Eight Summit

At the G8 Hokkaido Toyako Summit held in July 2008, World Economy, Environment and Climate Change, Development and Africa, and Political Issues were discussed as main topics. With regard to environment and climate change, G8 leaders compiled the Leaders Declaration seeking that the entire world share and adopt the goal of achieving at least 50% reduction of global emissions throughout the world by 2050. In addition, sectoral approaches proposed by Japan were recognized as useful tools for achieving national emission reduction objectives, etc. With respect to the Development and Africa topic, the summit documents also described the importance of science and technology.

### (2) The G8 Science and Technology Ministers' Meeting

Before the G8 Hokkaido Toyako Summit, the first G8 Science and Technology Ministers' Meeting was held in Okinawa in June 2008. G8 ministers met for the first time to discuss how to

<sup>1</sup> EC (European Community): In EU, the European Community is acting as the main organization for concluding treaties.

contribute to our societies by utilizing science and technology. From Japan, the Minister of State for Science, Technology and Innovation Policy attended. The discussions focused on the three themes: (1) Approaches to the Solution of Global Issues through International Cooperation (Research and Development for the Realization of a Low-Carbon Society), (2) Science and Technology Cooperation with African Countries and Other Developing Countries, and (3) Cooperation in Research and Development Resources. At the meeting, the attendees acknowledged the importance of new and innovative technologies in order to achieve a low-carbon society and reached the consensus of opinion that each country should enhance R&D in this field.

### **(3) United Nations (UN)**

The United Nations takes measures regarding the prevention of disasters and observing the earth in the S&T field. Japan especially participates and cooperates in various science projects and activities of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) which is the specialized agency of UN.

UNESCO implements activities to resolve global-scale problems and establishes international rules through the International Hydrological Program (IHP), the Intergovernmental Oceanographic Commission (IOC), and the International Bioethics Committee (IBC), etc. Japan promotes UNESCO activities by implementing human resources development projects in the S&T fields in the Asia-Pacific region and by dispatching experts to commissions to participate in discussions through the contribution of the trust fund of UNESCO.

### **(4) Organization for Economic Co-operation and Development (OECD)**

OECD works through its Council at Ministerial Level; Committee for Scientific and Technological Policy (CSTP); Committee for Information, Computer and Communications Policy (ICCP); Committee on Industry, Innovation and Entrepreneurship (CIIE); Committee for Agriculture (AGR); Environment Policy Committee (EPOC); Nuclear Energy Agency (NEA); International Energy Agency (IEA); and others to engage in S&T activities, including the exchange of opinions, experiences, information and personnel between the member countries, preparation of statistical information and implementation of joint research.

In 2007, the Council at Ministerial Level decided to establish the OECD Innovation Strategy and promotes efforts across organizations.

In addition, under CSTP, there are six subgroups: Global Science Forum (GSF); Research Institutions and Human Resources (RIHR); Working Party on Innovation and Technology Policy (TIP); Working Party on Biotechnology (WPB); Working Party on Nanotechnology (WPN); and Working Party of National Experts on Science and Technology Indicators (NESTI). Representative activities of these subgroups under the leadership of Japan are as follows:

#### **1) Global Science Forum (GSF)**

GSF was established as a forum for S&T policymakers to exchange opinions and make recommendations concerning important issues in the S&T sector that require international cooperation and concerted action. Taking the falsified thesis data issues in countries in the world as an opportunity, discussions are being held on subjects that are of concern throughout the world, including approaches to prevention of inappropriate scientific activities and formulation of road maps of large research facilities.



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

TIP sets out its major purposes to be enhancement of productivity, promotion of creation and utilization of knowledge, and cultivation of sustainable growth. In FY 2008, TIP conducted discussions and case studies on R&D tax system, impacts of public research on economic society, globalization and open innovation, intellectual property right system, and the evaluation on innovation policies.

## 3) Working Party of National Experts on Science and Technology Indicators (NESTI)

NESTI was established mainly to conduct adjustments and provide advice concerning S&T-related statistics provided to CSTP. It sponsors discussions and examination regarding frameworks for international comparison, investigation methods, and the development of S&T indexes, such as those concerning research expenses and human resources, as well as the development of such indexes. Japan participated in NESTI as a bureau member country and contributed to activities including the preliminary survey on patent usage by private and public research institutions. Japan also dispatches experts to the NESTI bureau and works on development of new S&T indexes in the fields of analysis of nanotechnology patents and the measurement of science linkage.

## (5) Human Frontier Science Program (HFSP)

HFSP is an international research aid program that was proposed by Japan at the Venice Summit in June 1987 with the aim of promoting basic international joint research focused on elucidation of complex mechanisms of living organisms. With the addition of Norway joined this program in 2008, HFSP is now operated by a total of 14 countries and region, including Japan, US, France, Germany, EU, UK, Switzerland, Canada, Italy, Australia, the Republic of Korea, New Zealand, India, and Norway. The Program provides grant of research expenses for international joint research teams, grant of travel expenses, accommodation, and other expenses for young researchers conducting research abroad, and organizes meetings of HFSP grant recipients. With a total of 13 HFSP research-expense grant recipients having been awarded the Nobel Prize as of FY 2008, the program has been highly acclaimed worldwide. Japan has actively supported the program since its inception.

## (6) International Science and Technology Center (ISTC)

In March 1994, four countries and region, namely, Japan, US, EU, and Russia established ISTC in order to promote the peaceful utilization of researchers who were engaged in the development of weapons of mass destruction in the former Soviet Union countries, and to support the move to market economies. As of December 2008, the total amount of the support funds earmarked for approved projects totals about 814.6 million US dollars, and the number of the engaged researchers is more than 97 thousand. Fifteen years have passed since its establishment and discussions on the role and significance of ISTC are being held.

## (7) International activities conducted by SCJ

On behalf of Japan, SCJ participates in 48 international scientific organizations, including the International Council for Science (ICSU<sup>1</sup>) and the Inter Academy Panel on International Issues

<sup>1</sup> ICSU: Established in 1931 as a non-governmental and non-profitable international academic institution aiming for promotion of international activities in science and applied fields thereof for the benefit of mankind.

(IAP<sup>1</sup>). SCJ strives for cooperation with various countries by actively taking part in international academic cooperative projects, including the International Geosphere-Biosphere Programme (IGBP<sup>2</sup>).

In addition, since 2005, SCJ has been participating in the issuance of joint statements released by science councils of the G-8 countries from a scientific viewpoint with regard to the agendas of annual G-8 summits. For FY 2007, SCJ issued a joint declaration with science councils of the G-8 countries and other nations concerned (China, India, Brazil, South Africa and Mexico) regarding “energy efficiency and climate protection” and “innovation”, which were major agenda items in May at the G-8 summit held in Heiligendamm in Germany, and the council’s chairman handed the joint declaration to the Japanese Prime Minister in June. In FY 2008, the councils held a meeting in Tokyo on March 17 and 18, 2008 toward holding of the G8 summit in Japan. Further, the councils hold an annual international symposium for resolving global-scale problems with participation of researchers in broad fields from various countries. In September 2007, SCJ held a symposium titled International Conference on Science and Technology for Sustainability 2007: International Cooperation for Development at SCJ.

Furthermore, the Science Council of Asia (SCA), which comprises science councils of 11 Asian countries, with a view to promoting collaboration among Asian countries in academic fields, held the 7th conference with “Energy and Environment” as the main theme in June 2007. In this conference, two joint declarations “Energy and Environment” and “The Future of the SCA” were adopted.

#### **(8) Other systematic efforts for international activities**

The Cabinet Office, with a view to strategically promote international S&T activities, held a Science and Technology Ministers’ Round Table Meeting in October 2008 with the participation of relevant ministers from 31 countries. In addition, the Cabinet Office proactively executed bilateral policy dialogues.

<sup>1</sup> IAP: Established in 1995 as a forum of the world science academy. SCJ assumed the position of the executive committee member from 2006 to 2009.

<sup>2</sup> IGBP: A cross-disciplinary international research project hosted by ICSU. This was established in 1986 and provides international and cross-disciplinary frameworks for executing science projects concerning global changes.