

## Chapter 5 Development and Promotion of Policy in Collaboration with Society

### Section 1 Deepening the Relations between Society and Science, and Technology and Innovation

While the recent progress of S&T has raised the public expectations for S&T, the GEJE and the accident at the Tokyo Electric Fukushima Daiichi Nuclear Power Station have revealed insufficient risk management and increased the anxiety and distrust of the general public in regard to S&T. When planning and conducting STI policies, it is important that the government, in collaboration with researchers, engineers, and research institutions, gain the citizens' understanding, trust and support, by carefully considering the expectations and anxieties of society and the general public and by explaining the possibilities, risks and costs of S&T to the general public. Thus, the government is making efforts to promote S&T communication activities, including risk communication and public participation in the policy process in order to deepen the relationship between society and STI.

When promoting measures based on the 4th Basic Plan of the Council for the Science and Technology (CST) Basic Plan Promotion Committee, MEXT reviewed issues to be considered from the viewpoint of “deepening the relationship between society and STI” and summarized the “Discussions Summary on Promotion of STI Policies that Respond to Social Demands” in November, 2012.

#### 1 Promotion of STI Policies from the Public Viewpoint

##### (1) Further involvement of the public in policy planning and promotion

To make economically and socially valuable STI policies, when planning and promoting policies, the government needs to accurately understand the issues and the social needs that are to be addressed, and to appropriately reflect them in policy. It is also important for the government to disseminate these policies to all levels of the general public and to make efforts to strengthen accountability. Accordingly, the government promotes the implementation of public comment procedures and wide involvement of the public in policy planning and promotion.

The Action Plan created in the process of the 2013 S&T budget preparation was reviewed in the Science, Technology and Innovation (STI) Strategy Councils (provisional), a diverse group of people from industry, academia and government that ensures opinions from concerned citizens are widely reflected at the stage of policy planning.

##### (2) Response to ethical, legal and social issues

As S&T progresses and become more complex and diversified, the relationship between S&T and the general public has continuously deepened— in ethical, legal and social terms— due to misconduct such as fabrication, falsification, or the plagiarism (FFP) of data in research activities and other aspects of advanced science, technology and bioethics. Thus, the government promotes the following measures:

1) Establishment of ethics among researchers and engineers

Based on the “Guidelines for Countermeasures against Misconduct in Research Activities by the Competitive Research Fund (September 2005 Agreement in the Liaison Committee of Ministries and Agencies Concerned with Competitive Funding), which stipulates measures are to be taken when misconduct such as fabrication or plagiarism in research is revealed, MEXT, METI, and other relevant ministries have requested that all organizations concerned take appropriate measures, and these agencies have also simultaneously established a reception desk to process all accusations of misconduct. In addition, in October 2012, these guidelines were revised to promote proper penalties when misconduct is revealed.

2) Efforts in relation to bioethics and safety in the life sciences

To adequately deal with problems on bioethics that could occur as a result of the rapid growth that has occurred in the life sciences over recent years, the CSTP is implementing surveys and studies on important issues, and MEXT and MHLW will also review any necessary acts, regulations, and guidelines (refer to Part 2, Chapter 2, Section 3, 2).

(3) Fostering and securing human resources connecting society with STI policies

Human resources who bridge society and STI play an important role in the government’s efforts to implement effective STI policies. The government promotes fostering and securing human resources who play these roles and promotes increasing the number of opportunities for their activities.

1) Science and technology communicators

To develop S&T with the general public, it is necessary to promote the fostering and securing of “S&T communicators” to bridge the gap between the general public, policy makers and researchers, and to promote communication between them.

The National Museum of Emerging Science and Innovation, run by the Japan Science and Technology Agency, makes efforts to foster and produce S&T communicators, who work both inside and outside of the museum through S&T communication activities, such as conducting dialogues with visitors, and planning and producing exhibitions and events (refer to Part 2, Chapter 5, Section 1, 2). The National Science Museum also engages in activities to train S&T communicators (refer to Part 2, Chapter 5, Section 1, 2).

2) Establishment of systems to foster and secure University Research Administrators

Universities and research institutions in Japan have insufficient human resources who can conduct research management, while also understanding the contents of research and development at their specified level. This imposes excessive burdens on researchers because of the tasks they need to do in addition to their research activities. To improve this situation, MEXT supports fostering and securing human resources who can conduct research management (University Research Administrator) at universities, with the aim of establishing an environment that both activates and enhances research activities as well as research and development management at universities.

## 2 Promotion of S&T Communication Activities

In order to create a society where the general public is familiar with and has a strong interest in S&T, it is necessary for the government to provide various opportunities for the general public to touch, experience, and learn S&T by promoting interactive communication between researchers, engineers and the citizens.

(Science and technology week)

MEXT, in cooperation with other relevant organizations, including experimental research institutions and local authorities, held the 53rd “Science and Technology Week” from April 16 to 22, 2012. During this week, various events, including opening research facilities to the general public, performing experiments in classrooms and giving lectures, took place at relevant organizations across the country. At the same time, a “Science Café<sup>1</sup>,” where researchers and citizens could casually talk over a cup of tea was held in the “Joho-Hiroba (Information Plaza) of MEXT.”

(Enhancement of activities conducted by science museums)

The Japan Science and Technology Agency supports experimental classes, events and the establishment of networks by science museums, universities, local authorities and volunteer groups, to promote S&T communication activities nationwide. The National Museum of Emerging Science and Innovation, in addition to planning and conducting seminars and events, fosters an exchange between researchers and the general public through lectures and the creation of exhibitions to introduce advanced S&T in an easy-to-understand manner. It also encourages collaboration among science museums and schools across the country as the basis of Japan’s S&T communication activities.

The National Science Museum Exhibition holds exhibitions that provide opportunities to share the joys of nature and science across generations and allows them to think together. It also conducts learning support that corresponds to the characteristics of users, by utilizing intellectual, material and human resources, including research results and sample materials accumulated by the national center of natural history and S&T history. The Museum engages in fostering human resources who connect people with S&T, such as the “Science Communicators Practical Training Program.” The Museum also encourages scientific experimental study programs developed for schools across the country through events such as the “Museum Open House for Teachers” and through programs to improve science literacy for all generations.

(Efforts of research agencies)

The Japan Aerospace Exploration Agency (JAXA) provides various educational activities such as “Cosmic Collage” with the aim of getting the young people who will lead the next generation more interested in S&T as a whole, including space science.

RIKEN conducts various outreach activities, such as “Riken DAY: Let’s Talk with Researchers (provisional),” where the general public and researchers can talk about science.

<sup>1</sup> An opportunity for scientists and general citizens, acting as equals, to engage in a dialogue on research results and trends in various academic fields, including the role of scientists in society.

MAFF provides producers and consumers with information and opportunities to exchange opinions on the research and development of advanced technology in the fields of agriculture, forestry and fisheries. These independent, administrative experimental research institutions open their facilities to the public and provide lectures on dissemination throughout the year, helping to raise awareness by introducing research activities and exhibiting research results.

The National Institute of Advanced Industrial Science and Technology (AIST) operates the Science Square Tsukuba/Waterfront and the Geological Museum as permanent exhibition facilities. In 2012, its research bases were opened to the public in nine places nationwide and more than 15,000 people visited the research facilities. In addition, with the aim of establishing interactive communication with the public, AIST actively promotes S&T communication programs focusing on dialogue. It does so through events such as the Science Cafés, experimental classrooms, lectures and the “AIST Open Laboratory.”

Universities and public research institutions make efforts to widely disseminate information on research results to the general public.

To promote the development of S&T communication, the cabinet office held the “Science and Technology FESTA” at the Kyoto Pulse Plaza in March 2012, and it provided opportunities for dialogue with prominent scientists, science classes, and S&T exhibitions, mainly for young people and children.

The Council for Science and Technology Policy (CSTP) summarized a policy on the “Promotion of the 'Dialog on Science and Technology with Citizens' (A Basic Course of Action)” in June 2010. In this policy, CSTP encourages researchers who receive public research funds to allocate 30 million yen or more per year, per research project, to actively engage in dialogue with the public regarding the contents and the results of their research activities.

(Efforts of the Science Council of Japan and academic societies)

The Science Council of Japan (SCJ) holds the academic forum as a way to share academic results with the general public. In 2012, it was held twelve times under a wide range of themes, including such topics as, “Now, Confident Steps towards Reconstruction – Consider Energy Policy and Reconstruction of Industry after the GEJE (provisional),” “Protecting Life and Land from Large-scale Disasters” and “For the Realization of 'Responsible Research Activities' (provisional).” Furthermore, a Science Café was also held six times in 2012.

The academic society is a voluntary association organized mainly by researchers in universities and other research institutions; it plays an important role as a place for research evaluation, information exchange, and communication beyond that of individual research organizations. It largely contributes to the development of academic research through academic research meetings, seminars and symposiums that disseminate the latest results from excellent research and the publications of academic journals. Through programs such as the “Grant in Aid of Publication of Scientific Research Results,” MEXT subsidizes international conferences held by academic societies that invite researchers from overseas, and holds symposiums in order to raise awareness of the latest research results and to disseminate those results to children, young people and adults, as well as to various periodical academic publications.

(Promotion of risk communication)

The Japan Science and Technology Agency (JST) held the “Science Agora 2012” from November 10 to 11, 2012 and held symposiums and talks on risk issues under the main theme, “Finding a good relationship between you and science.” Also, JST supported activities to establish and develop a communication network for assessing risks in science and technology, conducted by Hokkaido University and Kyoto University.

The Consumer Affairs Agency (CAA), the Food Safety Commission, MHLW, and MAFF conduct risk communication activities for food safety. As a result of the first case of BSE found in 2001, the 2003 Basic Food Safety Act was enacted, declaring these activities to be the responsibility of the Nation. Opinion exchange meetings are held regarding various themes, including the prevention of food poisoning, as well as the safety of imported food products, functional foods, food additives and pesticide residues. In particular, since 2011, and in response to the accident at the TEPCO Fukushima Daiichi NPS, the Ministries and agencies concerned have worked in collaboration to hold opinion exchange meetings regarding countermeasures against radioactive substances.

## Section 2 Promotion of Effective STI policies

The 4<sup>th</sup> Basic Plan positions STI policies as a part of its “policies for society and the general public,” and it promotes the planning of policies based on objective evidence, establishment of the PDCA cycle, and innovation of the R&D system

### 1 Strengthening of Planning and Promotion of Policies

(Studies for “Reinforcing headquarter functions of CSTP”)

The Cabinet Office submitted to the 181<sup>st</sup> Diet a “bill for partial amendment of the Act for the Establishment of the Cabinet Office,” which calls for a reorganization of the CSTP and the establishment of a Council for Science, Technology, and Innovation”; however, it failed to pass because the lower house was dissolved.

With the inauguration of the Abe Cabinet in December 2012, Prime Minister Abe offered the direction that will allow Japan to build the “world’s most innovation friendly country.” The Council for Science and Technology Policy served as the control tower for this in his policy speech (February 28, 2013).

In the CSTP meeting on March 1, 2013, three action items that need to be addressed by the middle of 2013 were specified: 1) the formulation of a comprehensive science, technology and innovation strategy, 2) the consideration of policies that have to be included in the growth strategy, and 3) the consideration of measures to fundamentally reinforce the CSTP as a locus of control. Reviews are currently being conducted.

(Strategic funds for the promotion of S&T)

Strategic funds for the promotion of S&T<sup>1</sup> are used for necessary measures taken to implement planned policies based on a comprehensive review of measures taken by ministries and agencies, and by

<sup>1</sup> Created by the government to strategically promote STI policy in 2011

the CSTP. MEXT performs administrative work in accordance with the policies made by the CSTP. In 2012, the CSTP promoted activities focusing on collaborative measures between ministries and agencies, including activities that are difficult to individually address within each ministry and agency, and activities to reform the social system, such as regulations surrounding S&T. In addition, in response to the issues regarding radioactive substances released by the Accident at the TEPCO Fukushima Daiichi NPS, MEXT flexibly promoted “urgent investigations and research to establish measures to reduce the transfer of radioactive substances to agricultural products,” and “urgent investigation research to clarify contamination sources and the contamination routes of fish contaminated with high-level radioactive cesium.”

(Science for RE-designing Science, Technology and Innovation Policy: (SciREX) program)

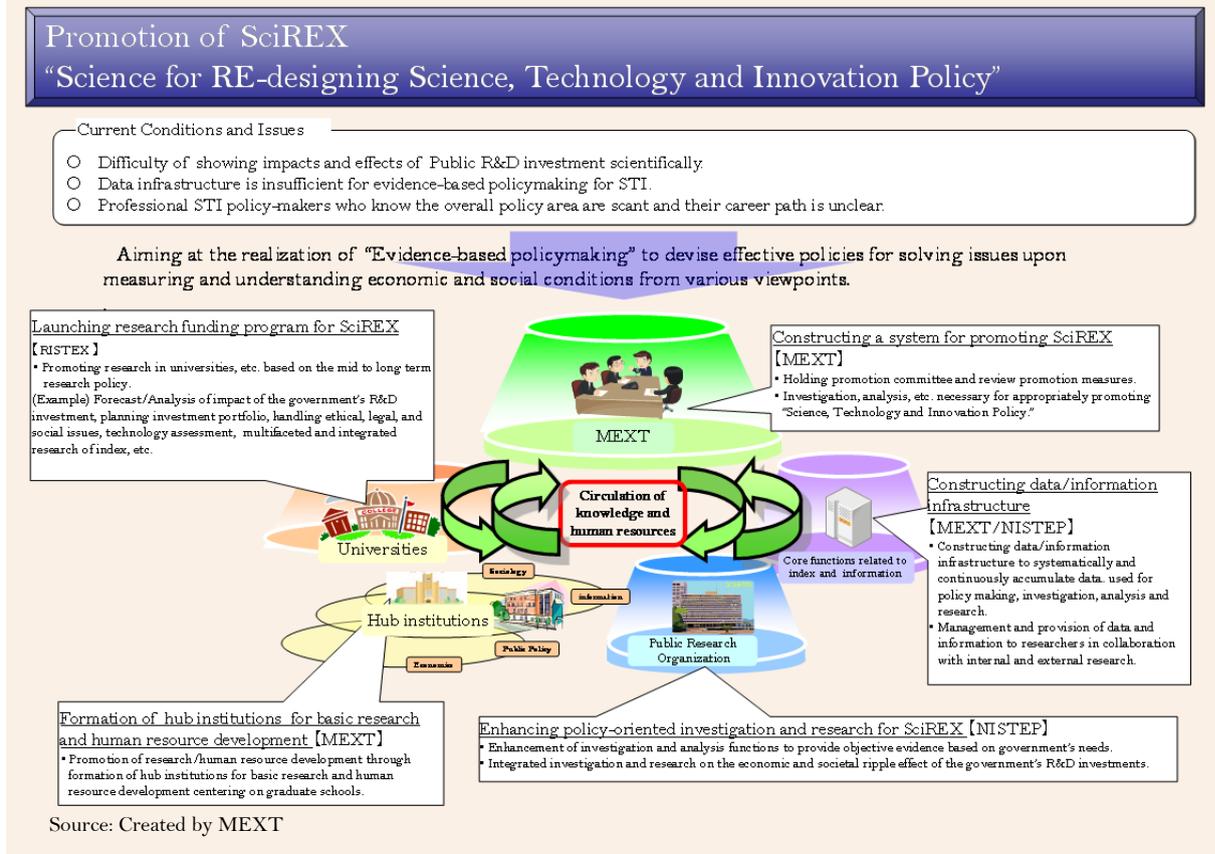
MEXT, in cooperation with the National Institute of Science and Technology Policy (NISTEP), the Research Institute of Science and Technology for Society (RISTEX), and the Center for Research and Development Strategy (CRDS) has implemented the “SciREX” program, which is aimed at realizing “objective, evidence-based policy making,” and where effective policies are made to respond to issues, drawing on a multifaceted grasp and analysis of economic, social and other factors (Figure 2-5-1). MEXT promotes the program by holding the “SciREX Steering Committee,” which integrates programs as a whole and gives advice on basic procedures for carrying out the programs, as well as giving advice on other issues that affect each program.

MEXT supports hub institutions (universities) fostering research personnel who can advance the “SciREX” and human resources who can facilitate its social implementation. MEXT has also established a network structure that joins hub institutions in order to enable nationwide, systematic human resource development. In 2012, National Graduate Institute for Policy Studies, the University of Tokyo, Hitotsubashi University, Osaka University (Kyoto University), and Kyushu University made preparations including the development of curricula and will begin accepting students in 2013.

The NISTEP conducts investigations and analysis based on government needs, such as the investigation and research of economic and societal ripple effects caused by government R&D investments. In addition, it has been constructing data and informational infrastructure to systematically and continuously manage and accumulate the data used for policy making, investigation, analysis, and research concerning STI.

The RISTEX aims to contribute to mid-term the long-term policy-making, and it considers various viewpoints in order to understand and analyzes social issues, and to assess the present situation and possibilities of S&T required to deal with those issues. Based on this evidence, RISTEX supports activities to research and to develop measures and indices, as well as activities to develop policies through rational processes and through public projects. In 2012, RISTEX adopted five R&D projects and two project-planning investigations out of 43 entries, and promoted the R&D of them in addition to six other R&D projects that were adopted in 2011.

Figure 2-5-1/ Promotion of Science for RE-Designing Science, Technology and Innovation Policy



## 2 Enhancement of the Assessment and Allocation Functions in the Research-fund

### (1) System reform for the effective and efficient assessment and allocation of research funds

Based on the Basic Policy<sup>1</sup>, which states “the competitive fund systems that have a similar purpose or subject of R&D will be consolidated within or across government ministries and agencies,” MEXT promotes efficient R&D by consolidating all systems into five systems, including the Grants-in-Aid for Scientific Research Program (KAKENHI).

In order for research funds to be effective and convenient to use, and based on the “2011 Action Plans” (July 2010), efforts to unify, streamline, and rationalize rules for the use of competitive funds are being made in all relevant ministries, agencies and fund-distribution organizations. In 2012, the format of documents required for carry-over was integrated throughout all of the competitive funds that were allocated by the government—with the exception of KAKENHI, which had already been streamlined—in order to reduce the burden of carry-over procedures. In addition, MEXT improved a rule so that multiple research funds can be combined to purchase the devices and equipment required for R&D.

### (2) Improvement and enhancement of the competitive fund system

The competitive fund system is a core research fund system for the establishment of a competitive

1 The report on Consultation No. 11 “Japan’s Science and Technology Basic Policy Report” requested to CSTP (December 24, 2010).

research environment and for the consistent development and ongoing commitment of researchers to various and creative R&D activities. Until now, efforts have been made to secure budgets and to improve and enhance the system (Budget in 2012: 425.5 billion yen. [Table 2-5-2](#)).

Concerning indirect costs, in the competitive fund system, in an attempt to promote competitiveness among research institutions, a fixed percentage of the research grant is allocated to institutions that employ researchers who have won competitive funds. The government has also been striving to implement action for securing 30% of the direct costs.

Regarding R&D management work, including issuing invitations to the public and the application of competitive funds, the “cross-ministerial research and development management system (e-Rad)” (hereinafter referred to as “e-Rad”) is used to improve the convenience of researchers and to avoid illogical overlaps and the excessive concentration of fund allocations. In January 2013, five years after starting the operation, a new system was begun, mainly to improve aging equipment and to enhance the functions necessary for improving user convenience. The new system allows users to display information entered into a public database with e-Rad, and to modify it to create a summary document of each researcher’s career and achievements, which improves the efficiency of users’ applications and the management of their work in regard to requesting research funds.

In order to ensure the fair, transparent, and high-quality examination and evaluation of research proposals, the government ensures diversity in the age, gender and affiliation of examiners. It also aims to eliminate stakeholders, to develop an examiner-evaluation system, to specify methods and criteria for examination and adoption, and to disclose examination results.

For example, the examination of KAKENHI applications is done via a process of peer review that is conducted by more than 6,000 examiners. JSPS selects examiners by carefully avoiding too much concentration on certain research organizations and by considering the aggressive promotion of both young researchers and female researchers; this is done by using the database of examiner candidates, which contained 65,000 registered names as of 2011. The disclosure of examination results and associated information has been improved year by year. In addition to numerical information, such as roughly ranking all of the unsuccessful research subjects and the average score of each evaluation element, there are detailed items in each evaluation element that examiners have judged as being inadequate that are disclosed through the Electronic Application System for Grants-in-Aid for Scientific Research in order to give the applicants a more detailed evaluation of the results. In the “Analytical Report for 2010 Expert Survey on Japanese S&T Systems and S&T Activities by Field” (May 2011, National Institute of Science and Technology Policy), the examination of KAKENHI is evaluated as being “fair and highly transparent for applicants.”

As for measures to prevent the inappropriate use of competitive funds and other public research funds, the CSTP provided common “measures to prevent the inappropriate use of research funds” (August 31, 2006) and MEXT created implementation standards as listed in its, “Guidelines for Management and Audit of Public Research Funds at Research Institutions (implementation standards)” (February 15, 2007) (hereinafter referred to as “Guidelines”), which called for research institutions to establish necessary systems for the implementation of appropriate management and for the audit of public research funds.

MEXT assessed and analyzed the implementation status of the system through a “Self-Assessment

Checklist on the Improvement of the System and Other Matters” submitted by research institutions and as a result of on-site investigations, and it disclosed a summary report to the public. Also, measures were taken to prevent the fraudulent use of funds, including seminars for research institutions. In addition, since 2012, MEXT has promoted the improvement and enhancement of proactive activities in research institutions regarding the management and auditing system for public research funds, and has conducted an “Investigation of the implementation status of the guidelines” which covers instructions for the improvements and the implementation of step-by-step correction measures stated in the Guidelines.

In October 2012, the liaison meeting of related offices and ministries on competitive funds revised the “Guidelines on the Proper Implementation of Competitive Funds” in which penalties were revised, including strengthening the restrictions on application eligibility for a person who has spent funds for private purposes.

Table 2-5-2 / List of Competitive Funds

Ministry /Agency	Sponsor	Program	Responsibilities of Each Program	FY 2011 Budget (Unit: million yen)	FY 2012 Budget (Unit: million yen)
CAO	Food Safety Commission	Research and Development Programs for Food Safety Risk Assessments	To implement relevant studies and research for setting forth guidelines and standards on risk assessments through a “research-area setting type (provisional).” To manage a competitive funds system where proposals are publicly invited after research areas are set. To promote science-based risk assessments for food safety.	242	211
Cabinet Office, Government of Japan Subtotal				242	211
MIC	MIC	Strategic Information and Communications R&D Promotion Program (SCOPE) (*1)	To publicly invite proposals for unique and novel research subjects in the field of information and communications technologies from various fields, including universities, incorporated administrative agencies, corporations and research institutions managed by local authorities, and to offer contract research to the institutions after competitive selection by an external evaluation committee so that the aforementioned parties can implement the research of advanced technology with self-direction.	1,654	2,340
	MIC	Promotion Program for Reducing Global Environmental Load through ICT Innovation	To promote R&D from ICT seeds in order to create ICT innovation, realizing significant reduction in CO <sub>2</sub> emission. Excellent projects were selected by an external evaluation committee from among publicly invited proposals, and the R&D was implemented intensively during the period of the first committee of the Kyoto Protocol.	868	-
	MIC	Strategic International Collaborative R&D Promotion Program	To promote international collaborative R&D as conducted by Japanese research institutions and overseas research institutions. This is done for the purpose of accelerating international standardization, for accelerating the practical use of achievements in R&D, for contributing to the further creation of innovation, for the strengthening of the international competitiveness of Japan, and for improving the safety and reliability of people’s daily lives, as well as that of the society and of the economy, etc.	-	100
	MIC	R&D of Technologies for Resolving Digital Divide.	To enhance communications and broadcasting services for the elderly and for the disabled by offering policy support for the R&D of technologies useful for them.	-	77

	National Institute of Information and Communications Technology	Grants to Subsidize Advanced Technology Development for Pioneering New Communications and Broadcasting Areas (*2)	To create new businesses in the communications and broadcasting areas by offering policy support for the R&D of creative technologies that promote international R&D collaboration, and for international standardization by international joint-research teams.	151	74
	Fire and Disaster Management Agency	Promotion Program for Fire and Disaster Prevention Technologies	To facilitate R&D that will develop innovative and practical fire and disaster prevention technologies and that will use those technologies in order to broadly invite proposals from people engaged in R&D from industry, academia, government, universities, private sectors, research corporations, and Fire-Defense Headquarters. This program was established in 2003.	159	208
Ministry of Internal Affairs and Communications Subtotal				2,832	2,799
MEXT	MEXT/JSPS	Grants-in-Aid for Scientific Research (KAKENHI)	The Grants-in-Aid for Scientific Research aims to advance academic research, (including research based on researcher's creative ideas, basic research and applied research) across all fields, including the humanities and social sciences as well as the natural sciences. The program supports creative and pioneering research that will support the foundation of a rich society.	263,300 (Grants allocated to researchers 220,363 (*3))	256,610 (Grants allocated to researchers 230,690 (*3))
	JST	Strategic Basic Research Programs	To create a timed-research system beyond the frame of organizations (virtual institutes) and in line with the policy set by the government as based on social and economic needs, and to promote R&D for the creation of new technology contributing to important issues.	56,749	54,544
	JST	Industry-Academia Collaborative R&D Programs	To promote R&D utilizing intellectual properties, including R&D conducted by selected companies and universities (researchers) and R&D utilizing a platform conducted by multiple academic researchers and the industry, in order to create innovation by promoting the practical application of academic research output through collaboration between industry and academia.	22,895	24,037
	JST	International Collaborative Research Program	To promote international research partnerships with developing countries to address global challenges in the fields of environment and energy, natural disaster prevention, infectious diseases control, and bioresources; to strategically promote international joint research in cutting-edge science and technology fields with other developed countries and regions including Europe and the U.S., and with a growing Asia, under equal partnerships (fifty-fifty cooperative relationships) based on intergovernmental agreements.	2,877	3,142
	MEXT	R&D Promotion for National Issues (*4)	A competitive fund used to adopt excellent proposals for research activities targeted for implementation by the government, with a view to realizing S&T policies.	20,436	19,136
Ministry of Education, Culture, Sports, Science and Technology Subtotal				366,257	357,469

	MHLW	Health and Labour Sciences Research Grants	To manage creative or pioneering research and other issues that face strong social demands, to form a creative research environment and to promote health and labour sciences research, to maintain the scientific promotion of administrative policies regarding health-care, welfare, environmental health, and industrial health and safety, and to enhance their technical level.	37,551	38,205
MHLW	Pharmaceuticals and Medical Devices Agency	Grants for Promoting the Development of Orphan Drug and Orphan Medical Devices	To support research activities and to disseminate the results regarding R&D on difficult-to-treat diseases and rare diseases (and others in which it is relatively difficult for companies to conduct R&D proactively due to high risk), and to pioneer research using innovative technology and methods.	-	3,749 (*5)
	Pharmaceuticals and Medical Devices Agency	Program for Promotion of Fundamental Studies in Health Sciences	To promote research and to establish a broad technical foundation for the development and discovery of innovative medicines based on the seeds and know-how of universities and public research institutions while aiming at improving the nation's health-care level.	4,599	-
Ministry of Health, Labour, and Welfare Subtotal				42,150	41,954
	MAFF	Research and Development Projects for Application in Promoting New Policy of Agriculture, Forestry and Fisheries	By gathering research capabilities from industry, academia and the government and by utilizing the technology seeds from various fields to attain the goal of "raising Japan's food self-sufficiency ratio (50% by 2020)" as positioned in the "the Basic Plan for Food, Agriculture and Rural Areas" (Cabinet decision, March 30, 2010), MAFF promotes the development of technologies of practical use that will quickly solve the technical problems of production in the agriculture, forestry, fishing, and food industries and the relevant distribution and processing fields.	5,151	3,820
MAFF	National Agriculture and Food Research Organization	Basic Research Promotion for Creation of Innovation	In order to address various themes in the policy of agriculture, forestry and fisheries, as based on creative ideas and basic research from researchers in diverse fields, MAFF integrally promotes 1) basic research for the development of technology seeds aiming at the creation of new technology innovation and new industry and 2) applied research for the development of developed technical seeds to yield practical technology. Also, MAFF promotes joint R&D contributing to reconstruction from the GEJE as conducted by universities and with technology seeds leading to the creation of business and public research institutions, including experimental stations, and private sectors that are planning to commercialize their research results.	5,565	4,039
Ministry of Agriculture, Forestry, and Fisheries Subtotal				10,716	7,859
	METI	Regional Innovation Creation R&D Program	To implement R&D work conducted by research entities that are optimally combined with local resources in order to activate the local economy by merging businesses founded on R&D with newly	1,000	-
	METI	Support Program for Experimental Research of Regional Innovation Creation	To support experimental research by research entities that optimally collaborate resources from regional, small and medium-sized enterprises and from industry-academia-government, while aiming for the revitalization of regional economies by creating new businesses and industry using regional resources and technologies.	-	277
METI	NEDO	Program for Advanced Industrial Technology Creation	In order to enhance industrial technology, to provide a grant for excellent research themes by presenting technology fields and technology themes that industry expects universities, inter-university research institutes, national research institutes, colleges of technology, incorporated administrative corporations, public experimental research institutions, foundations, or incorporated associations; (hereinafter referred to as "universities, research institutes, etc.") to address, and publically invite research theme proposals from young researchers at universities, research institutes, etc. (individual or team).	2,628	1,650

	NEDO	Grant for Practical Application of University R&D Results	To provide financial aid for industry-academia joint R&D projects aimed at the commercialization of university research results.	518	-
	NEDO	Research and Development Program for Innovative Energy Efficiency Technology	To commission and support energy saving technology development, this program aims at guiding the entire process from innovative technology research, leading-edge research all the way through to the practical application and demonstration.	10,200	-
	Japan Oil, Gas and Metals National Corporation	R&D for Promotion of Oil and Natural Gas Development	To conduct basic research and applied research, based on proposals selected from public submissions, for unique and innovative technologies concerning oil and natural gas exploration and development.	80	80
<b>Ministry of Economy, Trade, and Industry Subtotal</b>				<b>14,426</b>	<b>2,007</b>
MLIT	MLIT	Construction Technology Research and Development Subsidy Program	To supply funds for the research and development of technologies contributing to the sophistication and enhancement of the international competitiveness of construction technologies under MLIT's jurisdiction in order to promote technology innovation in the construction field. There are two types of public invitation: "Public invitation of technology development for solving policy issues (general type, small and medium-sized enterprise type), and "public invitation of technology development for addressing earthquake disaster." MLIT provides grants for technology and for research development of R&D themes appropriate for each type.	250	300
MLIT	Japan Railway Construction Transport and Technology Agency	Program for Promoting Fundamental Transport Technology Research	To implement technologies contributing to traffic safety, the preservation of the environment and the development of advanced traffic services in the transport field by publicly inviting unique and innovative research projects based on the free-thinking of researchers. This program was discontinued in 2012.	270	210
<b>Ministry of Land, Infrastructure, Transport and Tourism Subtotal</b>				<b>520</b>	<b>510</b>
MOE	MOE	Environmental Research and Technology Development Fund	To promote gathering scientific knowledge and technology development requisite for promoting environmental policy, to establish a sustainable society; for example, by preventing global warming, by forming a recycling society, by coexisting with the natural environment, and by managing environmental risk.	8,007	6,670
	MOE	Program for Development and Experimental Research of Technology to Prevent Global Warming (*6)	For the development and experimental research of technology to reduce the emissions of energy-derived CO <sub>2</sub> , which needs to be, and can be, realized at an early stage; to invite proposals from private corporations, public research institutes, and universities; to support proposed programs selected by a evaluation committee consisting of external experts.	6,200	6,000
<b>Ministry of the Environment Subtotal</b>				<b>14,207</b>	<b>12,670</b>
<b>Total</b>				<b>451,350</b>	<b>425,479</b>

- Note: 1. The accumulations and the numbers in the totals may not match due to rounding off.  
2. Apart from this list, using the "Leading-edge Research Promotion Fund" established in 2009, the "Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST)" (100 billion yen), and the "Funding Program for Next Generation World-Leading Researchers (NEXT)" (50 billion yen) have been implemented.
- \*1. Since 2012, including continuing the Promotion Program for ICT Green Innovation.  
\*2. The name of the program in 2011 is "Financial Aid for the Promotion of Advanced Technology Development in Telecommunications and Broadcasting".  
\*3. The budget does not represent the grants of said fiscal year because research expenditures used for the next fiscal year or later are included in the budget (foundation part) due to the introduction of "foundation" in part of the categories in FY 2011. Therefore, both budgets and grants are specified.  
\*4. The name of the program in 2011 is the "Core National Research & Development Promotion".  
\*5. The budget in 2012 is the amount for continuing the basic research promotion program in the insurance and medical fields, and comes out of the Grants for promoting the development of orphan drug and orphan medical devices  
\*6. The name of the program in 2011 is the "Program for the Development of Technology to Prevent Global Warming".

Source: Created by MEXT

### 3 Enhancement of R&D Implementation Systems

#### (1) Reform of the R&D Corporation

The R&D Corporation is an incorporated administrative agencies performing R&D activities that are difficult for private sectors or universities, such as long-term or high-risk R&D, and it refers to 37 corporations in the Research and Development Enhancement Act (as of November 1, 2011). During an additional resolution of the Upper and Lower Houses, when this act was formed, it was agreed that the most appropriate modalities of the R&D Corporation would be considered. Moreover, the 4<sup>th</sup> Basic Plan states, “In reference to the Basic Policy on Review of Administrative Systems and Projects of Incorporated Administrative Agencies” (Decided by the Cabinet on December 7, 2010), “the government will establish a new system concerning national R&D institutions to achieve reform in organizational governance and management and to strengthen the R&D Corporation’s function, while considering the characteristics of R&D” (long-term nature, uncertainty, unpredictability, and expertise).

On January 20, 2012, the government made a Cabinet decision concerning the “Basic Policy on Review of Administrative Systems and the Organization of Incorporated Administrative Agencies,” (hereinafter referred to as the “Basic Policy”), which positions a “Corporation type whose important policy objective is the maximization of R&D achievement contributing to the public interest” as an “R&D type” in the new corporation system, and which establishes governance focusing on the characteristics of R&D. However, the Basic Policy was temporarily frozen based on the “Basic Policy for 2013 Budget Preparation” (Cabinet decision on January 24, 2013), and it was decided that revision of the incorporated administrative agencies would be continuously reviewed and, thus, efforts for reformation are being made.

In addition, the government made a Cabinet decision concerning a “bill for partial amendment of the Act on General Rules for Incorporated Administrative Agencies” on May 11, 2012 and submitted it to the 180<sup>th</sup> regular Diet session. In this bill, the administrative agency, whose objective is to maximize the output of administration systems and projects related to R&D contributing to the public interest, is positioned as the “National R&D Administrative Agency (literal translation),” and rules based on R&D characteristics, such as the establishment of the advisory council for the evaluation of R&D, the assignment of foreigners to the committee, and the change of the upper limit of the mid-term objective period from five years to seven years, are incorporated. The bill states that, in implementing the Act on General Rules after amendment, consideration shall be given to administrative systems and projects of administrative agencies, including the National R&D Administrative Agency; however, it was discontinued in accordance with dissolution of the Diet. In the Administrative Reform Promotion Council to be held on January 29, 2013, previous activities relating to incorporated administrative agencies will be summarized and reviewed, then the consideration of specific ways of reform will be made.

In the “Liaison Committee to Review Appropriate Procurement in R&D Programs” and the “Study Committee for Appropriate Procurement in R&D Program,” the modalities of procurements considering the characteristics of R&D projects were reviewed. On December 1, 2011, both committees summarized the “Appropriate Modalities of Procurement in R&D Programs (interim report)” and the recognition of rational and effective contract methods, which support the characteristics of R&D, was shared among agencies. Based on this interim report, efforts will be made to realize both the maximization of research

output and the efficiency of procurements through the following methods: 1) Trial implementation of more rational and effective contract methods and an analysis and evaluation of those methods, 2) Establishment and operation of an information-sharing system, 3) Increased understanding and improvement of the current status of competitive bidding, 4) Consideration of the standards in optional contracts, and 5) Review of the system and operation of government procurements.

#### (2) Development of a system for effectively promoting research activities

In order for universities and public research institutions to promote research activities effectively and efficiently, in addition to recruiting researchers, it is necessary to develop a system enabling active employment for various personnel specialized in the management of overall research activities, in the management and operation of intellectual properties, and in the maintenance and management of facilities and equipment, etc. However, it has been pointed out that individual research institutions are insufficient in the securing of specialized personnel and that most researchers do not have enough time for their research. In response, the government will strengthen efforts to improve these conditions.

With these situations in mind, MEXT supports fostering and securing human resources who can conduct research management in universities and other institutions (University Research Administrator) (refer to Part 2, Chapter 5, Section 1, 1 (3)).

In order to create internationally competitive industries, the Japan Patent Office, through the National Center for Industrial Property Information and Training, has dispatched intellectual property management experts, called “Intellectual Property Producers,” to universities and R&D consortiums where public funds are injected and where innovative output is expected.

In order to assist in the design of research plans to be implemented in collaboration with universities, incorporated administrative agencies and public research institutions, MAFF offers support for the deployment of coordinators throughout the country who are specializing in agriculture, forestry and fisheries and in the food industry. Such support includes the introduction of viewpoints on the management of technology (MOT), including the strategic use of intellectual properties.

## 4 Establishment of the PDCA Cycle in STI Policy

### (1) Ensuring the effectiveness of the PDCA cycle

In order to promote STI policies effectively and efficiently, it is necessary to set clear performance targets, such as policies, measures and implementation systems. It is also necessary to appropriately conduct timely follow-ups, to ensure progress, and to reflect upon results when reviewing policies and resource allocation. Finally, it is necessary to plan new policies by establishing the PDCA (Plan-Do-Check-Action) cycle. For this reason, the government will promote efforts for ensuring the effectiveness of the PDCA cycle. Specifically, it will conduct activities such as the establishment of the National Guidelines. (Refer to Part 2, Chapter 5, Section 2, 4 (2).)

### (2) Improvement and enhancement of R&D evaluation systems

In order to effectively and efficiently promote an internationally high-level of R&D that contributes to both society and the economy, as well as to the development of new science fields, it is important to further improve the R&D evaluation system.

All ministries and agencies conduct R&D evaluation, based on their own detailed guidelines which specify evaluation methodologies that have been formulated in accordance with the National Guidelines. In order to respond to the integrated development of STI policies as based on the 4<sup>th</sup> Basic Plan and the establishment of the PDCA cycle, the National Guidelines were revised on December 6, 2012, so as to aim for further improvement and enhancement of the R&D evaluation system. In this revision, the introduction of the evaluation of R&D programs and goal-setting that is based on outcome indicators has been promoted.

Based on the “Guidelines for the Evaluation of Research and Development in MEXT” (February 17, 2009 decision of Minister of MEXT), evaluation is conducted in accordance with the objectives, political positions, scales, etc., of each research project. It is based on a wide range of R&D covering everything, from scientific research stemmed in the researcher’s free thinking and personal motivation for conducting R&D to large projects that realize a specific policy objective. Regarding important subjects, the appropriateness of budget requests is judged by conducting a preliminary evaluation by means of an external evaluation. An interim evaluation is then conducted to confirm the necessity of making changes to the plan, and a post evaluation is conducted for application to the next deployment. As for basic research, since much research leads to unexpected developments over the years, care is taken to avoid evaluations that expect hasty output that is based upon uniform and short-term points of view.

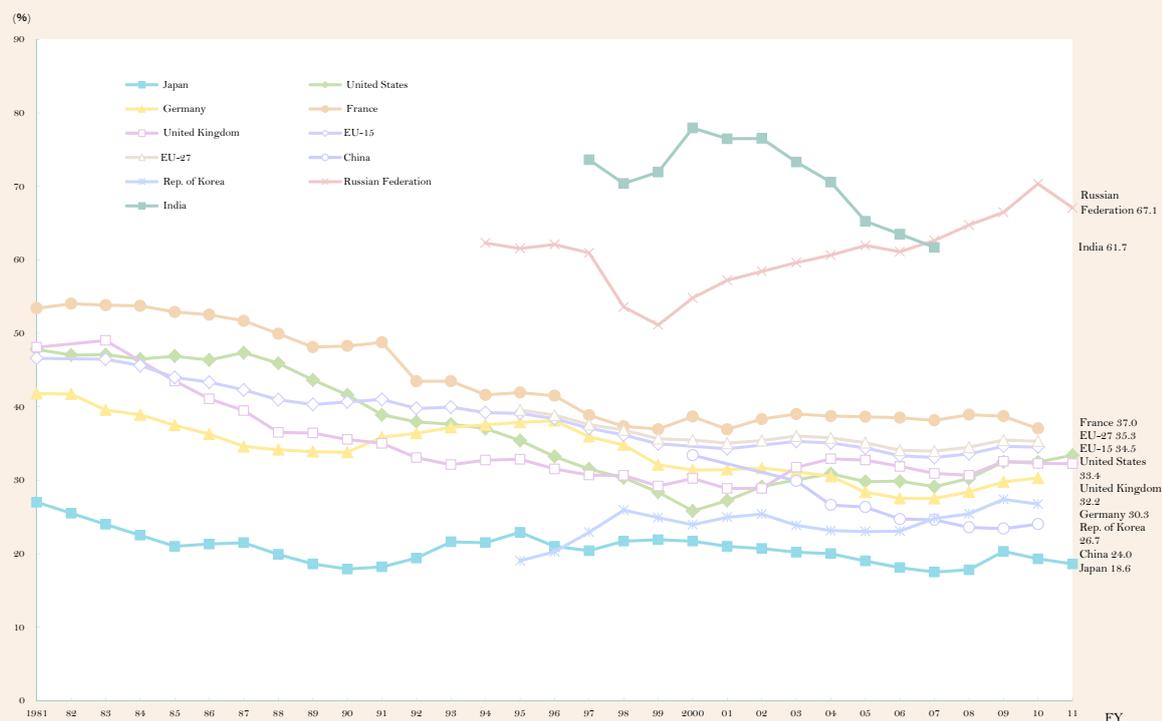
METI conducts preliminary evaluations, interim evaluations, post evaluations, and follow-up evaluations of R&D projects. Since 2008, in order to review projects with similar objectives and to clarify the mutual relationship of each project, METI, while considering the direction of the field as a whole, has introduced and implemented a “policy evaluation for technology,” where the interim and post evaluation of related projects once conducted separately over different fiscal years, are now conducted together.

Meanwhile, incorporated administrative agencies, national universities and corporations conduct evaluations of their performance in accordance with the “Act on General Rules for an Incorporated Administrative Agency” (Act No.103 of 1999) and the “National University Corporation Act” (Act No. 112 of 2003), respectively. Ministries and agencies conduct policy evaluations in accordance with the “Government Policy Evaluations Act” (Act No.86 of 2001).

### Section 3 Expansion of Research and Development Investment

The government set the expanded target of R&D investment to become 4% or more of GDP in all government and private sectors by FY 2020. The 4th Basic Plan states the following: “comprehensively, considering that the percentage of the Japanese government's burden of research costs is lower than that of foreign countries, considering that the government's investments are expected to produce the synergetic effect of promoting private-sector investment, which is currently hampered by a weak economy, and considering that many foreign countries are increasing S&T investment by setting targets, an expansion of investment is required.” (Figure 2-5-3)

Figure 2-5-3/ Trends in government-financed R&D expenditures in selected countries



Note: Defense-related research expenditures are included.

Source: Created by MEXT based on the "Report on the Survey of Research and Development" by the Statistics Bureau and "Main Science and Technology Indicators Vol. 2012/2" by OECD.

Although the financial situation of Japan is expected to become more critical, the government should secure the expenses necessary for promoting the measures outlined in the 4<sup>th</sup> Basic Plan so as to ensure consistency with the Fiscal Management Strategy, including the fiscal consolidation targets and the Medium-term Fiscal Framework decided by the Cabinet in June 2010.

Likewise, in order to induce R&D investment in the private sector, which occupies more than 70% of all R&D investment in Japan, the government, while respecting the principle of voluntary efforts being taken by private companies, should conduct rational reviews of regulations and systems, including the utilization of a tax system that facilitates R&D activities which will stimulate motivation.

(Government R&D investment)

Government R&D investment in 2012 was 5.1521 trillion yen, which comprised 4.7117 trillion yen for the central government, including both the initial budget and the supplementary budget, and 440.4 billion yen for local authorities. (Refer to Part 2, Chapter 1, Section 3-2 for details of R&D investment by the central government.)

(Preferential treatment for promoting R&D investment by the private sector)

To promote R&D in the private sector, various tax measures are provided as shown in Table 2-5-4.

Table 2-5-4/ R&amp;D Taxation System

Item	Purpose	Description	Applicable law	Remarks
R&D taxation system	Promotion of research and development investment by the private sector, etc.	Tax Credit for research and development expenditures.	Special Taxation Measures Act, Article 10, Article 10-2 (income tax) 42-4, 42-4-2, Article 68-9, 68-9-2 (corporate tax), Local Tax Act, Supplementary Provision, Article 8, Item 1.	Enacted in FY 2003 (Hereinafter, for private business owners, the tax credit system will remain the same.)
		I. Proportional Tax Credits for total research and development expenses (*) The research and development credit is a percentage (8 to 10%) of the total of research and development expenses. (The maximum amount is the sum of 20% of the corporate tax liability)		
		II. Special Tax Credit on special research and development expenditures(※) For joint-experimentation research and experimentation research commissioned to universities, public experiment and research institutes, the National Experiment and Research Institute, and other organizations, in addition to Item I above, a tax equivalent to 12% of the total research and development expenses regarding such experiments and research is exempted (but limited to an amount equivalent to 20% of the corporate tax, including the special tax exemption in Item I above.) (Corporate tax) In accordance with FY 2013 tax reform, research and development expenditures relating to joint research conducted by corporations based on a certain contract, etc., was added to the special research and development expenditures.		
		III. Tax system to strengthen the technical base of SMEs (Applied instead of I or II) (1) The tax credit amount is a value equivalent to 12% of the test and research expenses at SMEs (but limited to a value equivalent of 20% of the corporate tax). (*) (2) The tax credit amount in (1) above is excluded from the tax base for corporate inhabitants' tax (Local tax).		
		(Remarks) 1. The tax credit amount in relation to the above I through III is a value equivalent to 30% of the corporate tax for only FY 2013 through FY 2014 2. In relation to the amount exceeding the tax credit mentioned in I through III, it can be deferred one year for deduction. However, in regard to the amount exceeding the limit occurring in FY 2009 and FY 2010, it can be deducted in FY 2011 and FY 2012		
		IV. Proportional Tax Credits for increased research and development expenses Either of the following 1) or 2) will be selected and only applicable to FY2012 through FY2013 (but limited to an amount equivalent to 10% of the corporate tax, apart from I through III) 1) When the amount of experimental and research expenses exceeds the average of the experiment and research expenses for the current term, and for three years before the current term, and exceeds the largest amount out of experiment and research expenses for two years before the current term, then the tax equivalent up to 5% of the amount exceeding the average is exempted. 2) When the amount of experimental and research expenses exceeds 10% of the sales amount for the current term and for three years before the current term, the tax is exempted in a predefined proportion to the excessive amount.		Enacted in FY 2008

Source: Created by MEXT