Toward the Reinforcement of

Science and Technology Diplomacy

(Provisional Translation)

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Council for Science and Technology Policy

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Introduction

Science and technology (hereinafter referred to as "S&T"), which aims to create "scientific knowledge" as the world's common assets, has the potential to contribute to not only the present, but also to the future happy and affluent lives of citizens as well as the whole of mankind through development of S&T, economic and social development by returning S&T results to society, the strengthening of security, and the addressing of global issues including global warming countermeasures.

As a result of the collective efforts of industry, academia and the government, Japan's S&T has made progress and expanded in line with economic growth over the sixty-plus years since World War II. It is no exaggeration to say that Japan now plays an important part in the world's S&T. In particular, Japan has become a world leader in terms of its technology capabilities in many fields, including energy and the environment.

Meanwhile, in its diplomacy, Japan has been actively voicing its opinions to the international community and demonstrating leadership, in order to secure the safety and prosperity of Japan and its people, as well as to contribute to securing peace, stability and prosperity in the international community as a whole and to achieve common regional or global benefits.

However, given the current situation of Japan in the international community, it is now essential to review the relation between S&T and diplomacy in order to sufficiently promote Japan's national interests.

This report focuses on "S&T diplomacy," which links S&T with foreign policy so as to achieve their mutual development. It introduces the basic policy for promoting S&T diplomacy and possible examples of actual challenges and efforts, and indicates the need to strengthen S&T diplomacy for Japanese citizens and all people involved in S&T and diplomacy in the public sector and the national and local government.

In February 2008, we compiled "Toward the Reinforcement of Science and Technology Diplomacy (Interim Report)," summarizing the outcome of discussions by the Expert Panel on Basic Policy of the Council for Science and Technology Policy and the Working Group on Promotion of Science and Technology, based on "Toward the Reinforcement of Science and Technology Diplomacy (April 24, 2007)" proposed by executive members at a session of the Council for Science and Technology Policy held in April 2007.

This final report summarizes the results of the repeated discussions held subsequently on the measures to be implemented under the initiative of the Japanese government in the future, by giving consideration to the further proposal made by executive members under the title "Government's Concrete Efforts Toward

Strengthening Science and Technology Diplomacy (February 29, 2008)" and hearing the opinions of relevant ministries, based on the basic policy and measures for promoting science and technology policy that were indicated in the interim report.

We expect the relevant ministries to steadily implement the measures indicated in this report as well as to make mutual coordination regarding related measures and measures so as to maximize the effects as a whole, by taking such steps as establishing a meeting among the core Cabinet members involved in science and technology diplomacy. At the same time, the Council for Science and Technology Policy needs to closely follow up on the status of implementation and coordination of measures by the relevant ministries.

We hope that, at meetings including G8 Hokkaido Toyako Summit and G8 Science and Technology Ministers' Meeting this year, discussions will be held based on ideas such as indicated in this report for strengthening Japan's science and technology diplomacy to produce fruitful results.

Chapter 1 Basic Understanding of S&T Diplomacy

1. Strengthening Japan's S&T capabilities

Japan has promoted S&T by setting the goal of "becoming an advanced science- and technology-oriented nation" as a national strategy. The main underlying objectives are to improve S&T standards and contribute to economic and social development and the improvement of public welfare in Japan, as well as to the progress of S&T in the world and the sustainable development of human society.

In addition, with the aim of playing an active role in the international community and further advancing Japan's S&T, Japan has promoted various international exchanges of information on S&T, including international exchange of researchers, joint research (hereinafter referred to as "R&D"), and international distribution of S&T-related information.

As a result of the collective efforts of industry, academia and the government, Japan's S&T has made progress and expanded in line with economic growth over the sixty-plus years since World War II. It is no exaggeration to say that Japan now plays an important part in the world's S&T. In particular, Japan has become a world leader in terms of its technology capabilities in many fields, including energy and the environment. Japan's S&T also has value as diplomatic resources that can be used as "soft power" in international cooperation.

Therefore, Japan should contribute to resolving various problems facing various countries in the world by using such excellent S&T and needs to further strengthen its S&T capabilities.

2. Challenges currently facing Japan's diplomatic policy

In its diplomacy, Japan has been actively voicing its opinions to the international community and demonstrating leadership, in order to secure the safety and prosperity of Japan and its people, as well as to contribute to securing peace, stability and prosperity in the international community as a whole and to achieve common regional or global benefits.

In particular, there are important summit-level international conferences scheduled to be held in Japan in 2008. Specifically, the Fourth Tokyo International Conference on African Development (TICAD IV) is scheduled for May and G8 Hokkaido Toyako Summit in July. This alone indicates the strength of domestic and overseas calls for Japan to demonstrate powerful leadership in the international community.

Meanwhile, companies and private non-profit organizations have come to

play a greater role in many areas of international cooperation. A large part of the technology for solving environmental problems, such as energy conservation and environmental technology, and the technology directly linked to the development of developing countries, is held by private companies. Therefore, private companies are expected to expand their investment and provide further contributions of personnel in developing countries.

The term “diplomacy” as used in this report not only has the conventional meaning of the relationships between the Japanese government and governments of foreign states. It covers a broader scope of activities, ranging from the various overseas and domestic efforts made by the public sector and local public entities to theme-specific personnel exchanges, joint projects, and international contributions by ministries, government agencies, and educational and research institutions. It is hoped that these ministries and organizations, as well as individual researchers and people in charge, will work in close cooperation with each other, such as by increasing coordination between the related ministries, based on the major objectives of their individual activities.

3. New roles of S&T

Various efforts have been made around the world to resolve international issues concerning population, the environment, food, energy, resources, and poverty, but a heap of difficult problems for which solutions are nowhere in sight still remain. Under the current globalization trend, these problems are not only problems of a single country or region, but they are problems facing each and every country.

Japan has been successful in achieving economic growth and addressing environmental problems through application of S&T, and it goes without saying that S&T will also be able to contribute to addressing such worldwide problems.

In order for human society to achieve sustainable development and in order not to pass a negative legacy to the next generation, members of the whole world should be aware that they are in the same boat, sharing responsibilities for the future of mankind, and utilize S&T − the common assets of mankind − in addressing these problems as a worldwide effort.

4. Stronger linkage between S&T and diplomacy

Promotion of S&T is one of Japan’s important national strategies, and one of the few internationally viable trump cards held by resource- and energy-poor Japan. Previously, Japan has used S&T as a diplomatic means, while using diplomacy as a means to develop Japan’s S&T such as implementing joint projects in advanced research fields.

However, the role of Japan had not been quite clear in Japan's diplomacy, and diplomatic efforts to promote Japan's S&T had not been sufficient.

Meanwhile, looking at the present international situation, threats of worldwide problems that cannot be resolved without further development of S&T, such as measures against global warming and infectious diseases, have been sharply increasing in recent years. These problems cannot be resolved unless countries around the world make sufficient use of advanced S&T through international coordination and cooperation. In other words, such diplomatic problems cannot be resolved without using S&T, and advancement of S&T is indispensable for resolving those diplomatic problems.

Moreover, Japan's S&T capabilities play a significant role in the development of developing countries in Asia and Africa. Therefore, developing countries hold high expectations for assistance and activities employing Japan's S&T capabilities.

Against such background, Japan should, in its S&T diplomacy, utilize diplomacy for the further development of S&T, and promote efforts to utilize S&T for diplomatic purposes. In particular, we place emphasis on enhancing the linkage between S&T and diplomacy so as to increase their synergy in the future.

For the time being, particular focus should be placed on efforts to overcome global issues, such as measures against global warming and infectious diseases, in light of the fact that the Hokkaido Toyako Summit and the Fourth Tokyo International Conference on African Development (TICAD IV) will be held in Japan this year.

Chapter 2 Basic Policy for Promoting S&T Diplomacy

The following 1 to 4 are indicated as the basic policy for promoting Japan's S&T diplomacy. Specific efforts should be implemented by aiming to make effective use of the limited resources and maximize national interests as well as bearing these principles in mind.

1. Establishing systems in which Japan and its counterparts can enjoy mutual benefits

In order to maintain long-term, continuous mutual cooperation, Japan should establish systems in which Japan and its counterparts can enjoy mutual benefits.

Therefore, Japan will, for example, help the counterparts increase their capabilities to independently resolve various problems and become self-reliant, and will jointly identify the problems facing the counterparts and extend cooperation to resolve those problems.

2. Generating synergy between S&T and diplomacy for resolving the global issues facing mankind

With a view to sending out Japan's excellent research results to the world, Japan will aim to link S&T, which has the potential to further increase Japan's competitiveness, with Japan's diplomacy, generate a synergy between them, and have them achieve mutual development. Japan will focus on proposing Japan's S&T to the world, and utilizing such S&T for human society and contributing thereto by taking an open stance unbound by national borders, and will take the initiative in resolving the worldwide problems facing mankind.

3. Working on developing "human resources" that sustain S&T diplomacy

"Human resources" serve as the basis of both S&T and diplomacy. In order to strengthen S&T diplomacy by optimally combining tangible and intangible resources, Japan will work on developing "human resources" that sustain S&T diplomacy, as well as promoting international exchanges and networking of such "human resources." In addition, Japan will reinforce diplomatic human resources who are capable of demonstrating Japan's leadership in forming international agreements and creating international frameworks.

4. Increasing Japan's international presence

Japan will establish an international brand image for Japan’s excellent S&T, and will increase its international presence in order to be regarded by other countries as a reliable partner. To this end, for example, summit-level or ministerial-level policy dialogues on S&T will be increased.

Chapter 3 Concrete and Strategic Promotion of S&T Diplomacy

Efforts related to S&T diplomacy are not limited to government efforts, but can also be found very frequently in S&T- or diplomacy-related activities of companies, universities and individuals. For example, all kinds of activities related to S&T lead to raising the level of S&T and increasing Japan's international competitiveness. As a result, Japan's S&T has come to be used in efforts for tackling problems in the areas of the environment and energy, disaster prevention, higher education, information technology, healthcare, and infectious diseases, through private markets.

Therefore, each and every one of Japan's individuals, company and university researchers, and government and government agency officials concerned should implement their business and activities based on the basic policy indicated in Chapter 2 in their daily international exchanges and cooperation. At the same time, for implementation of strategic S&T diplomacy, it is essential that the general public understand the whole picture of Japan's S&T cooperation with the counterparts.

In promoting S&T diplomacy, it is important to combine the four principles of basic policy mentioned in Chapter 2. In addition, reflecting on the fact that Japan's past S&T diplomacy had tended to be passive and Japan often failed to fully demonstrate its leadership, we should now shift to S&T diplomacy where Japan makes statements and takes actions actively focusing on the following three points.

1. Strengthening S&T cooperation with developing countries for resolving global issues

(1) Implementation of S&T cooperation and provision/demonstration of S&T results

Japan will implement S&T cooperation with developing countries on global issues concerning global warming, infectious diseases, water/food, and disasters, according to the social needs of the relevant countries. In addition, Japan will actively provide its excellent S&T results such as energy conservation and environmental technology to developing countries and demonstrate them at appropriate locations in the world.

(2) Capacity development[1] in developing countries

Japan will, under its initiative, implement joint research by using ODA, while

[1] Since the term "capacity building" is frequently used for increasing the capacity of individuals, the term "capacity development" is used here as a broader concept that also covers organizations, regions, and societies.

also taking advantage of the developing countries' research potential, and provide capacity building to developing countries and improve their capacity to address problems.

2. Strengthening S&T cooperation using Japan's advanced S&T

(1) Implementation of international joint research under Japan's initiative

Under international cooperation, Japan will take the initiative in promoting R&D that contributes to resolving worldwide problems and in creating new frameworks for promoting multilateral joint research conducted by governments or research institutions.

(2) Development and joint use of advanced research infrastructure

In order to carry out international joint research using advanced research facilities and to develop international observation systems that contribute to climate change predictions and disaster prevention, Japan will promote efforts to actively make advanced research facilities available to overseas researchers and encourage their mutual use, to create networks, to accept and dispatch researchers, and to implement joint research.

3. Strengthening the basis for promoting S&T diplomacy

In order to strengthen the activities of Japanese researchers and business operators in developing countries and other overseas locations, and to reinforce diplomatic human resources who will demonstrate Japan's leadership in forming international agreements and creating international frameworks, Japan will play a leading role in international organizations that examine measures against worldwide problems. In addition, the public and private sectors will effectively use the excellent know-how possessed by Japan's nongovernmental organizations and private bodies in coordination with each other and Japan will work on improving the environment for supporting the activities of private companies in developing countries.

Chapter 4 Measures to Be Implemented to Promote S&T Diplomacy

The measures to be implemented under the leadership of the Japanese government in relation to the strategies for promoting S&T diplomacy described in Chapter 3 above are as follows.

So far, cooperative efforts regarding many of these measures have been made in a piecemeal manner, but it is necessary to make such efforts in a coordinated and consistent manner while verifying the results of the past efforts.

When implementing the following measures, it is important for Japan to promote S&T cooperation by effectively utilizing the achievements and human networks accomplished through Japan's past contributions as well as institutions and facilities improved under Japan's official development assistance (ODA) programs as the bases for local R&D and capacity building. It should be noted that it is necessary to take specific steps to support female or young researchers to be active abroad, for instance, in the field of health or sanitation, so that diverse human resources can maximize the willingness and realize their capabilities.

As the budget for ODA, which constitutes part of Japan's diplomatic power, has been declining in recent years, it is essential to implement ODA programs in a strategic and effective manner in line with its role and purpose with due consideration of trend and situation in the international community. In the future, it will be necessary to increase the overall ODA amount in order to improve the quality of aid to developing countries while giving due consideration to the viewpoint of strengthening S&T diplomacy.

In order to implement the following measures steadily, the ministries and agencies involved should cooperate on relevant measures and programs in order to maximize their effects. Moreover, they should promote further specific measures with due consideration of international developments as well as the circumstances in Japan. The Council for Science and Technology Policy should follow up on the implementation status of measures taken by the ministries and agencies involved.

1. Strengthening S&T cooperation with developing countries for resolving global issues

Japan will engage in S&T cooperation with developing countries, such as those in Asia and Africa, provide the achievements of Japan's S&T, and help those countries to promote capacity building and improve their problem-solving ability. Moreover Japan will disseminate information concerning its efforts and measures in this regard on the occasion of international forums such as TICADIV.

(1) Implementation of S&T cooperation and provision/demonstration of S&T

achievements

(i) Japan will actively promote international joint research on global problem implemented by research organizations, etc. in Japan and developing countries. Moreover, Japan will put priority on establishing a framework for S&T cooperation with developing countries. With regard to Africa in particular, it is essential to take prompt action in order to make use of Japan's accumulated achievements of S&T for the future development of Africa.

- International Joint Research with African Countries (tentative name) (Ministry of Foreign Affairs (MOFA), Ministry of Education, Culture, Sports Science and Technology (MEXT))

  With due consideration of the results expected to be achieved in TICADIV, Japan will dispatch Japanese researchers to universities, research organizations, etc. in Africa to have them engage in joint research with young researchers there, help to resolve problems facing African countries and promote capacity building.

- S&T Research Partnership for Sustainable Development (MOFA, MEXT)

  In light of the needs and requests of developing countries, Japan will implement joint research regarding global issues such as environment and energy, disaster prevention and infectious diseases control and help to improve the capabilities of universities, research organizations, etc. in developing countries.

- The Asia/Africa S&T Strategic Cooperation Promotion Program (MEXT)

  Japan will promote international research, etc. with Asian and African countries that will contribute to the development of advanced technologies and the establishment of international standards.

(ii) Regarding emerging and re-emerging infectious diseases, Japan will utilize bases in the countries and regions involved that have been established under Japan's ODA programs and improve their equipment and implement joint research and capacity building based on the needs of developing countries.

- Program of Founding Research Centers for Emerging and Reemerging Infectious Diseases (MEXT)

  Japan will establish research centers mainly in Asian countries at high risk of emerging and re-emerging infectious diseases in cooperation with overseas research institutions. It will help to improve domestic

research systems so as to promote basic research for combating infectious diseases, capacity building and accumulation of knowledge. In the future, Japan will actively implement joint research and capacity building that suit the needs of developing countries.

- Research concerning emerging/re-emerging infectious diseases (Ministry of Health, Labour and Welfare (MHLW))

  Japan will implement joint research with developing countries with a view to establishing the methods of diagnosing and preventing emerging and re-emerging infectious diseases that threaten the health of people around the world, drawing up effective plans for containing such diseases in the affected regions, developing ways to treat such diseases and ensuring the provision of adequate medical care.

(iii) Japan will provide data from Japanese satellites and demonstrate the use of satellite data with a view to resolving problems facing developing countries.

- International contributions through the provision of data from earth observation satellites (MOFA, MEXT)

  In order to contribute to global surveillance of disasters and monitoring of forests, Japan will provide developing countries with data sent from Japanese earth observation satellites such as the Advanced Land Observing Satellite "Daichi" (ALOS) and promote the use of such data.

- Global environment observation via satellite (MEXT, Ministry of the Environment(MOE))

  Japan will measure the global distribution of the concentrations of carbon dioxide and methane using the Greenhouse Gases Observing Satellite "GOSAT", draw global maps of estimated concentrations of these gases and estimated carbon balances, and provides relevant data to developing countries.

- International joint experiment using the super high-speed Internet satellite "KIZUNA" (WINDS) (Ministry of Internal Affairs and Communications (MIC), MEXT)

  Mainly for the purpose of resolving the “digital divide” that puts developing countries at a disadvantage, this project will promote international joint experiments concerning disaster prevention/mitigation, remote medical care and remote education with high picture quality, etc. by using the super high-speed Internet satellite "KIZUNA" (WINDS).

This will be promoted as a cooperation project with Asia-pacific countries.

(iv) Japan will use its advanced S&T to help to resolve water and food problems in developing countries, such as those in Africa

- Improving drought and submergence tolerance of rice in Africa (MOFA, Ministry of Agriculture, Forestry and Fisheries(MAFF))

  Rice varieties suited to West African drylands will be selected from ones all over the world, and genetic markers for target traits will be identified and introduced into NERICA (New Rice for Africa) varieties in order to enhance their drought tolerance levels.

- Providing information for the management of water resources and the mitigation of flood and drought damage (MEXT, Ministry of Land, Infrastructure, Transport and Tourism (MLIT))

  This project will seek to develop a detailed simulation method based on urban climate models and understand the water circulation mechanism by promoting mutual use of observation data and geographical information concerning rainfall volume, river flow volume, and so on, among related countries. Through this project, Japan will develop and provide information that will contribute to the mitigation of floods and droughts damages in urban areas in developing countries.

- Improving of the fertility of sandy soils in the semi-arid zone of West Africa through organic matter management (MAFF)

  Appropriate soil management methods will be developed and demonstrated, to improve soil fertility by usage of limited fertilizer and combinational application of conventional organic resources and useful plant genetic resources.

- Developing abiotic stress tolerance crops by introducing DREB genes (MAFF)

  For stabilizing global food supply, rice and wheat by introducing DREB genes will be developed and demonstrated, which are tolerant to such stress as drought and salinity, through joint research with international agricultural research institutions.

- Promotion of R&D and technical support regarding building environmental technologies in hot and humid regions (MLIT)

Japan will conduct R&D concerning environment protection technologies related to housing and buildings in hot and humid regions and seek to diffuse the results to other Asian countries and other regions.

- R&D and promotion of diffusion of Japanese-type high-efficiency water circulation systems (Ministry of Economy, Trade and Industry (METI)

  Japan will conduct joint survey and research programs with companies in other Asian countries by utilizing membrane technology an area in which Japanese companies have an edge over foreign companies, in order to support private-sector activities in water-related fields such as effective water circulation systems.

(2) Capacity development in developing countries

Japan will implement capacity building and promote the establishment of a human network responding to problems facing relevant countries and regions.

- Support for the establishment of a network of higher education institutions in Asia and Africa (MOFA, MEXT)

  Provide opportunities for training and studies in Japan and developing countries by effectively combining existing international joint research programs between Japan and Asia/Africa with programs to dispatch Japanese S&T researchers, thereby establishing a closely-knit, multi-layered human network.

- Dispatch of S&T researchers (MOFA, MEXT)

  In light of the needs and requests of developing countries, Japan will dispatch researchers under ODA programs to promote research exchanges and joint research programs that will contribute to capacity building in such countries in fields such as environment, energy, disaster prevention/mitigation and the fight against infectious diseases.

- Project to foster environmental leaders (Cabinet Office, MEXT, MOE, etc.)

  Through cooperation between relevant ministries and agencies, Japan will create opportunities for students, researchers/engineers, policy makers and business people around the world to become acquainted with Japan’s excellent environment technologies and policies, with a view to fostering key personnel (environmental leaders) equipped with knowledge and experiences regarding environment-related S&T and policies and capable of exerting leadership in realizing sustainable development

around the globe and disseminating the concept of consideration for environment protection across various sectors.

- Support for establishment and operation of universities and graduate schools in developing countries (MOFA, etc.)

  Through cooperation between relevant ministries and agencies and Japanese universities, etc., Japan will use ODA programs to enhance support for the establishment and operation of universities and graduate schools that play an important role in fostering personnel necessary for developing countries to resolve their problems on their own.

- Japan Capacity Building Program for African Agricultural Researchers (MAFF)

  The program aims at capacity building for young African researchers by Japanese researchers at international agricultural research institutions, for disseminating research outputs and technologies to them.

- Measures for responding to water-related disasters in relation to climate change (MLIT)

  Japan will conduct networking activities regarding research, training and information in an integrated manner by using the functions of the International Center for Water Hazard and Risk Management in order to cope with the risk of water-related disasters which is growing due to the effects of climate change, while cooperating with relevant international organizations.

- Project to promote research cooperation (METI)

  Under this project, Japanese companies and research institutions will conduct joint research with research institutions in Asia and other regions in order to tackle the challenges of environment-related technological development particular to relevant developing countries and to develop human resources in those countries.

2. Strengthening S&T cooperation using Japan's advanced S&T

Japan will contribute to resolving global issues by implementing S&T cooperation mainly with other developed nations through the use of its advanced S&T and research infrastructure.

(1) Implementation of international joint research under Japan's initiative

(i) Aiming to achieve a low-carbon society, Japan will promote the development of innovative environment and energy technologies in order to significantly reduce the emission of greenhouse gases. Japan will seek to disseminate its efforts and measures to the world on various occasions, the G8 Hokkaido Toyako Summit and the G8 Science and Technology Ministers' Meeting in particular, and seek to take the initiative in international debate.

- Establishment and implementation of the Low Carbon Technology Plan (Cabinet Office, MEXT, METI, etc.)

  Japan will devote country-wide efforts to the development of innovative technologies for reducing the emission of greenhouse gases and deploy its excellent environment and energy technologies across borders so as to enable all counties to pursue reduction in the emission of greenhouse gases through various approaches. Japan will also draw up the "Low Carbon Technology Plan," which will promote international joint research in this regard. Under this plan, the relevant ministries and agencies will promote the implementation of the Cool Earth-Innovative Energy Technology Program and the development of innovative technologies for grasping the state of climate change.

- Building the Global Earth Observation System of Systems (GEOSS) (MEXT, etc.)

  Japan will play the leading role in building the Global Earth Observation System of Systems (GEOSS), in which 72 countries, and the EC and 52 intergovernmental, international and regional organizations are participating, in order to encourage international cooperation in earth observation and prediction and to provide data and results which contribute to a total of nine areas of societal benefits.

- Providing climate change projection data obtained by Earth Simulator (MEXT)

  Japan will make international contributions by providing data obtained by Earth Simulator such as regional climate change projection through earth observation.

- Global environment observation from satellite (MEXT, MOE) (repeat)

  Japan will measure the global distribution of the concentration of carbon dioxide and methane using the Greenhouse Gases Observing Satellite "GOSAT", draw global maps of estimated concentrations of

these gases and estimated carbon balances, and provide relevant data to developing countries.

- Launch of an international joint research program (MEXT)

  In order to enhance its S&T diplomacy, Japan will promote international joint research programs intended to resolve global issues.

- Asia-Pacific Partnership on Clean Development and Climate (APP) (METI)

  The APP, which is a public-private partnership involving major greenhouse gas-emitting countries in the Asia-Pacific region, aims to promote efficient reduction of greenhouse gas emissions in the region by developing, transferring and deploying cleaner and more efficient technologies on a sector-by-sector basis.

(ii) Japan will engage in international joint research through programs for multilateral and bilateral joint researches that involve both developed and developing countries.

- Launch of an international joint research program (MEXT) (repeat)

  In order to enhance its S&T diplomacy, Japan will promote international joint research programs intended to resolve global issues.

- Promotion of large-scale international joint projects (MEXT)

  Japan will promote international joint projects such as the ITER (International Thermonuclear Experimental Reactor) project and the International Space Station (ISS).

- Asia-Pacific Network for Global Change Research (APN) (MOE)

  The APN seeks to implement research regarding global environmental change in the Asia-Pacific region and promotes improvement in the research capabilities of developing countries.

- Strategic International Cooperative Program (MEXT)

  This program provides intensive support to international research project with countries and in fields of cooperation designated on basis of intergovernmental agreements, thereby promoting strategic international cooperation in a top-down manner.

- Global environmental observation project based on technology

cooperation among Japan, the United States and Europe. (MIC, MEXT)

This project promotes programs to observe the global distribution of rainfalls, water circulation, clouds, aerosol, etc. via satellite through the cooperation of Japan, the United States and Europe, all of which have advanced technologies in this regard, with a view to enhancing the accuracy of global environmental observation technologies, which are essential to combating global warming.

- Conduct of international joint research on nuclear energy (Cabinet Office, MEXT, etc.)

  Japan will conduct joint research on radiation applications in such fora as the Forum for Nuclear Cooperation in Asia (FNCA) and will promote such activities as joint research on the effects of radiation on health with foreign countries. Japan will also carry out joint research on advanced reactors in the framework of the Generation IV International Forum.

(2) Development and joint use of advanced research infrastructure

(i) Japan will promote the provision of data concerning global climate change forecasts obtained through the use of supercomputers and satellites operated by individual countries.

- Providing climate change projection data obtained by Earth Simulator (MEXT) (repeat)

  Japan will make international contributions by providing data obtained by Earth Simulator such as regional climate change projection through earth observation.

- International contributions through the provision of data from earth observation satellites (MOFA, MEXT) (repeat)

  In order to contribute to global surveillance of disasters and monitoring of forests, Japan will provide developing countries with data sent from Japanese earth observation satellites such as the Advanced Land Observing Satellite "Daichi "(ALOS) and promote the use of such data.

- Global environment observation from satellite (MEXT, MOE) (repeat)

  Japan will measure the global distribution of the concentration of carbon dioxide and methane by using the Greenhouse Gases Observing Satellite "GOSAT", draw global maps of estimated concentrations of

these gases and estimated carbon balances, and provide relevant data to developing countries.

(ii) Japan will promote the disclosure of information concerning the world's most advanced, highest-performance research facilities in the country and the use of such facilities.

- Promotion of international joint use of advanced research facilities (MEXT)

  Japan will promote the use of the world's most advanced, highest-performance research facilities in the country by foreign researchers, mainly those from Asian countries, and pursue international joint research in order to resolve global issues.

(iii) Japan will promote the establishment and improvement of international research infrastructure.

- Building the Global Earth Observation System of Systems (GEOSS) (MEXT, etc.) (repeat)

  Japan will play the leading role in building the Global Earth Observation System of Systems (GEOSS), in which 72 countries, EC and 52 intergovernmental, international and regional organizations are participating, in order to encourage international cooperation in earth observation and prediction and to provide data and results which contribute to nine areas of societal benefits.

- Promotion of large-scale international joint projects (MEXT) (repeat)

  Japan will promote international joint projects such as the ITER (International Thermonuclear Experimental Reactor) project and the International Space Station (ISS).

3. Strengthening the basis for promoting S&T diplomacy

(i) Japan will enhance human resources and networks involved in S&T diplomacy.

- Enhancement of policy dialogue with other countries (Cabinet Office, MOFA, etc.)

  Japan will enhance ministerial-level policy dialogue on S&T with other countries by holding a meeting of S&T ministers of Japan and African nations, and the Informal Ministerial Meeting on Science and

Technology between ASEAN and Australia, China, India, Japan, Korea and New Zealand, etc. In addition, it will dispatch excellent Japanese scientists and engineers in both public and private sectors to foreign countries in cooperation with Japanese research institutions, etc. and diplomatic establishments abroad in order to promote dialogue. Measures for promoting dialogue will be considered in the future.

- Enhancement of the functions of diplomatic establishments in regard to S&T diplomacy (MOFA)

  Japan will enhance the S&T related functions of diplomatic establishments abroad by designating official in charge of S&T affairs at its major diplomatic establishments, training diplomats proficient in S&T and utilizing local S&T-related human resources.

- Enhancement of leadership at international conferences and organizations (MOFA, etc.)

  Japan will seek to show its leadership in S&T scenes by dispatching high-level experts to international conferences and organizations and securing senior posts, such as chairmanship.

- Enhancement of intra-governmental coordination and collaboration with foreign embassies in Tokyo and the development of a network of diplomatic establishments and other overseas offices (Cabinet Office, MOFA, MEXT, etc.)

  Japan will enhance collaboration intra-governmental coordination and collaboration with foreign embassies in Tokyo in order to promote S&T diplomacy. In addition, it will develop a network of diplomatic establishments and overseas offices of Japanese S&T-related organizations.

- Enhancement of the international network of researchers and fostering of young researchers capable of making international contributions (MEXT, etc.)

  Japan will promote international research exchanges by utilizing frameworks of agreements between Japanese and foreign research councils or between Japanese and foreign universities, thereby enhancing the international network of researchers. In addition, it will foster young researchers with keen international perspective.

- Japan-CGIAR Fellowship Program (MAFF)

The program provides, to young Japanese researchers, opportunities of research training in the Consultative Group on International Agricultural Research (CGIAR) in order to foster agricultural researchers with international perspectives.

(ii) Japan will enhance cooperation with other countries by building global and pan-Asian databases and actively engage in international activities for standards-setting.

- Development of an open access database (Cabinet Office, etc.)

  In order to promote international joint research and personnel exchanges in Asia, Japan will cooperate with Asian countries to develop a public database system in which individual countries can register data concerning researchers, R&D results, measures for supporting business-academia-government collaboration and research exchange programs, and which can be accessed without restriction.

- Global Mapping (MLIT)

  In order to help to deal with global issues such as global warming, this project seeks to develop accurate geographic data composed of eight layers, including land cover, at a one-kilometer resolution with consistent specifications. In particular, Japan will play the central role in supporting the mapping process of other countries as the advocator and the secretariat of International Steering Committee for Global Mapping.

- Enhancement of collaboration in Asia for international standard-setting (MIC, METI)

  Under this project, Japan, China and the Republic of Korea will cooperate to test international connections of products related to the Next Generation Network (NGN) so that Japan and Asia as a whole can play the leading role in setting international standards regarding NGN. Moreover, Japan will conduct technical cooperation such as dispatching experts to promote capacity building so that the industrial sectors of Japan and other Asian countries can cooperate to engage in international standardization activities at ISO and IEC.

- Active involvement in standard-setting work at ITU with a view to tackling global warming (MIC).

  In order to play the leading role in the implementation of measures for reducing greenhouse gas emissions using ICT and the

standards-setting work regarding ICT necessary for this, Japan will invite symposiums of the International Telecommunication Union (ITU) on ICT and climate change and actively involve itself in the standard-setting work in ITU regarding anti-global warming measures.

(iii) Japan will provide information showcasing its leading-edge S&T and broadly disseminate them abroad.

- Enhancement and provision of information on Japanese S&T (Cabinet Office, MOFA, MEXT, etc.)

  Japan will compile information and data on S&T involving the country's government, industry and academia and disseminate it abroad to other countries through written materials such pamphlets and via the Internet.

Conclusion

This year, Japan will host G8 Hokkaido Toyako Summit and the G8 Science and Technology Ministers' Meeting, etc. Taking this opportunity, we adopted the new concept of "S&T diplomacy" and worked out basic policies for this concept, strategies for the promotion and specific measures to be taken.

S&T is inextricably linked to the future of not only developed countries but also developing countries. Therefore, emerging countries such as BRICS, as well as the United States and European countries, have been promoting S&T as a national policy and incorporating it in diplomacy.

This report focuses mainly on S&T diplomatic strategies in relation to Asian and African countries and developed countries in light of the coming G8 Hokkaido Toyako Summit and TICADIV. However, we must not forget to pay attention to Central and South American countries, too, in the future.

Under the circumstances, it is quite natural for Japan, the country which aims to become an "advanced science and technology-oriented nation," and has world-leading S&T, to utilize its superior S&T expertise for diplomacy in a strategic manner.

This report covers mainly international S&T measures, which are tools for pursuing S&T diplomacy. However, in order to promote S&T diplomacy, it is also necessary to create a favorable environment for smoothly implementing private-sector activities. Moreover, it is essential to provide support for foreign and Japanese researchers to live and be active outside their home countries with due consideration of the fact that Japanese researchers and students are less involved in international exchanges than their foreign counterparts.

As described above, in addition to the tasks taken up in this report, there are other tasks that should be considered for the purpose of strengthening S&T diplomacy. We will conduct a follow-up on the implementation status of the measures cited in this report and the effectiveness thereof. At the same time, we hope that deliberations on how to promote Japan's S&T diplomacy will be continued from various viewpoints in coordination with relevant efforts toward institutional reforms.