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Report on the Development and Results of International Science and Technology Cooperation Promoted by the National Science Council

In recent years, the National Science Council has been responsible for advancing any number of international S & T cooperation projects. These programs and their progresses are divided into several categories and described below:

A: The continued strengthening of S & T cooperation relations with nations which already have such ties with the ROC, including the U.S., Japan, France, Germany, Korea, Singapore, South Africa, the Netherlands, Switzerland, and Austria.

1. ROC-U.S. Cooperation: By 1988, various ROC government agencies had signed 24 bilateral S & T agreements with the U.S. By the end of 1991, the number of bilateral accords on S & T cooperation had expanded to 51, accounting for nearly one half of the existing 107 cooperative pacts between the two nations. Many of the subjects of these agreements are U.S. governmental organizations. In 1988, these included: the National Science Foundation, the National Institutes of Health, the Nuclear Regulatory Commission, the National Institute of Standards and Technology, the National Technical Information Services, the U.S. Department of Agriculture, the U.S. Department of Labor, the Trade Development Program, the Bureau of Reclamation of the Department of Interior, the Department of Energy, the National Academy of Sciences, the National Oceanic and Atmospheric Administration, and the Environmental Protection Administration. By the end of 1991, cooperation was expanded to the Alcohol, Drug Abuse and Mental Health Administration, the Federal Energy Regulatory Commission, and the Charting and Geodetic Services, National Ocean Service, NOAA, increasing the total number of cooperative organizations to 16. In recent years, the scope of several on-going joint research projects have been broadened, including a) After the ROC-U.S. Workshop on Long-Term Air Quality Changes and Their Climatic Impact in December 1989, the Climate and Air Quality Taiwan Station (CATS) was inaugurated. Background climatic and atmospheric research was carried out under this project which was affiliated with the International Global Atmospheric Chemistry Project (IGAC); b) In the area of global change, planning was completed on the Kuroshio Edge Exchange Processes (KEEP) and World Ocean Circulation Experiences (WOCE) projects in August and September of 1989, respectively; and c) Comprehensive planning of the third phase of the five-year (1991-1996) ROC-U.S. Natural Hazards Mitigation Research Program was undertaken. Meanwhile, in order to promote aviation technology development in the ROC and train basic manpower in aviation technology, 30 academics were selected to undergo training at the American Applied Physics Laboratory (APL) in February this year. In addition, a Science Division was inaugurated in Chicago in February 1991 to create a new base for expansion. From these examples, we can see that over the past three years ROC-U.S. bilateral S & T cooperation ties have grown at blazing speed. This also indicates that S & T cooperation activities account for an extremely high proportion of all ROC-U.S. cooperation ties.

2. ROC-Japan Cooperation: The NSC has commissioned the Asia-Pacific Council for Science and Technology and the Japanese East Asia Association for Cooperation in Science and Technology to coordinate and carry out cooperative agreements to better unite the academic and business circles of the two nations. Currently, there are over 110 areas of cooperation, up from the 80 in 1988. Moreover, in order to introduce Japanese high technology and strengthen the training of state-of-the-art technicians with the aim of raising domestic S & T standards, increasing technical capability, and improving Taiwan's trade deficit with Japan, the NSC in 1989 began selecting outstanding persons to undergo study and research of high technology in Japan. Under this special plan, 26 persons were sent to Japan in 1989, 31 persons in 1990, and 27 in 1991.

3. ROC-France Cooperation: In recent years, the NSC has continuously increased ties with French S & T cooperation organizations. Centre National de la Recherche Scientifique (CNRS) and Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER) are new cooperative units. Cooperative fields have been deeply rooted in medical sciences, bio-technology, atomic energy, geology, mathematics, and oceanography. Dr. Hsia Han-min, Chairman of the NSC, visited France in September 1990 to strengthen bilateral cooperation. Dr. Hsia discussed relevant matters with presidents of the MRT and other French research institutes. Dr. Francois Kourilsky, Director General of the CNRS, was invited to visit Taiwan in November 1991. He lauded the research achievements here in life sciences, oceanography, and mathematics.

4. ROC-Germany cooperation: The NSC primarily conducts S & T cooperation with such German organizations as the Deutsche Forschungsgemeinschaft (DFG), Deutscher Akademische Austauschdienst (DAAD), and Alexander von Humboldt Stiftang (AVH). In June 1989, the NSC and the DAAD signed an agreement sending doctoral students from the ROC to Germany for short-term (6-18 months) studies. Last year (1991), 16 local doctoral candidates were selected to take part in the program.

B: Establishment of S & T cooperation relations with other countries:

New cooperation ties have been established with nations including Hungary, Czechoslovakia, the Commonwealth of Independent States, the United Kingdom, and Ireland as described below:

1. ROC-Hungary cooperation: In order to expand cooperation relations with Hungary, NSC Chairman Dr. Hsia Han-min led a delegation to Hungary in September 1990, setting a foundation for future cooperation ties between the two countries. Subsequently, in wake of further contact between the two sides, Mr. Ujfalussy, Vice President of the Hungarian Academy of Sciences, along with two other officials of the institution visited Taiwan in the beginning of June 1991. On 10 June, they represented Hungary in inking a scientific cooperation agreement with the NSC. In the future, the NSC and the Hungarian Academy of Sciences, along with the Chung Hwa Institution for Economic Research, will jointly hold an Economic Reconstruction and Growth Seminar. Eleven noted East European scholars will be invited to Taiwan to attend the meeting and discuss the state of economic reform in Eastern Europe. In addition, the Asian Vegetable Research Center and the Hungarian Vegetable Research Center are conducting cooperation on pepper growing and seeding. The Hungarian side has already sent a senior researcher to Taiwan for this project.

2. ROC-Czechoslovakia cooperation: In wake of NSC Chairman Dr. Hsia Han-min's leading of a delegation to Hungary in September 1990, Dr. Liu Ke-chih, Director of the Humanities & Social Sciences Division, also led a delegation to Czechoslovakia. Afterwards, under the active coordination of Dr. Meng Hsien-chun, Director of the NSC Representative Office in Europe. Dr. Jiri Niederle, President of the International Cooperation Council of the Czechoslovak Academy of Sciences visited Taiwan on 10 May, 1991 and signed an ROC-Czechoslovak scientific cooperation agreement while on the island. As a result, four Chinese professors visited Czechoslovakia and four noted senior Czechoslovak scientists visited Taiwan in August 1991.

3. ROC-Commonwealth of Independent States cooperation: At the invitation of NSC Chairman Dr. Hsia, Dr. Boris Kryukov, the Deputy Director of the Soviet National Science Academy of Engineering, led a four-member delegation to Taiwan in November 1991. On November 14th, Dr. Kryukov signed a memorandum of understanding on ROC-Russian technology cooperation, including the sponsoring of bilateral seminars, mutual exchanges of scientific personnel, and the carrying out of cooperative research plans. As the political center of the new Commonwealth of Independent States is in Russia, NSC Chairman Dr. Hsia led a delegation to Russia in December 1991 with the aim of strengthening ROC-Russian S & T ties and bettering the understanding of the domestic situation in Russia. During the trip, Dr. Hsia exchanged opinions on S & T cooperation matters between the ROC and the Commonwealth of Independent States with the Minister of the Ministry of Science, Advanced Education. Both sides are expected to open representative offices in Taipei and Moscow by the end of this year. The NSC is presently busy planning its office. With the approval of both governments, the respective offices will be opened.

4. Future cooperation with the EC: The NSC has already sought approval from the Executive Yuan to immediately establish a science division in Vienna to be responsible for EC affairs. The NSC is also trying to take other steps to initiate cooperation with the EC in the future.

5. ROC-United Kingdom cooperation: Back in 1987, sponsored by the NSC, the Department of Geology of the National Taiwan University jointly held the First Sino-British Geological Conference in Taipei with the London University. In 1989, the NSC also financed ten Chinese geologists to attend the 2nd Sino-British Geological Conference in London. In August 1991, the NSC and the Royal Society of England signed the Memorandum of Understanding for exchanging scientists and holding bilateral seminars. In November 1991, Dr. Shih Hung-chih, Director of the International Programs Division, NSC, visited England to further cement ties with the Royal Society and pursue cooperation with the British Academy.

6. ROC-Ireland cooperation: The EOLAS and the NSC signed the Agreement on Science and Technology in August 1990 for applied science research and technology development. In January 1991, Mr. J.M. McBride, Chairman of the EOLAS, and Dr. Barry McSweeney, director of the Bio-technology Center (under the EOLAS), visited the NSC seeking to develop cooperation in bio-technology. In September of that year, the NSC sponsored the visit of four Chinese professors to Ireland discussing issues in this field.

C: The state of participation by the ROC in the field of S & T commonly focused on by countries throughout the world:

1. Active participation in international research projects

(a) The ROC's research vessel (R/V) "Ocean Researcher I" reached the port of Manila on 11 December, 1990, in its inaugural venture, cooperating with the Philippines on the World Oceanic Circulation Experiment (WOCE). In addition, during the vessel's trips through the Bashi Channel between Kaohsiung and Manila, Philippine scholars and experts in the field were invited aboard to jointly take part in surveying work. Any number of research findings previously unknown to the Philippines were established.

(b) The American R/V Moana Wave arrived and stayed in the Taiwan Strait in May and June 1990. ROC and American researchers jointly carried out research on geophysics related to the Taiwan-Luzon collision belt and investigations of the waters around southern Taiwan. Information was obtained helping to explain the collision of Taiwan and the mainland, which led to the formation of ocean floors and mountains throughout history.

(c) The Russian research vessel, financially aided by the NSC and invited by National Sun Yat-Sen University, arrived in Kaohsiung harbor on 17 June, 1991. This ship carried out research on the IGBP (International Geosphere and Biosphere Program) Project and conducted academic exchanges with local oceanographers.

(d) The French Atlante research vessel is scheduled to visit Taiwan in 1993. At that time, ROC oceanographers will board the ship and jointly take part in related research.

2. Active Participation in the International Decade for National Hazard Reduction (IDNHR) Project

In order to reduce the misfortunes brought on men by various natural disasters, the 42nd General Assembly of the United Nations in 1987 passed the IDNHR initiative project. The project began in 1990 and will last ten years. In order to complement these measures, the ROC and the U.S. began carrying out the TAMEX (Taiwan Area Mesoscale Experiment) Plan on Taiwan. The basis of this project was set in the earlier signed ROC-U.S. Cooperative Guidelines between the NOAA and NSC on mesoscale. The NSC sponsored the International AMS (American Meteorological Society) and TAMEX Seminar, jointly held by National Taiwan University and the Central Weather Bureau between 3-6 January 1992. At the same time, planning was carried out on the Medium-Term Disaster Mitigation Plan which covers weather (including typhoons, and relevant TAMEX research), earthquake, and flood prevention. A number of successes have been seen so far from this research. The results will be forwarded to related government authorities to serve as reference in implementing better measures in the future.

3. Active Participation in the Global Change International Cooperation and Research Project.

Global change research has been a focal point of international research in recent years and is also one of the priorities of the NSC's inter-disciplinary research plans. Presently, research projects under way in this area include: 1) KEEP, 2) WOCE, and 3) CATS. In the future, the NSC will further establish direct links with and make contributions to the relevant international projects on global change. Moreover, the ROC joined the IGFA, an international group of funding agencies for global changes. Dr. Wang Sung-mao, Vice Chairman of the NSC, was invited to lead a delegation to the fourth annual conference of the IGFA held in The Hague from 2-4 December, 1991. In addition, the ROC will host the organization's annual conference in the spring of 1993.

D: Participation in important international organizations

Besides promoting international S & T cooperation and academic exchanges, the participation in international organizations raises the ROC's international image and stature. Therefore, participation in such groupings has been a focal point of NSC work in recent years. In October 1989, the NSC joined the IFS as a future member. In April 1991, the nation entered the foundation as a formal member under the name "Republic of China." The IFS was founded in 1972 in Stockholm, Sweden with the purpose of forwarding international scientific cooperation, and assisting developing nations to develop most urgently needed technology in order to raise living standards. Presently, 93 science and research organizations from 79 countries are members of the IFS, making it an important international S & T body. Since the entrance of the NSC into the foundation as a future member, the NSC has actively participated in foundation activities. The NSC has mapped out the International Scientific Instrument Training Program in order to assist in the training of scientific personnel from Third World nations on how to operate and maintain such equipment. This training course will be instituted in five phases over three years. The first phase of training was held in February 1992 at the NSC's Hsinchu Precision Instruments Center.

In the future, the NSC will continue to strengthen cooperation ties with the countries already mentioned. In addition, cooperative relations with the Commonwealth of Independent States and East European nations will be expanded, as well as extended to the three Baltic nations. Cooperation ties have yet to be established with South American nations. Fact-finding missions to the region are being planned to better understand local conditions so that across-the-board planning may be commenced. As such, all types of cooperative ties can be utilized to assist in development of the region. At the same time, the NSC will provide important research results and information from the Global Change and Natural Hazard Mitigation Programs to backward Asia-Pacific nations in order to help them avert damage caused by all kinds of natural disasters and raise technology levels.

Database on Sci-tech R&D Projects of Government Departments

There is currently no complete database on sci-tech R&D projects being carried out by the many government departments. There is, therefore, no simple method of referencing projects. In some cases, the same researcher has applied for the same project through different bodies. In other cases, different research groups from different bodies are conducting similar or related research since there is no way to discover the overlap. In order to address this problem, the NSC, along with other relevant bodies, has established a basic database to facilitate referring to research projects and to help in related administration. Also in conjunction with the Research, Development, and Evaluation Commission, the NSC has drawn up standards regulating commissioned research projects so that government research projects will all be carried out under the same administrative system. Data from the "Year-end Conference on Sci-tech Research Projects" for the past two years is already being entered into the database as a foundation.

The database will include the following:

1. Project name (in Chinese and English)
2. Initial project reference number
3. Executing body
4. Statistical reference number
5. Research field
   a. Science
   b. Engineering
   c. Medicine
   d. Agriculture
   e. The Humanities and the social sciences
6. Strategic sci-tech topics
7. type of research
   a. Basic research
   b. Applied research
   c. Technology development
   d. Commercialization
8. Project period
   a. Full-term
   b. Intermediate
9. Source of funding (Support organization)
   a. Full-term support
   b. Intermediate support
10. Current funding
    a. Capital expenditure (e.g., land, construction, equipment, etc.)
    b. Overhead expenditure (e.g., personnel, materials, etc.)
11. Has the project manager participated in this type of project before
12. Project manpower (including research, technical, and support personnel)
    a. Name
    b. Birthdate
    c. Specialty or field
    d. Professional level
    e. Education
    f. Sex
    g. Person-month participation
    h. Type of participation

Date for fiscal years 1990-1992 should all be entered in the system within a year. The system will be connected to PC's located at all relevant government agencies, or they will also be able to request information facsimilie. The system will be a high-efficiency, complete nationwide sci-tech project database which will supply sci-tech project information to the government to help in policy decision-making. In the future, the database will be made available for reference by all.

In addition, the NSC and the Research, Development, and Evaluation Commission have drawn up the "Administration of All Central Government Agency-Commissioned Research Projects (Draft)". This draft deals with carrying out all aspects of government projects: development, evaluation, notification, contracting, funding, acceptance of results, and breach of contract. This will act as a basis for all government agencies in executing commissioned research projects.