

China's Scientific & Technological Actions on Climate Change

Jointly Issued by

Ministry of Science and Technology

National Development and Reform Commission

Ministry of Foreign Affairs

Ministry of Education

Ministry of Finance

State Environmental Protection Administration

Ministry of Agriculture

Ministry of Water Resources

State Forestry Administration

State Oceanic Administration

China Meteorology Administration

Chinese Academy of Sciences

National Natural Science Foundation

China Association for Science and Technology

June, 2007

Contents

I. Current Status of Climate Change and Urgent Demands for S&T	1
1. Climate change is an increasingly prominent issue that brings about profound impacts on human societies	1
2. An appropriate response to climate change would be very much related to China's economic and social development	1
3. Addressing climate change calls for urgent S&T activities	1
II. China's S&T Achievements in Climate Change	2
1. Scientific research and technological development	2
2. Infrastructure buildup for Scientific Research	3
3. Human Resources Development and Research Structural Buildup	3
III. Guidelines, Principles and Targets	4
1. Guidelines	4
2. Principles	4
3. Targets	4
IV. Key Tasks	5
1. Scientific aspects of climate change	5
2. Technological development for GHG emission controls and climate change mitigations ...	6
3. Climate change adaptation technologies and measures	7
4. Key strategies and policies on climate change	7
V. Measures to Enforce the Implementation of the China's S&T Actions	8
1. Strengthening leadership and coordination for jointly promoting S&T research progress on climate change	8
2. Mobilizing more financial resources from diverse channels to support scientific research and technological development on climate change	8
3. Strengthening human resources development and its introduction from overseas and enhancing disciplinary build-up in the field of climate change	9
4. Strengthening S&T basic infrastructures and platforms in support to research on climate change	9
5. Strengthening popularization of scientific knowledge, and increasing public awareness of climate change	9
6. Strengthening international S&T cooperation and promoting international technology transfer	10

Climate change has an increasingly significant and far-reaching impact on all nations in the world. It therefore becomes a focus of attention by international communities. China, as a developing country that is vulnerable to the impacts of climate change, attaches great importance to the issue of climate change, and China has adopted a number of active measures to address it. The Outline for National Medium- and Long-term Plans for Science & Technology Development (2006-2020) (hereafter referred to as the Outline for S&T Development) has listed energy and environment as priority areas, in which the global environmental change monitoring and response measures are identified as one of the priority themes. The China's National Climate Change Programme (hereafter referred to as the CNCCP Programme) clearly states that climate change issue shall be addressed through S&T advances and innovations, and that strengthening S&T is a major initiative in response to climate change at the national level. In order to implement the key tasks identified in the Outline for S&T Development, to provide S&T support to the CNCCP Programme, to coordinate climate change-related scientific research and technological development, and to enhance the comprehensive S&T capacity in response to climate change, the China's Scientific & Technological Actions on Climate Change (hereafter referred to as the China's S&T Actions) is hence formulated as follows:

I. Current Status of Climate Change and Urgent Demands for S&T

1. Climate change is an increasingly prominent issue that brings about profound impacts on human societies

Research shows that human activities have led to the climate change characterized with global warming over the past five decades. It is expected that by the end of this century, the global average surface temperature will increase by 1.1-6.4 °C. This change has affected and will continue to affect the natural ecosystem and human socio-economic systems in an adverse manner, posing one of the most critical challenges to mankind in his effort to pursue sustainable development.

Due to global climate change, the climate in China has experienced significant changes in recent years. During 1986-2006, China experienced 21 warm winters nationwide in succession. Consequently there was a marked increase in the frequency and intensity of extreme weather/climate events and associated disasters all causing increased losses, such as shortage of water resources and a sharp imbalance between regions, a deterioration in ecology and environment, a tremendous loss in agricultural production, a heavier pressure on food security, a rising sea level, and a threat to coastal economic and social development.

2. An appropriate response to climate change would be very much related to China's economic and social development

In the next 15 to 20 years, China will continue to register a rapid economic growth, which means a rising demand for and consumption of energy. The Chinese Government is active in fulfilling its UNFCCC commitments as evidenced by issuance of the CNCCP Programme, and in achieving the target to reduce energy consumption per unit GDP by 20% by 2010 against the 2005 level. In spite of the fact that the China's energy consumption per unit GDP and GHG emission intensity suggest a decline in general, it would be difficult to reverse the trend of rising energy consumption and total GHG emission in a short period of time. Climate change and related international treaties are regarded as a special international environment encountered in the process of China's peaceful development and shall be dealt with appropriately.

3. Addressing climate change calls for urgent S&T activities

Responses to and solutions of the climate change issue, after all, depend on the advances in S&T. Strong S&T supports in connection with climate change are required to better understand the behavior of climate change, to

identify its impacts, to develop its adaptation and mitigation technologies, and to formulate climate change response policies and measures.

Since the 1990s, climate change has become an important leading-edge discipline. Major developed countries that have invested huge financial resources in research are now in a leading position in climate change-related S&T. The climate change-related S&T projects, which China has accomplished, have provided strong supports to its internal and foreign affairs in the field of climate change. But the fact that related S&T activities in China are still lack of a medium- and long-term strategies and they are met with inadequate funding, makes it difficult to adapt itself to the rapid developments in climate change or to meet the needs in formulation and implementation of national climate change-related policies and actions, and in participation in negotiations and international cooperation. It is of imperatively urgency to reinforce China's climate change-related S&T.

II. China's S&T Achievements in Climate Change

1. Scientific research and technological development

Since 1990, China has carried out a series of climate change-related S&T projects under framework of national S&T programs, such as National Hi-tech R&D Program (863 Program), National Basic Research Program (973 Program) and National Key Technologies R&D Program, focusing on global climate change prediction and its impacts, future trends of the living environment changes in China, global environmental change, response strategy and technologies in response to climate change, genesis mechanism of and prediction theory on major climate- and weather-induced disasters in China, technologies for use of clean and efficient energies, for energy saving and efficiency, for exploitation of new and renewable energies, and etc.

Meanwhile, China is also actively involved in the international S&T cooperation on the issues of global environmental changes, such as the four international research programmes under the framework of Earth Science Systems Partnership (ESSP): World Climate Research Programme (WCRP), International Geosphere-Biosphere Programme (IGBP), International Global Change Human Dimension Programme (IHDP) and International Biodiversity Programme (DIVERSITAS), and the Intergovernmental Coordination Organization on Global Earth Observation (GEO) and the Global Climate Observing System (GCOS). China's participation in the global change research initiatives are marked with both Chinese characteristics and global significance.

Thanks to the above-mentioned national programmes and international cooperation in S&T, China has made achievements in climate change-related research and technologies development in the following four aspects:

(1) Basic Research on Climate Change

With established atmospheric background observatories, some significant findings have been made on GHG observations, especially CO₂ concentration. Methane emission data from paddy field in China have been collected. The study on China's paleo-climate research based on loess, stalagmite, ice core, lake core data and historical literatures keeps the same pace as the rest of the world research communities. The temperature change curve depicting climate change over the past 100 years in China has been established. The global and regional climate models Chinese owning Intellectual Property Rights (IPR) have been developed, which were widely recognized and honored with a National First Award for Advances in S&T and they have been applied to operational climate predictions. Some modeling findings from the global climate model have been incorporated in the Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC). The study of Asian monsoon activity and variability and their contributions to drought and flood in China was concluded with important findings that draw the world's attention. The regional climate change scenarios for future China have been produced on a preliminary basis.

(2) Impacts of Climate Change and Response Measures

An important conclusion has been reached that agricultural farmlands fall into the category of "weak carbon sinks". The Daily Weather Generator based stochastic numerical weather model and the Chinese Regional

Agricultural Impact Assessment Model have been developed. A database system has been created to support research on impacts of climate change; the Knowledge Database of Major Policies and Action Plans in response to climate change in Agriculture, Forestry and Water Resources has been developed. Cost-benefits analysis of response strategies for areas most vulnerable to sea level rise has been made; and research methods on risk levels of climate change in line with international practices have been developed.

(3) Development and Application of GHG Emission Control and Climate Change Mitigation Technologies

Major advances have been made in developing efficient coal-burning power generation technology, heat-power co-generation technology, clean coal power generation technology, utilization technology of oil field torch gas, and etc. Energy efficient and saving technologies have been widely used in building materials, steel, chemicals, construction, transportation (electric vehicles), mining and other sectors. Research and development of renewable and new energies like wind power, bio-energy, solar energy, hydro power, thermal power and fuel cells have been witnessed substantial progress.

(4) Social and Economic Impact Analysis and Mitigation Measures

A preliminary analysis of the present status and future trend of GHG emissions and sinks in China has been made. The potential and cost of CO₂ reduction in energy, industry and transportation sectors has been studied. The impacts of different GHG emission limitations on China's emission control have been compared. The possible effects of developed countries' GHG emission reduction policies and measures on China have been studied.

On the basis of all of the achievements, the National Assessment Report on Climate Change was formulated and published.

2. Infrastructure buildup for Scientific Research

Large-scale observation networks have been put in place, including the national climate monitoring network, national weather observation network, national specialized meteorological observation network, national ecological observation network and CO₂ flux observation network. A number of key national laboratories and sectoral labs run used to study the global changes have been set up. With independent research efforts and through international cooperation, large equipments and facilities for climate change studies have been developed or introduced from overseas.

3. Human Resources Development and Research Structural Buildup

With about two decades' efforts, one core climate change expert team has been formed in China with expertise in economics, social sciences, energy, meteorology, ecology, environment and other disciplines. And now over 1,000 researchers and experts are working in the scientific and application fields of climate change.

Through participating in international negotiations and relevant international cooperative activities for long time, a number of experts both full of scientific knowledge and familiar with international instruments and negotiation procedures are available.

A number of national climate change research institutes have been set up. Training courses on climate change have been provided by many universities and colleges. Provincial technical service centers on Clean Development Mechanism have also been created.

III. Guidelines, Principles and Targets

1. Guidelines

With “Scientific Approach of Development” as guidance, science & technology shall play a basic and leading role in response to climate change for the implementation of the Outline for S&T Development and the CNCCP Programme. To this end, S&T innovations and advances shall be promoted; emissions of GHG shall be controlled through S&T solutions; and China’s adaptation capacities shall be enhanced, with the aims that strong S&T supports shall be provided to maintaining sustainable socio-economic development, safeguarding the national interests, and fulfilling the international commitments.

2. Principles

(1) Combining government leadership with enterprise participation

Based on national demands, emphasis shall be given to solving major S&T issues related to climate change. Governments should play a leading role in this process. At the same time, through policy and system innovations and by making use of the market mechanism, enterprises shall be encouraged to participate in key technologies R&D, including wider dissemination and application of research findings, by rousing their initiatives and enthusiasm in pursuing S&T innovation and advances.

(2) Combining technological researches with policy studies

On the basis of independent innovations and aiming at future trends of climate change-related S&T, the efforts shall focus on solving key issues and on developing key technologies so as to bring China’s climate change research to a new level. At the same time, by centering on national demands for social and economic development and on the strategy for peaceful development, and taking into consideration the international political, economical, commercial and diplomatic situations, policies related to domestic and international affairs should be advised in active response to climate change.

(3) Combining short term demands with long term objectives

Technical solutions and response strategies shall be provided, which should be effective and scientifically based to tackle the practical and emerging issues encountered in international climate change cooperation and in domestic demands for energy saving and pollutants emission reduction technologies. At the same time, the technological supporting system with strong independent innovative potentials shall be set up to meet medium- and long-term national strategic targets.

(4) Combining overall planning with separate implementation

Taking into consideration the current S&T funding channels and division of responsibilities of agencies as well as the necessity to integrate the available resources, an overall planning and layout of climate change S&T shall be made. At the same time, the tasks as set out in the China’s S&T Actions shall be implemented in all national S&T programs according to their respective functions.

3. Targets

Targets to be met by 2020 are:

- (1) To significantly improve the capability for making independent innovations in the research on climate change;
- (2) To make breakthroughs in and wider applications in social and economic sectors of key technologies related to GHG emission control and climate change mitigation;
- (3) To notably enhance the adaptive capacity of key sectors and typical vulnerable areas in response to climate

change;

(4) To markedly improve the ability of S&T support to international cooperation, engagement and decision making on climate change;

(5) To make substantial progress in building up the climate change disciplinary, and in improving S&T infrastructure, research conditions and qualification of research teams;

(6) To noticeably increase the public's awareness of climate change and related scientific knowledge.

And the near term objectives during the 11th Five-year Plan period (2006-2010) are

(1) To put in place a national S&T policy framework and coordination mechanism in response to climate change and to further improve the capacity of integrating S&T resources;

(2) To achieve internationally recognized research findings in key climate change areas;

(3) To develop and improve Chinese prediction, analysis, assessment and decision-making models on climate change;

(4) To advance research on key technologies for climate change mitigation and to launch pilot projects at local level and in industrial sectors;

(5) To make breakthroughs in the studies on the impacts of climate change on agriculture, water resources, coastal areas, forestry, fishery, bio-diversity, desertification and human health and to implement demonstration projects on adaptation in typical vulnerable areas;

(6) To formulate the National Adaptation Strategy on Climate Change;

(7) To make China's contributions to the design of international climate change regime;

(8) To build up highly professional research teams as well as research bases on climate change.

IV. Key Tasks

1. Scientific aspects of climate change

New climate system models: to develop the new climate system models, which will depict carbon cycle process, the earth's physical and biochemical processes, land surface, ice sheets and eco-system, as well as high resolution numerical model of sea and atmospheric circulations; and etc.

Detection and attribution of climate change: to reconstruct the high resolution paleo-climate change series in China over the past 2,000 years; to conduct sensitivity experiments on impacts of natural and anthropogenic factors with climate models; to determine the dominant factors affecting climate change in different historical periods; and etc.

Monitoring, prediction and early warning of climate change: to develop technologies of climate change monitoring, prediction and early-warning; to monitor the process, elements and factors of climate change; to simulate and predict future global climate change under various GHG emission scenarios; to predict future climate change in major regions of the globe under the influence of human activities; to provide early warning of extreme weather/climate events, associated disasters as well as risk assessment; and etc.

Asian monsoon system and climate change: to study changes of Asian monsoon system and its role in global climate change; to analyze the impact of human activities on Asian monsoon system and climate change; to study the sea-land-air interactions and their role in global climate anomaly; and etc.

Genesis mechanism of extreme weather/climate events and associated disasters in China: in the context of global warming, to study changes and trend of frequency, intensity and spatial distribution of extreme weather/climate events and associated disasters; to understand changes of energy and water cycle in Asia and China as well as their relationship with drought and flood; to study costal sea level variation characteristics; and etc.

Changes and trends in cryosphere: to study inter-effects between cryosphere and such aspects as climate, hydrology, ecology, environment, and etc.; to study impact mechanism of snow cover changes of Qinghai-Tibet Plateau on climate of the middle and lower reaches of the Yangtze River as well as its response to global climate change; to study Polar and Eurasia snow covers' effects on China's climate change; and etc.

Responses of physical cycles to climate change: to study carbon, nitrogen and water cycles as well as their coupling mechanism in the context of climate change, to study the response of components and processes of ecosystems to climate change; and etc.

2. Technological development for GHG emission controls and climate change mitigations

Energy saving and energy efficiency technologies: to develop energy saving and energy efficiency technologies and equipments for such energy-intensive sectors as electricity, metallurgy, petrochemical and chemical industry, building materials, transport and construction, and etc. and of electromechanical machinery; to develop commercial and civilian energy-saving techniques and equipments; to study integrated cascade use of energy; and etc.

New and renewable energy technologies: to develop low-cost, large-scale renewable energy development and utilization technologies, large-scale wind power generation equipments; to develop technology of photovoltaic cells with high cost-effect ratio and its utilization; to develop solar power generation technology and study integration of solar powered building; to develop technologies of fuel cells, hydropower, biomass energy, hydrogen energy, geothermal energy, ocean energy, biogas, and etc.

Clean and efficient coal exploitation and utilization technologies: to develop efficient coal mining technologies and related equipments; to develop such efficient power-generation technologies and equipments as heavy-duty gas turbines, integrated gasification and combined cycle (IGCC), high steam condition supercritical (ultra-supercritical) units, and large-scale supercritical circulating fluidized bed; to develop technologies of coal liquefaction or gasification with poly-generation system; to develop conversion technologies of coal liquefaction, gasification and coal chemical industry; and etc.

Exploration and clean/efficient development and utilization technologies of Petroleum, natural gas and coal bed/mine methane. To develop exploration technologies of complicated fault-block, lithologic stratum, and deep-sea and deep-reservoir petroleum and natural gas resources; to develop technologies for improving recovery efficiency of heavy oil pool and low-grade petroleum resources; to develop technologies for clean and efficient development and utilization of petroleum, natural gas and coal bed/mine methane resources; and etc.

Advanced nuclear technologies: to develop and acquire fast reactor designing and related core technologies, nuclear fuel and constructional materials-related technologies; to make breakthroughs in such key technologies as sodium cycle; to actively participate in the development and research on International Thermonuclear Experimental Reactor (ITER); and etc.

CO₂ capture, utilization and storage technologies: to develop key technologies and measures for capturing, using and storing CO₂; to design the technical road map for CO₂ capture, utilization and storage; to carry out related capacity building and engineering and technical demonstration project; and etc.

Biological and engineering carbon sequestration technologies: to develop biological carbon sequestration technologies in such sector as forestry; to develop all kinds of engineering carbon sequestration technologies;

and etc.

GHG emission control technologies through good agricultural and land-use practices: to develop technologies of improving agricultural productive practice and of improving land-use, for GHG emissions control, and etc.

3. Climate change adaptation technologies and measures

Climate change impact assessment models: to develop impact assessment tools and integrated assessment models based on existing climate change impact assessment models and according to characteristics and demands in making regional impact assessments in China; and etc.

Adaptation technologies & measures to impacts of climate change on China's major vulnerable sectors: to study impacts of climate change on China's such aspects as agriculture, water resources, coastal zone, forests, grass land and other ecosystems, human health and public sanitation, unique eco-system and endangered species; to develop corresponding adaptation technologies and measures; and etc.

Adaptation technologies & measures to the impacts of extreme weather/climate events and associated disasters: to study impacts of extreme weather/climate events and associated disasters on human society and ecosystem, and study technical measures for disaster mitigation; to develop technologies and corresponding response mechanisms for prediction, early warning and adaptation; and etc.

Development of risk management system for climate change impacts in vulnerable regions: to identify areas sensitive and vulnerable to climate change via impact assessments; to evaluate risk level of climate change impacts on various sensitive and vulnerable areas; to study on the establishment of climate change risk management system in China; and etc.

Climate change impacts on major construction projects and corresponding adaptation measures: to assess climate change impacts on China's major projects' construction and operations as well as the counter-actions, and propose corresponding response measures; and etc.

Interactions of climate change with other global environmental issues and adaptation measures: to study interactions of climate change with other global environmental issues such as biodiversity, desertification and environmental pollution, to develop response mechanism, adaptation technologies and measures; and etc.

Dangerous levels of climate change impacts and adaptation capabilities: to study dangerous levels of climate change impacts; to assess adaptation capabilities of different sectors and regions to climate change dangerous levels, and etc.

Case studies on adaptation: to carry out case studies in chosen sectors/regions on adaptation, to propose practical adaptation policies and measures via cost effectiveness analysis; and etc.

4. Key strategies and policies on climate change

Climate change and China's energy security strategies: to analyze medium- and long-term trends of China's energy demands; to study the relationship between GHG emission control and China's energy supplies/demands; to assess the economic and technological potentials of diversifying energy supplies and of energy saving and pollutants emission reduction; and etc.

Future international regime on climate change: to study development tendencies of international regime on climate change and analyze the potential impacts on China of various possible options; to make China's contributions on the design of international climate change regime; and etc.

China's future energy development and GHG emission scenarios: to study China's future energy demand scenarios and GHG emission scenarios; to study relationships between global GHG emission, stabilization of

GHG concentration and climate change; and to assess potentials of energy saving and emission reductions of China's industrial sectors and regions, and their macroeconomic costs; and etc.

Clean development mechanism and carbon trading system: to study impacts of climate change international regime on global carbon markets; to study the appropriate domestic policies matching CDM; to study the possible components and structure of the future China's carbon market system cored by CDM; and etc.

Addressing Climate change in relationship with low-carbon economic development: to assess policies and institutional structures of developed countries in development of low-carbon economies; to analyze possible approaches and potentials for China to develop low-carbon economy; and to study institutional frameworks, mechanisms and management models that facilitate low-carbon economy development in China; and etc.

International commodity trade and GHG emission: to study relationship between traded commodity and its GHG emissions; to evaluate in a comprehensive manner the impacts of global responsive actions to climate change on overseas transfer and division of manufacturing industries; and etc.

S&T response strategies in response to climate change: to study trend of climate change S&T development; to study the establishment of a mechanism of introduction, assimilation and re-innovation of technologies; to develop China's S&T development strategies in response to climate change, combining independent innovation with international cooperation; and etc.

V. Measures to Enforce the Implementation of the China's S&T Actions

1. Strengthening leadership and coordination for jointly promoting S&T research progress on climate change

Recognizing the significance of S&T on climate change, the Government should strengthen the macro management and policy guidance. To this end, a full play should be given to the Leading Coordination Committee on Global Environmental S&T (LCGEST) in leading, supervising and coordinating national S&T activities on climate change. The overall layout of S&T on climate change should be optimized, in order to closely coordinate such program, fund as National Basic Research Program (973 Program), Hi-tech R&D Program (863 Program), Key Technologies R&D Program, Technological Basic Infrastructure and Platform Program, International S&T Cooperative Protocols, and programs under National Natural Science Foundation, as well as scientific resources of academic institutions, universities and enterprises. All local, departmental and sectoral resources should be mobilized and integrated, in order to jointly promote climate change S&T.

The functions of Expert Committee and the Expert Groups under LCGEST should continuously be strengthened, by giving full play to the Expert Committee on major issues of climate change and to the Expert Groups in taking the lead of specific research topics. A standing interdisciplinary working mechanism for the committee and groups should be set up and further improved. The universities and research institutions should be encouraged and guided to conduct comprehensive crosscutting studies.

The Office of Global Environmental Affairs under the Ministry of Science and Technology (MOST) as the Secretariat of LCGEST should be further strengthened to better coordinate and communicate on the climate change issues.

2. Mobilizing more financial resources from diverse channels to support scientific research and technological development on climate change

The Government should be the main source of S&T resources for the research on climate change, and all national S&T programs should strengthen their supports to climate change, and promote the implementation of

the China's S&T Actions. At the same time, agencies, local governments, associations and business sectors should be guided to increase their financial support.

More resources should be mobilized from diverse and different channels to support climate change S&T. Enterprises should be encouraged to be a major player in tech-innovations and to increase their financial support in R&D. The financial and capital markets should be effectively utilized for technology development of mitigation climate change, and the venture investment should be introduced. All social circles should be encouraged to provide financial support to climate change S&T activities, international funding channels should be further explored and funding mechanisms under international treaties should be fully utilized.

3. Strengthening human resources development and its introduction from overseas and enhancing disciplinary build-up in the field of climate change

Efforts should be strengthened, especially for the availability of qualified academic team leaders, middle-aged and young talents with an international vision, and capable to steer the development of their own disciplines. Effective incentive and competitive mechanisms should be set up. The engagement of local and sectoral teams should be enlarged. Special efforts should be made to train and build up such research teams that have strong innovative capabilities, outstanding professional knowledge, and international reputations in the field of climate change studies, so as to build up an advanced, highly professional and well-reserved climate change research team.

Recruiting overseas talents and introducing foreign intelligence should be strengthened, and accordingly the policies on recruitments, incentive mechanism and evaluation system should be well established. A resilient mechanism in talent recruitment, intelligence attraction and project operation should be improved. Flexible approaches should be encouraged to attract foreign talents for consulting, lectures and technical cooperation.

Climate change disciplinary build-up should be strengthened, interdisciplinary research and cross-cutting with social sciences should be advocated and teaching programs of universities and research institutes should be optimized, so as to establish a multidisciplinary and well-structured framework of climate change S&T.

4. Strengthening S&T basic infrastructures and platforms in support to research on climate change.

A bunch of interdisciplinary, comprehensive and innovative research bases and laboratories on climate change should be established, improved and integrated at the national level, to put in place a well distributed national climate change research network. All available conditions should be fully utilized to strongly strengthen such S&T infrastructures as climate monitoring system, observational networks of agriculture, water resource, sea level rise, ecological system, and etc.

The construction of platforms for sharing the climate change data should be strengthened. And priorities should be given to data sharing and system integration. In particular, efforts should be made in network-based resource sharing system and related mechanism should be promoted. Widely sharing of large scientific equipment should be strengthened. Local governments and sectors should facilitate the construction of technical service networks in response to climate change and create technical support platforms, contributing to form a national technical service system to address climate change.

5. Strengthening popularization of scientific knowledge, and increasing public awareness of climate change

A communication mechanism involving governments, media, enterprises and the public should be established. Newspapers, television, radio and Internet should be used to disseminate scientific knowledge of climate

change, response measures, current status and research findings on climate change both in China and around the world. And mass media should become an effective way to provide guidance from governments, to call for actions by enterprises and to increase public awareness of climate change.

A series of popular readings and outreaching materials on climate change should be published. Climate change knowledge popularization activities in different forms with rich information should be organized for young students at primary and middle schools. Institutes and universities are encouraged to set up student organizations and forums on climate change. Researches in institutes and universities should be integrated with the science popularization activities.

The topic of climate change should be an important component of all science popularization activities. Centralized training, outreach and demonstration activities should be well enhanced. Appropriate but differentiated outreach and knowledge popularization activities should be conducted in large, medium-sized and small cities and in rural areas.

6. Strengthening international S&T cooperation and promoting international technology transfer

S&T cooperation on climate change should be incorporated into bilateral and multilateral intergovernmental S&T cooperation agreements, in order to enhance the scope and in-depth of the international S&T cooperation on climate change.

The national, local, institutional and sectoral S&T programs can be further open to the international, according to the principle of “Mutual benefit and win-win outcome and promoting independent innovations”. It is encouraged to take the lead in launching international cooperative programs in a given field of climate change as appropriate to enhance the climate change research capabilities.

Greater efforts should be made to promote and participate in the establishment of effective technology transfer mechanism for the affordable, applicable, advanced and environment-friendly technologies to address climate change, and to encourage introduction, assimilation and re-innovation of the foreign technologies on mitigating climate change.

The Chinese scientists, research institutions and enterprises should be encouraged and supported to initiate and participate in international and regional scientific research and technological development programs on climate change. The Chinese scientists and officials should also be encouraged to compete for senior posts of international organizations. Foreign institutions and international organizations should be encouraged and welcomed to organize important international symposiums and workshops on climate change in China. Efforts should be made to attract important international S&T organizations to locate their headquarters or branches in China. A “Forum on Climate Change and Science and Technology” will be initiated by the Ministry of Science and Technology of China to promote international dialogues and exchanges of views on climate change.