Translation

The following document is China's climate change adaptation strategy for the period 2022-2035. It replaces an earlier strategy that covered the years 2013-2020. This new strategy aims to make China's society and economy more resilient in the face of climate change through better monitoring and prediction of extreme weather, more resilient crops, farmland, and waterways, and other measures. The strategy is designed to complement China's ongoing efforts to mitigate climate change by reducing greenhouse gas emissions.

Title
National Climate Change Adaptation Strategy 2035
国家适应气候变化战略2035

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National Climate Change Adaptation Strategy 2035

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Contents

Preface

Over the past century, under the combined influence of human activity and natural factors, the world has been experiencing climate change with global warming as a significant feature. The international community has increasingly recognized the serious threats and challenges climate warming poses to the present and future survival and development of mankind, and a global consensus has formed around taking active measures to address climate change. Mitigation and adaptation are the two major strategies for addressing climate change, and they are both mutually reinforcing and indispensable.

Mitigation means reducing greenhouse gas emissions and increasing carbon sinks through the long-term adjustment of natural ecosystems and energy, industrial, and other economic systems, in order to stabilize and reduce concentrations of atmospheric greenhouse gases and slow down the rate of climate change. In this process, the climate risks that have already occurred will not be eliminated. Potential climate risks are still accumulating, and they will continue to do so for a certain length of time even after the global achievement of a carbon emission peak and carbon neutrality.

Adaptation means strengthening the risk identification and management of natural ecosystems and economic and social systems, taking adjustment measures, fully utilizing favorable factors, and preventing unfavorable factors, in order to lessen the adverse impacts and potential risks arising from climate change. The impacts and risks of climate change are significantly regionalized in nature, and effective adaptation actions can reduce the adverse impacts and risks of climate change faced by countries and regions, which is more realistic and urgent for assuring economic and social development and ecological and environmental security.

China has always adhered to both mitigation and adaptation, and has implemented national strategies to actively address climate change. In order to coordinate promotion of climate change adaptation, China released its first *National Climate Change Adaptation Strategy* in 2013, specifying the overall requirements, key tasks, regional patterns, and assurance measures for climate change adaptation from 2014 to 2020, providing the guidance and foundation for climate change adaptation work. Since the release of the first *National Climate Change Adaptation Strategy*, China has achieved positive results in climate change adaptation, but given the long-term nature and complexity of climate change, current analysis and assessment of climate change impacts and risks are still insufficient, and the degree of emphasis and action on climate change adaptation still need to be increased.

The period from now to 2035 is a critical one in which China will basically achieve socialist modernization and build a beautiful China (美丽中国). The *Outline of the*

People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035[1] expressly proposes strengthening observation and assessment of the impact of global warming on China's regions with weak resilience (承受力), and boosting the ability of urban and rural construction, agricultural production, and infrastructure to adapt to climate change. The *Opinions of the Chinese Communist Party (CCP) Central Committee and the State Council on Further Tackling the Challenge of Pollution Prevention and Control* makes formulating the *National Climate Change Adaptation Strategy 2035* (the "*Strategy*") and vigorously promoting climate change adaptation pilot efforts important tasks.

In order to implement the decisions and deployments of the CCP Central Committee and the State Council, strengthen China's actions and initiatives for adapting to climate change, and improve its ability to prevent and defend against climate risk, this *Strategy* puts forward the guiding ideology, basic principles, and main objectives of China's adaptation to climate change in the new period based on an in-depth assessment of climate change risks and impacts, and the effectiveness of climate change adaptation work and its challenges and opportunities. Based on the exposure and vulnerability of various areas and regions to the adverse impacts and risks of climate change, it further clarifies the key areas, regional patterns, and assurance measures for China's climate change adaptation work. This *Strategy*'s target period goes to 2035, and adjustments will be made during its practical implementation based on changing circumstances and the work requirements.

Chapter I Basic Circumstances

Section One Impacts and Risks

The global climate is warming significantly. The global average temperature has increased at a rate of 0.15°C per decade since the middle of the 20th century, and with climate system warming expected to continue past the middle of the current century, the adverse effects and risks of climate change will continue to intensify. In line with the overall global climate change trend, temperatures in China have risen significantly. Temperatures rose an average of 0.26°C per decade between 1951 and 2020, faster than the global average during the same period.

Climate change has already brought about serious adverse impacts on China's natural ecosystems, and they are continuing to spread and penetrate into economic and social systems. Floods and droughts, glacier retreat, permafrost reduction, glacial lake expansion, and water security risks have increased significantly; the distribution of

[1] Translator's note: CSET's English translation of China's 14th Five-Year Plan Outline is available online at: https://cset.georgetown.edu/publication/china-14th-five-year-plan/.

vegetation belts has shifted northward, biological invasions have increased, and terrestrial ecosystem stability has decreased; the coastal sea level is rising faster than the global average, marine disasters are growing more frequent and stronger, and marine and coastal zone ecosystems are under serious threat. Agricultural cultivation methods and crop patterns are changing, meteorological disasters and plant disease and pest damage are intensifying; health risks associated with extreme weather and climate events such as heat waves are increasing, along with vector-borne diseases, and these may induce a variety of allergic and chronic diseases; the operating environment for energy, transportation, and other infrastructure and major engineering project construction is changing, which easily leads to reduced safety, stability, reliability, and durability; and the operation of urban lifeline systems, the quality of human habitats, and the safety of residents' lives and property are under serious threat. Climate change is also causing changes in resource utilization, environmental capacity, and consumption demand, which in turn affects the layout and operational safety of sensitive secondary and tertiary industries through the production chain, and may even trigger systemic financial and economic risks.

China's climate is complex, and climate change and its adverse effects exhibit significant regional differences. The Northeast has warmed more than the national average, and its cumulative temperature increase is beneficial to agricultural production, but it also faces risks such as heightened summer flooding risk, wetland area reduction, and increasing permafrost vulnerability. North China is warming and drying significantly, with prominent water supply and demand conflicts and serious heat island effects in megacities. In East China, typhoons have increased in intensity, urban pluvial flooding and heat wave events have increased, and rising sea levels threaten the safety of coastal cities. In Central China, droughts and floods are frequent, lakes and wetlands are shrinking and face increasing risk of ecological degradation, and biodiversity is declining. In South China, extreme weather and climate events such as heat waves, torrential rain and floods, typhoons and storm surges are frequent, and disasters such as salt tides and seawater intrusion have intensified. In Northwest China, melting of snow and ice is accelerating, snowmelt flooding is frequent, and the vulnerability of water resources and ecosystems has increased. In Southwest China, winter and spring droughts have worsened, and pressure on water and soil conservation, rocky desertification management, and biodiversity protection has increased. The Tibet-Qinghai Plateau shows significantly increased warming and humidity, glacier retreat, permafrost degradation, lake expansion, and river runoff, with increased risk of ice and snow disasters, geological disasters, and interlinked (链性) disasters. In addition, in major strategic regions such as Beijing-Tianjin-Hebei, the Yangtze River Delta Economic Zone, the Guangdong-Hong Kong-Macau Greater Bay Area, the Yangtze River Delta, and the Yellow River Basin, climate issues intertwine

and overlap with population, resource, environmental, and other issues, and climate risk aggregation, chaining, and amplification effects are obvious.

The global warming trend will continue in the coming period, the frequency and intensity of extreme weather and climate events are expected to mount further, and climate change impacts and risks will further expand in breadth and depth. With the growth of the overall size of the economy and the deepening of the global economic integration process, the risks caused by climate change to China's economic and social development and the security of people's work and daily life will increase. As an important non-traditional security factor, climate change brings with it long-term adverse effects and sudden extreme events that have become important risks faced by China in the process of basically realizing socialist modernization and building a beautiful China.

Section Two Current Status and Effectiveness

The climate change adaptation policy system and its preliminary construction. In 2013, China released the *National Climate Change Adaptation Strategy*, which provided strategic guidance to all ministries and local governments for carrying out climate change adaptation work and promoted the active execution of climate change adaptation work in key fields and regions. The *National Climate Change Response Plan (2014-2020)* issued in 2014 proposed adhering to the principle of promoting simultaneous mitigation of and adaptation to climate change, and stepping up actions to strengthen climate change adaptation in key fields and regions. In 2016, action plans for climate change adaptation in cities, forestry, and other fields were released in succession, and the concept and requirements of climate change adaptation were also incorporated in relevant policy documents on meteorology, agriculture, water conservancy (i.e., hydropower and water resource development and flood prevention), seas and oceans, infrastructure, urban and rural construction, and ecological and environmental protection. Relevant departments have also issued specifications and technical guidelines on climate feasibility demonstration, and have considered climate change factors when revising technical standards and specifications for hydropower stations, buildings, highways, and waterways.

Climate monitoring and early warning are improving. A comprehensive meteorological observation system is being built consisting of ground-based automatic weather stations, radar, meteorological satellites, etc. Disaster databases with long-sequence time series are being established on regional droughts, rainstorms, high temperatures, sand and dust storms, typhoons, snowstorms, freezes, and other kinds of meteorological disasters, construction of a risk census database is being promoted, and nationwide meteorological disaster hazard zoning and risk zoning are being

completed. The layout of monitoring networks in the fields of forestry, hydrology, seas and oceans, ecological environment, and hygiene and health are being improved, and networks have been established for China near-shore and South China Sea monitoring, island and near-shore hydro-meteorological monitoring, and Yellow Sea and Bohai Sea monitoring. A geological disaster monitoring and early warning forecast system has been established, the nationwide four-level (county, township, village, and group) mass measurement and mass prevention system has been improved, and geological disaster meteorological warning work has been carried out, initially achieving full early warning coverage in moderately and highly risk-prone areas.

The ability of key fields to adapt to climate change has improved effectively. Inter-basin water resource storage regulation and allocation projects, represented by the South-to-North Water Diversion Project (南水北调工程), are being implemented to optimize the allocation of water resources, and improve the ability to regulate and control water resources. Construction of backbone projects for river and lake management is being promoted to continuously improve the flood control and disaster mitigation system. With active promotion of green agriculture and climate-smart agriculture, and improvement of farmland infrastructure, the ability to prevent and mitigate farmland disasters has been significantly enhanced. Through implementation of major projects to protect and restore important ecosystems, the trend of ecological deterioration has been basically curbed, natural ecosystems are generally stable or improving, and a nationwide framework of ecological security barriers has basically been built. As of the end of 2020, construction of 800 million *mu* [132 million acres] of high-standard farmland had been completed, the effective utilization coefficient of farmland irrigation water was 0.565, the forest coverage rate reached 23.04%, the comprehensive vegetation coverage of grassland was 56.1%, and the wetland protection rate had reached 52%.

Climate change adaptation pilot demonstrations are being solidly advanced. The *Notice on Carrying Out the Work of Constructing Pilot Climate-Adaptable Cities* has been issued, with 28 cities (and districts and counties) selected nationwide to carry out climate-adaptable city construction pilot projects and explore urban climate change adaptation construction and management models in line with the actual circumstances of different places. This has significantly improved the concept of urban adaptation to climate change, and continuously strengthened disaster prevention and relief capabilities. Pilot construction of "sponge cities" is being carried out in 30 cities, forming a set of extendable and replicable experiences to start the systematic and region-wide promotion of sponge city construction demonstration work. Focusing on 60 cities with more serious pluvial flooding disasters, urban pluvial flood-prone zone improvement projects are being implemented in 1,116 flood-prone areas. Work is

being carried out to construct water-saving cities, ecological garden cities, ecological civilization construction demonstration areas, and other demonstration projects, and synergies with climate change adaptation work are being strengthened.

Awareness of climate change adaptation is gradually increasing. Key cities have been pushed to carry out climate change impact analysis and risk assessment, and to raise awareness of climate change adaptation. Making full use of World Meteorological Day, International Day for Disaster Reduction, National Disaster Prevention and Mitigation Day, World Water Day, China Water Week, Tree Planting Day, World Day to Combat Desertification, International Day for Biological Diversity, World Environment Day and other opportunities, climate change adaptation-related training, propaganda, and education are being carried out in a comprehensive manner through multiple channels. "United Nations Decade on Biodiversity, China in Action" has been actively organized to systematically carry out propaganda on biodiversity conservation and climate change adaptation based on nature reserves, zoos, botanical gardens, forest parks, etc. Comprehensive disaster prevention and mitigation education activities are being actively carried out in schools and communities, forming a good situation with broad participation by the whole society.

International cooperation on climate change adaptation is deepening. China has actively participated in the international negotiations of the *United Nations Framework Convention on Climate Change* (UNFCCC) and other international negotiations, as well as in the preparation of assessment reports for the Intergovernmental Panel on Climate Change (IPCC), and plays a constructive role in encouraging the international community to emphasize both mitigation and adaptation, so as to strengthen global adaptation to climate change. China has joined with relevant countries to launch the Global Commission on Adaptation, promoted large-scale climate change adaptation actions and partnerships, strengthened international cooperation on climate change adaptation, and publicized and promoted China's experience and case studies in climate change adaptation to tell China's climate change adaptation story. It has actively promoted South-South cooperation on climate change adaptation, and donated small satellites (smallsats), mobile weather stations, and other equipment to developing countries like Ethiopia, Bolivia, and Uruguay, helping them raise their climate change adaptation ability, thereby demonstrating the image of a responsible great power (负责任大国).

Section Three Opportunities and Challenges

From an international perspective, the world is undergoing profound changes unseen in a century (百年未有之大变局), and global climate governance has become an important area for uniting the strengths of all countries and promoting construction of

a community of common destiny for humanity (人类命运共同体). A global consensus has formed on actively preventing and resisting climate risks and improving climate change adaptation ability. In recent years, extreme weather and climate events and disasters such as extreme heat, drought, torrential rainfall, and forest fires have occurred with increasing frequency, arousing widespread global concern and further highlighting the importance and urgency of climate change adaptation.

From a domestic perspective, since the 18th Party Congress, under the strong leadership of the Party Central Committee with Comrade Xi Jinping as the core, China has firmly implemented a national strategy to actively address climate change, doing its utmost to promote green and low-carbon development, and becoming an important participant, contributor, and leader in building global ecological civilization (生态文明). In September 2020, President Xi Jinping solemnly announced at the General Debate of the 75th Session of the United Nations General Assembly that China would strive to achieve its carbon emission peak by 2030 and carbon neutrality by 2060. This is a major strategic decision made by China based on its responsibility to promote the building of a community of common destiny for humanity and on the inherent requirements of sustainable development. The Party Central Committee and the State Council have issued the *Opinions on Completely, Accurately and Comprehensively Implementing the New Concept of Development and Doing a Good Job of Carbon Emission Peak and Carbon Neutrality* and the *Action Plan to Achieve a Carbon Emission Peak by 2030*, and built the "1+n" policy system, forming an atmosphere primed to help the whole society solidly promote a carbon emission peak and carbon neutrality and actively respond to climate change.

The 19th Party Congress clarified that climate change is one of the non-traditional security threats that mankind faces. The *Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035*, which expressly proposed to strengthen observation and assessment of the impact of global warming on China's regions with weak resilience, and boost the ability of urban and rural construction, agricultural production, and infrastructure to adapt to climate change, also put forward new requirements for the next phase of climate change adaptation. New infrastructure and new technologies spawned by economic transformation and upgrading and scientific and technological (S&T) innovation and progress have enriched the means of adapting to climate change and provided favorable conditions for strengthening climate change adaptation work.

China still faces many challenges in adapting to climate change, at present and in the future. First, the analysis and assessment of climate change impacts and risks are inadequate, and urgent improvement is needed in our understanding of the complexity, breadth, and depth of the direct and indirect threats that climate change poses to

natural ecosystems and economic and social systems. Second, the governance system for climate change adaptation needs to be improved. Climate change adaptation work has not been fully incorporated into the priorities of relevant ministries and local governments, and we have yet to form a working system of climate system observation – impact risk assessment – taking adaptation actions – evaluation of action effectiveness. Third, existing adaptation actions are still insufficient to support high-quality development and achieve the goal of a beautiful China, and the ability of key fields and regions to adapt to climate change still needs to be improved. Fourth, there is a considerable backlog of basic work on climate change adaptation, the relevant theoretical research and technology development are relatively weak, the supply of knowledge and experience is still insufficient, and there is still much room for improvement when it comes to the whole society's climate change adaptation awareness and ability.

Chapter II Overall Requirements

Section One Guiding Ideology

Guided by Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, and comprehensively implementing the spirit of the 19th Party Congress and the various plenums of the 19th CCP Central Committee, thoroughly implement Xi Jinping Thought on Ecological Civilization. In accordance with the decisions and deployments of the Party Central Committee and the State Council, focusing closely on the integrated promotion of the “five-in-one” overall layout[2] and coordinated promotion of the “four comprehensivelys” strategic layout,[3] persist in the development ideology of taking the people as the center (以人民为中心), completely, accurately, and comprehensively implementing the new concept of development (新发展理念), and integrating development and security, we shall implement the national strategy to actively address climate change, adhere to both mitigation and adaptation, seize opportunities to carry out solid carbon emission peak and carbon neutrality work, integrate climate change adaptation into overall economic and social development, and promote modernization of the governance system and governance capacity for climate change adaptation, so as to strengthen the climate resilience of natural ecosystems and economic and social systems, build a regional pattern of climate change

[2] Translator's note: The "five in one" (“五位一体”) refers to economic development, political development, cultural development, social development, and development of ecological civilization.
[3] Translator's note: The "four comprehensivelys" (“四个全面”) are: comprehensively establish a moderately prosperous society, comprehensively deepen reform, comprehensively govern the country according to law, and comprehensively govern the party strictly (全面建成小康社会、全面深化改革、全面依法治国、全面从严治党).

adaptation, effectively respond to the adverse effects and risks of climate change, and reduce and mitigate losses from extreme weather and climate events disasters, thereby helping build ecological civilization, a beautiful China, and high-quality economic development, and make positive contributions to the great rejuvenation of the Chinese nation (中华民族伟大复兴).

Section Two Basic Principles

Adapt proactively, putting prevention first. Fully recognizing the importance and urgency of strengthening action on climate change adaptation, take the initiative to invest, act proactively, take advantage of favorable factors, prevent unfavorable factors, and, to the maximum extent, choose actions that seek benefits while avoiding harm. Insist on prevention being primary, firmly establish a bottom-line mindset, enhance the climate resilience of natural ecosystems and economic and social systems, and strive to prevent adverse impacts and defuse the risks of climate change.

Adapt scientifically, conforming to nature. Scientifically assess climate change impacts and risks, and take reasonable and effective adaptation initiatives based on the state of economic and social development and the resilience of resources and the environment. Organically integrate nature-based solutions with climate change adaptation, and enhance comprehensive climate change adaptation ability by strengthening the protection, restoration, and sustainable management of ecosystems so that ecosystem service functions are utilized effectively.

Adapt systematically, highlighting the key points. Organically connect climate change adaptation with deployments for construction of ecological civilization and a beautiful China, and for high-quality economic development, gradually forming a situation of active adaptation to climate change by the whole society and all fields and regions. Emphasize climate change adaptation actions focused on climate-sensitive and vulnerable fields and key regions, and improve the level of climate change adaptation in key fields and major strategic regions.

Adapt collaboratively, practicing joint governance. Adhere to synergistic progress on adaptation and mitigation, and prioritize actions and initiatives with synergistic benefits from mitigation and adaptation. Take into consideration the relationships between domestic and international, global and local, and long-term, medium-term, and short-term, strengthen coordination and resource sharing, enhance information exchange and mutual understanding, and promote the participation of multiple entities in joining forces for climate change adaptation work.

Section Three Main Objectives

By 2025, the policy system and institutional mechanisms for climate change

adaptation will be basically formed, the ability to monitor and give early warning of climate change and extreme weather and climate events will be continuously enhanced, assessment of climate change adverse impacts and risks will be effectively improved, significant progress will be made in modernizing the climate-related disaster prevention and control system and prevention capability, climate change adaptation actions in key areas and key regions will have been effectively carried out, the regional pattern of climate change adaptation will be basically established, significant progress will have been made in constructing pilot climate-adaptable cities, advanced adaptation technologies will be applied and extended, and initial formation of an atmosphere of conscious participation in climate change adaptation will be achieved.

By 2030, the policy system and institutional mechanisms for climate change adaptation will be basically perfected, climate change observation and prediction, impact assessment, and risk management systems will be basically formed, the ability to prevent major climate-related risks and disasters will be significantly improved, climate change adaptation actions in various fields and regions will have been comprehensively carried out, the climate vulnerability of natural ecosystems and economic and social systems will be significantly reduced, the concept of climate change adaptation will be widely disseminated throughout society, the technical system and standards system for climate change adaptation will be basically formed, and the construction of a climate-adaptable society will have achieved phase-specific results.

By 2035, climate change monitoring and early warning abilities will reach the international advanced level of the same period, the climate risk management and prevention system will be basically mature, the risks of major climate-related disasters will be effectively prevented and controlled, the technical system and standards system for climate change adaptation will be further perfected, the ability of the whole society to adapt to climate change will be significantly improved, and the building of a climate-adaptable society will be basically completed.

Chapter III Strengthening Climate Change Monitoring, Early Warning, and Risk Management

Construction of climate change observation networks will be strengthened; monitoring, prediction and early warning, and impact and risk assessment will be enhanced; and climate risk management and comprehensive disaster prevention and mitigation abilities will be improved.

Section One Strengthening Climate Change Observation Networks

Refining the atmospheric observation network. We will: Establish a dynamic

assessment mechanism for climate observation system requirements, build a long-term, stable, and continuous observation system for the basic climate variables in the atmosphere, and form a complete three-dimensional atmospheric observation capability; upgrade observation equipment (mainly satellites and radar) and "earth-air-space" cooperative observation technology, and improve the automation and intelligentization (智能化) levels of observation; improve the observation quality management system, and increase observation accuracy and data quality; and promote the building of a comprehensive Qinghai-Tibet Plateau climate system observation capability.

A network for observation of multiple spheres and their interaction will be constructed. An inter-ministerial coordination mechanism will be established to coordinate resources, unify the layout, and jointly build an intensive, synergistic, and efficient multi-sphere observation system. We will promote the construction of a multi-layer observation network on the surface of the Qinghai-Tibet Plateau to carry out continuous monitoring of glaciers, multi-year permafrost, snow, lakes, and ecosystems, and improve the observation system for climate and environmental changes in the alpine regions of China. We will build an integrated marine and meteorological observation system uniting shore-based, sea-based, air-based, and space-based observation, along with corresponding supporting assurance systems, to achieve real-time monitoring of marine and climate elements in key ocean areas around the world. Ecosystem observation will be strengthened, and observation of human activity-caused emissions, subsurface changes, and changes in important man-made ecosystems will be conducted. By 2025, full-coverage observation of major climate variables in all climate zones in China will be achieved. By 2035, we shall build up the national climate observation network with high spatial and temporal resolution and covering all elements of observation, and significantly increase the monitoring rate of global weather and climate events.

Column 1 Climate and climate change observation network
We shall: Build a network of stations for baseline radiation and atmospheric background observation, stereoscopic ozone observation, Qinghai-Tibet Plateau cryosphere and ecosystem observation, and greenhouse gas and carbon monitoring. They will be well-structured, and rationally laid out, and have full functionality, standardized business, scientific processes, and stable and reliable operation. Construction and protection of the meteorological detection environment will be strengthened. By 2025, focusing on strengthening efforts to build our ability to observe the impact of global warming on China's regions with weak resilience, we will enhance our ability to observe basic climate variables,

strengthen our greenhouse gas observation capacity, and achieve full-coverage observation of all climate zones and key climate variables nationwide. By 2035, we will enhance our ability to monitor global climate change and its impact. Based on dynamic assessment of the climate observation system's requirements, we will continuously optimize and adjust the structure, layout, and functions of the national weather and climate observation network.

Section Two Strengthening Climate Change Monitoring, Prediction, and Early Warning

Improve climate system monitoring and analysis ability. We shall rely on multi-sphere, multi-source observation information and basic data products, improve the quantitative monitoring indicators system, standardize the technical methods of regional climate change monitoring, and carry out whole-process monitoring of climate system change and major weather and climate events. We will: Strengthen monitoring of global warming's impact on typically vulnerable areas in China; carry out dynamic monitoring of hydropower and water resources, vegetative cover, and desertification in key ecological zones in the arid and semi-arid regions of Northwest China, the Yellow River basin, and the Yangtze River basin; and strengthen the monitoring of climate and environmental effects of human social and economic activities. Focusing on ecological protection and restoration, we will strengthen the monitoring of weather disasters and the impact of climate change on ecological security.

Improve forecasting and prediction accuracy. We will: Deepen research on the mechanisms of multi-sphere and multi-time-scale interaction of climate systems and their influence; develop integrated numerical weather and climate forecasting systems and carry out fine-grid forecasting and prediction; improve the global-scale simulation and prediction of ozone, aerosols, vegetation ecology processes, etc; strengthen the ability to predict East Asian monsoons, the El Niño-Southern Oscillation, and intra-seasonal oscillations of the tropical atmosphere, and achieve prediction of major weather processes one month in advance and global climate anomalies one year in advance; and build a multi-decade climate prediction system to improve climate prediction 10 to 30 years into the future. By 2035, a complete operational system for weather and climate forecasting will have been formed, characterized by being intelligent and digital and having seamless full coverage.

Strengthen early warning of extreme climate and weather events. We will carry out attribution analysis of major extreme weather and climate events, and develop technologies for the prediction and early warning of extreme weather and climate events and compound-type (复合型) disasters. We will build a climate change risk early warning platform and a meteorological disaster monitoring, forecasting, and

early warning system differentiated by disaster type; improve the accuracy, refinement, and earliness of early warning for extreme weather and climate events, floods in small and medium-sized rivers, flash floods, geological disasters, and forest and grassland fires; and achieve one-hour advance warning for local strong weather, and one-week advance forecasting for catastrophic weather; and strengthen early warning information dissemination and risk prevention. By 2035, the accuracy and refinement of forecasting and prediction will reach the international advanced level.

Section Three Strengthening Climate Change Impact and Risk Assessment

Improve assessment technical levels and basic abilities. We will promote the construction of a climate change data center system, and establish a big data sharing platform covering multiple spheres and human activities, to achieve the connection and sharing of data on climate change and its social and economic impacts. Analysis products of key climate variables such as global temperature and precipitation going back over 100 years will be produced, and global and Chinese regional, multi-sphere, long-duration time series climate datasets based on ground observation and satellite remote sensing will be developed and opened to the public. We will conduct quantitative analysis of climate change impacts and risk attribution, and an index system and technical system will be established for assessing climate change, its impacts and risks, and climate resilience. Technical standards for evaluating the effects of climate change adaptation will also be established.

Strengthen climate change impact and risk assessment in sensitive fields and key regions. We will: Promote quantitative and dynamic climate change impact and risk assessment for key fields and climate-sensitive industries; promote the incorporation of greenhouse gas emission control and requirements for addressing climate change into environmental impact assessments; carry out censuses, zoning, monitoring, and refined assessment of wind energy, solar energy, and other climate resources; strengthen the demonstration of climate feasibility for major plans and construction of major engineering projects; enhance the ability to assess climate change impacts and risks in key vulnerable areas such as the Qinghai-Tibet Plateau, and in major strategic regions; and strengthen assessment of climate change risks in cities and urban agglomerations. By 2035, a more robust climate change impact and risk assessment system will be built covering multiple fields such as natural ecosystems, the economy, and society, and covering China's vulnerable regions.

Section Four Strengthening Comprehensive Disaster Prevention and Mitigation

Strengthen disaster risk management concepts. We shall: Strengthen research on global climate change and its mechanisms for affecting the gestation, occurrence, and development of natural disasters; grasp the new characteristics and evolution of

natural disasters caused by climate change; firmly establish the concepts of disaster risk management and comprehensive disaster mitigation; adhere to being prevention-oriented and combining prevention, resistance, and relief; adhere to uniting normal disaster mitigation with extraordinary disaster relief; and strive to achieve a shift from focusing on post-disaster relief to focusing on pre-disaster prevention, from responding to a single kind of disaster to comprehensive disaster mitigation, and from disaster loss reduction to disaster risk reduction, so as to improve our comprehensive disaster prevention and climate change adaptation abilities.

Strengthen the prevention and defusing of major risks. We will: Strengthen the construction of a comprehensive risk monitoring and early warning and assessment system for disasters influenced by climate change, strengthen consultation, research, and judgment on the overall disaster risk situation, and enhance comprehensive monitoring, assessment, and early warning abilities with respect to multiple disaster and disaster chain risks; effectively link the routine identification of potential disaster hazards with periodic comprehensive risk surveys, carry out dynamic risk assessment, update natural disaster risk zoning and comprehensive prevention and control zoning, and strengthen integration with related planning; push key industry sectors to improve their risk management systems, strengthen climate change impact and risk assessment within the safety risk assessment of major engineering projects, and develop and implement risk control measures.

Strengthen integrated management of natural disasters. We will: Adjust disaster prevention and mitigation deployments in response to climate change impacts, focusing on strengthening integrated management in regions where climate hazards have worsened and where disaster risks may undergo significant changes; improve the basic conditions of urban and rural disaster prevention, heighten disaster prevention abilities and standards of important urban buildings and infrastructure systems and at the grassroots level, strengthen comprehensive urban disaster management, gradually implement plans to improve the disaster resistance of rural areas, and promote the relocation of people away from high-risk areas; optimize the spatial distribution of major infrastructure and strictly limit construction activities in high-risk areas; actively promote the application of intelligent prevention and control technologies, and enhance the ability to resist damage and recover quickly under extreme conditions.

Strengthen the construction of emergency response mechanisms and forces. We shall: Refine emergency response mechanisms, and continuously optimize the flat organization command model of disaster emergency response and rescue, and the integrated mode of prevention, rescue, and disaster relief operation; comprehensively increase the formalization, specialization, and professionalism of China Fire and Rescue based on the concept of "integrated emergency response to all types of disasters";

step up efforts with regard to advanced and applicable equipment, strengthen the application of new technologies, and improve integrated rescue capabilities in extreme weather and climate events; fully utilize all kinds of specialized rescue forces under relevant state ministries, local governments, and enterprises; and promote the orderly participation of private emergency response forces in disaster prevention, disaster mitigation, and emergency response work.

Chapter IV Improving the Climate Change Adaptation Ability of Natural Ecosystems

We will coordinate promotion of the integrated protection and systematic management of mountains, rivers, forests, croplands, lakes, grasslands, and deserts; implement the principle of "four things to be determined by water"[4] in all respects; coordinate land and marine climate change adaptation work; implement nature-based solutions (基于自然的解决方案); and enhance the ability of China's natural ecosystems to adapt to climate change.

Section One Water Resources

Build an intelligentized monitoring system for water resources and flood and drought disasters. We shall: Optimize the network layout of stations for hydrological and other monitoring, improve the key monitoring systems of major rivers and their important tributaries, small and medium-sized rivers, small and medium-sized reservoirs, etc., and improve monitoring capabilities for groundwater, water metering, river and lake ecological flows, and soil and water conservation; upgrade national basic hydrological stations, promote the application of new monitoring tools, expand the scope of real-time online monitoring, and enhance intelligent water security monitoring and sensing ability; promote the construction of watershed "digital twins," promote air-space-earth integration of full-coverage watershed monitoring, and promote the construction of hydrological monitoring systems for glacier, permafrost, snowpack, and water resource conservation areas in western alpine regions. By 2035, we will have significantly improved the levels of monitoring, forecasting, early warning, rehearsal, pre-planning, and flood control scheduling for flood prevention and mitigation in river and lake basins, and the level of intelligentization in water security will have been significantly enhanced.

Promote the intensive and economical use of water resources. We will: Deeply implement national water conservation actions, establish a rigid constraint system for

[4] Translator's note: The "four things to be determined by water" (“四水四定”) refers to determining the location and scale of cities, farmland, population, and industry based on the availability of water (以水定城、以水定地、以水定人、以水定产).

water resources and strictly control the upper limits of water resource development and utilization, comprehensively construct a water-saving society, and promote a further shift in water use toward conservation and intensive use; improve water conservation standards and the water quota system, refine water price formation mechanisms, promote water tax reform and market-based trading of water rights, and promote comprehensive reform of agricultural water prices; strengthen rigid constraints on water resources, implement the strictest water resource management system, improve the system of indicators for controlling the total amount and intensity of water consumption in provincial-, city-, and county-level administrative regions, and resolutely curb unreasonable water demand. By 2025, the water resource rigid constraint system will be basically established, the efficiency and effectiveness of water resource utilization will be greatly improved, total water consumption nationwide will be restrained below 640 billion cubic meters, and water consumption per 10,000 Chinese yuan Renminbi (RMB) of GDP will have fallen 16% compared with 2020. By 2035, a water-saving society will be fully built, total nationwide water consumption will be restrained below 700 billion cubic meters, and water conservation and recycling will reach the world's advanced level.

Implement major national water network engineering projects. Based on overall basins and the spatial allocation of water resources, the construction of major water resource projects will be strengthened, and our ability to optimize the allocation of water resources will be improved. We will promote the construction of major water diversion projects, promote the high-quality development of later-stage South-to-North Water Diversion projects, implement major cross-watershed and cross-regional diversion projects, strengthen the construction of key water source and regional water supply projects, and comprehensively improve our abilities with respect to coordinated deployment of water resources and assurance of water supply security. An array of measures will be used to build emergency backup water sources and improve our ability to respond to extreme drought and sudden water security events. The ongoing construction and modernization of large and medium-size irrigation districts will be accelerated, and we will promote the integrated development of urban and rural water supply, the large-scale development of rural water supply, and the standardization of small water supply projects. By 2025, the water resource allocation project system will be further perfected, the proportion of the rural population covered by national large-scale water supply projects will reach 55%, and the rural tap water penetration rate will reach 88%. By 2035, economic and social development will be basically coordinated with water resource resilience, and urban and rural water supply assurance ability will be significantly enhanced.

Refine the watershed flood control engineering system and the flood risk

prevention and control system. We will: Strengthen the management of rivers and lakes, carry out embankment construction and river improvement, and improve the floodwater release capacity of rivers; enhance flood control ability by accelerating construction of control hub-type (控制性枢纽) projects, reinforcing sluices and silt arresters in endangered reservoirs, and strengthening joint scheduling of reservoir groups within basins; accelerate the optimized layout adjustment and construction of floodwater holding areas to ensure the distributed flood storage function of floodwater holding areas; strengthen the prevention and control of flash floods, building of urban flood control ability, etc., to make up the shortcomings and weaknesses in flood control; and improve the ability to prevent and control flood risks by scientifically raising the standards of flood defense projects, and fully considering the impact of extreme weather and climate events caused by climate change and changes in the flood control situation. By 2035, the river and lake basin flood prevention and mitigation system will be basically perfected, and the ability to prevent and mitigate disasters will be significantly enhanced.

Strengthen ecological protection and management capacity for major rivers and lakes. We will: Step up protection and management of rivers and lakes, integrate the proper execution of soil and water conservation, groundwater overdraft management, ecological recovery of damaged rivers and lakes, and other work, so as to protect and expand the ecological space of rivers and lakes; scientifically manage soil erosion, raise the effective conservation rate for soil and water, and strengthen the management of key areas such as the middle reaches of the Yellow River, the upper reaches of the Yangtze River, and the black soil region of Northeast China; implement water system interconnection and "beautiful water countryside" (水美乡村) construction; strengthen assurance of the ecological flows of rivers and lakes by stepping up ecological protection and management of large rivers and important lakes, focusing on regions with over-exploitation of water resources and fragile or degraded water ecosystems, taking watersheds as the units; strictly control the intensity of groundwater development, increase water recharge through multiple channels, and continue to promote comprehensive management of groundwater over-extraction. By 2025, more than 90% of key rivers and lakes will reach a basic ecologically sound flow rate, and the national rate of effective water and soil conservation will increase to more than 73%. By 2035, the water ecological space will be effectively protected, soil erosion will be effectively managed, the ecologically sound water quantity of rivers and lakes will be effectively assured, and beautiful and healthy water ecosystems will be basically formed.

Section Two Terrestrial Ecosystems

Build a comprehensive terrestrial ecosystem monitoring system. We must

continuously carry out nationwide surveying and monitoring of natural resources and ecological conditions. Taking the results of the Third National Land Survey as the base map, we will carry out integrated surveying and monitoring of forests, grasslands, wetlands, seas and oceans, soils, permafrost, karst, glaciers, and deserts. A monitoring and assessment system for vegetation phenology, wildlife, and habitat protection will be built; surveying, monitoring, and evaluation of water and soil erosion, desertification, and sandy and rocky desertification will be carried out; and supervision of key ecological functional areas (重点生态功能区), ecological protection red lines, and key illegal areas will be strengthened. Based on natural resource science and earth system science, we will establish a natural resource investigation and monitoring standards system with natural resource categorization standards as the core. An efficient natural resources surveying and monitoring technology system will be built using spatial information, artificial intelligence, big data, and other advanced technologies as the means. Relying on basic mapping results and various types of natural resource survey and monitoring data, we will establish a three-dimensional spatio-temporal database and management system for natural resources, and achieve centralized management of survey and monitoring data.

Establish and improve a terrestrial ecosystem protection and supervision system. We will gradually form a nature reserve categorization system with national parks as the mainstay and nature reserves as the foundation, supplemented by various types of nature parks, while significantly improving management effectiveness and ecological product supply capacity, so that the scale and management of nature reserves reach the world's advanced level, and the total area reaches more than 18% of the land area of the country. We will: Strengthen the construction of forestry and grass germplasm resource preservation banks that are adapted to climate change, and protect rare, endangered, and endemic forest and grassland plant germplasm resources; promote introduction and implementation of the *Regulations on Ecological Protection Compensation* to improve the ecological protection compensation system and increase the protection of natural ecosystems; put into effect national laws and regulations on ecosystem protection, clarify local management responsibilities, strictly implement supervision of ecological protection according to law, strengthen the supervision of nature reserves and ecological protection red lines, increase supervision and investigation of ecological damage, continue to promote the "Green Shield" (“绿盾”) nature reserves initiative, and strictly investigate, punish, and curb all kinds of illegal acts.

Strengthen the protection of typical ecosystems and the recovery of degraded ecosystems. We will: Continuously increase the total amount of forest resources, strengthen development of natural young- and medium-maturity forests, restore

degraded secondary forests, and increase the species diversity of planted forests; endeavor to transform grassland livestock production methods and restore degraded grasslands; carry out wetland restoration and enhance the ecological functions of important wetlands; establish technical systems for the restoration and management of ecosystems with degradation such as soil erosion, desertification, and rocky desertification, and strengthen the protection of natural vegetation in sandy areas. By 2035, the forest coverage rate will reach 26%, the comprehensive vegetation coverage of grasslands will reach 60%, the wetland effective protection rate will increase to 60%, and more than 75% of the manageable sandy land will be under management. Greater attention and protection will be given to glacial tundra, glacial tourism development will be regulated, and special protection policies for glacial tundra will be formulated. Demonstration projects for ecological restoration of abandoned mines will be implemented to improve regional ecological conditions and enhance ecosystem quality and service functions. For important ecosystem protection and restoration needs, we will scientifically carry out restoration-oriented weather modification for key regional ecosystems, and promote the modernization of ecological protection and restoration governance capabilities. We will coordinate and promote the integrated protection and systematic management of mountains, rivers, forests, cropland, lakes, grasslands, and deserts, balancing protection and utilization, and rationally carry out overall protection, systematic restoration, and comprehensive management.

Improve disaster warning, prevention, and governance capacity. We will: Strictly control wildfire sources, establish and improve a nationwide comprehensive early warning system for forest and grassland fire risks, comprehensively boost the ability to identify forest and grassland fire risks, and achieve a fire lookout coverage rate of 95% or more in key regions; improve biological pest and disease inspection, quarantine, and supervision abilities, establish a biological pest and disease monitoring and early warning site network, and extend biological control, ecological control, and other green prevention and control techniques; draw up and improve lists of invasive exotic species and management methods, strictly carry out review and approval of exotic species introduction, strengthen post-introduction use controls, and strengthen the work of ecological restoration and the investigation, monitoring, early warning, control, assessment, and removal of invasive exotic species in key areas; promote designing of insurance systems for forest and grass fires, extreme low-temperatures and snow or ice storms, biological pests and biological invasions, etc., to transfer and spread ecosystem disaster risks and increase post-disaster recovery ability; strengthen capacity building in sandstorm disaster prediction and monitoring, strengthen the investigation and monitoring of sandy land conditions in sandstorm-prone areas, increase the deployment of ground stations, and fully carry out comprehensive monitoring, to enhance the accuracy of sandstorm disaster warning and prediction and

improve emergency response capability.

Implement planning and construction of major engineering projects for ecosystem protection and restoration. We will solidly promote the construction of major engineering projects for ecological protection and restoration, focusing on National Key Ecological Functional Areas, ecological protection red lines, national nature reserves, etc., and highlighting ecological support for major national strategies. To comprehensively improve the quality of national ecological security barriers, improve the quality and stability of ecosystems, and protect and restore biodiversity, we shall implement the *Master Plan for the Major Projects for the Protection and Restoration of National Key Ecosystems (2021-2035)*, special construction plans for the creation of national parks and other nature reserves, and major projects for wildlife protection, ecological protection, and restoration support systems; and we shall strengthen the ecological protection and restoration of the Qinghai-Tibet Plateau Ecological Barrier Zone, key ecological regions along the Yellow River (including the Loess Plateau Ecological Barrier), key ecological regions of the Yangtze River (including the Sichuan-Yunnan Ecological Barrier), and the northeast forest belt, northern sand control belt, southern hill and mountain belt, and coastal belt.

Strengthen conservation of terrestrial ecosystem biodiversity. We will establish a national-level biodiversity monitoring and conservation network, and conduct baseline surveys and assessments of priority areas for biodiversity conservation. The biodiversity conservation and supervision system will be improved to ensure that important ecosystems, biological species, and genetic resources are comprehensively protected, and to increase the stability of all ecosystems. We will continuously refine the policy and legal systems for biodiversity conservation and mechanisms for the sustainable use of biological resources, forming a unified and orderly nationwide spatial pattern of biodiversity conservation.

Section Three Marine and Coastal Zones

Refine the marine disaster observation, warning, and assessment system. We will improve the marine observation and forecasting system, strengthen the early prediction, early warning, and comprehensive risk assessment of major climate disasters in coastal and inshore areas, improve the ability to provide early warning of major marine disasters, extreme weather and climate events, and flood risks in coastal cities, and continuously strengthen the monitoring and assessment of sea level changes. A marine ecological early warning and monitoring system will be established and improved, and operationalized marine ecological surveys, monitoring, assessment and early warning will be carried out to strengthen the monitoring and early warning of red tides, green tides caused by Ulva prolifera, and other ecological disasters.

Improve the ability of coastal belts and zones to prevent and defend against disasters. We will: Strengthen the prevention of marine disaster risks caused by rising sea levels and other factors in the context of climate change, and push coastal cities to strengthen capacity building for climate change adaptation and disaster prevention and mitigation; strengthen the construction of disaster prevention and mitigation hardware in coastal cities, build a more resilient system of comprehensive protection for coastal zones, and by 2035, completely eliminate sections severely prone to pluvial flooding in key flood prevention cities of coastal areas. Strengthen reinforcement measures for major coastal engineering projects, and update and improve design standards for coastal dikes, roads, power plants, airports, and port terminals to cope with climate disasters.

Strengthen protection and restoration of coastal ecosystems. We will continue to improve the construction of marine nature reserves, and promote the integrated protection and restoration of typical coastal zone ecosystems. By 2035, the area of improved and restored coastal wetland will be about 50,000 hectares, and not less than 98% of the coastal protection forest's backbone forest belt will be protected. Shoreline protection and restoration will be reinforced. By 2025, the length of improved or restored shoreline will be about 400 kilometers, and the retention rate of mainland natural shoreline will be no less than 35%. By 2035, about 1,200 kilometers of shoreline will be improved and restored. Marine ecological protection and restoration projects will be implemented to improve the quality of marine ecological environments and enhance the carbon sink capacity of marine ecosystems. We will insist on the stable and strict implementation of the marine seasonal fishing moratorium system, promote implementation of the cap-based marine fishery resource management system, strengthen fishery law enforcement supervision and inspection, bolster protection of marine fishery resources, and promote their sustainable use.

Continuously improve the quality of marine ecological environments. We will: Systematically promote the protection and construction of beautiful bays, strengthen land-sea coordination-based integrated management, systematic management, and management at the source, and continuously improve the environmental quality of near-shore marine areas; strictly implement the supervision of marine nature reserves and ecological protection red lines, strengthen the conservation of marine biodiversity and control of exotic species, further reduce pollution entering the sea from rivers, explore the development of green offshore farming, deploy monitoring of ocean acidification and hypoxia, alleviate the trend of worsening ecological and environmental risks such as eutrophication, ocean acidification, and hypoxia under climate change, and improve the quality, stability, and climate resilience of marine ecosystems. By 2025, the quality of the marine ecological environment will be

improving steadily, and the proportion of near-shore waters with good water quality will have reached about 79%. By 2035, the quality of the marine ecological environment will achieve fundamental improvement, and the level of marine ecosystem disaster prevention and mitigation will be raised effectively.

Column 2 Key projects for marine and coastal zone ecosystems

Comprehensive gulf ecology management projects: We will consolidate and deepen the results of comprehensive management of the Bohai Sea, implement actions for the comprehensive management of the seas adjacent to the Yangtze River estuary, Hangzhou Bay, and the Pearl River estuary. Guided by the prominent ecological and environmental problems in those marine areas, and adhering to the treatment of pollution precisely, scientifically, and according to law, we will deeply implement land-sea coordination-based integrated management, systematic management, and management at the source. With the focus on promoting demonstrations of beautiful bay construction in the Yellow Sea and Bohai Sea areas, the Yangtze River Delta region, the west coast of the Taiwan Strait, the Guangdong-Hong Kong-Macau Greater Bay Area, the Gulf of Tonkin region, and the South China Sea island area, we will explore synergies between enhancing climate resilience and reducing pollution and carbon emissions.

Coastal zone ecosystem protection and restoration projects: Taking coastal zone ecosystem structure restoration and service function enhancement as the guiding orientation, while also attending to strengthening the climate change adaptation capacity of coastal zone ecosystems, we will: Comprehensively protect natural shorelines based on the key marine ecological areas of coastal zones; turn reclaimed land back into ocean and beaches, and carry out shoreline and beach restoration, estuarine and bay ecological restoration, and protection and restoration of mangroves, coral reefs, saltcedar (Tamarix chinensis), and other typical marine ecosystems; and strengthen disaster prevention against smooth cordgrass (Spartina alterniflora) and other exotic invasive species. We will: Focus on improving the ecological environment of the Guangdong-Hong Kong-Macau Greater Bay Area and important bays and estuaries such as the Bohai Sea, the Yangtze River Estuary, and the Yellow River Estuary, promote the overall planning of land and sea and the joint management of rivers and seas, and promote the restoration of marine hydrodynamic conditions in local coastal areas; maintain important coastal ecological corridors to protect biodiversity; restore the structure and function of the typical coastal wetland ecosystem in the Gulf of Tonkin;

protect Hainan Island's tropical rainforest and marine endemic animals and plants and their habitats, strengthen aquatic ecological protection and restoration, and improve coastal ecosystem service functions and disaster prevention and mitigation abilities.

Chapter V Strengthening the Climate Change Adaptation Ability of Economic and Social Systems

We shall prevent the transmission of climate risks from natural ecosystems to economic and social systems, focusing on key fields sensitive to the impact of climate change. Adhering to the concept of synergies between mitigation, adaptation, and sustainable development, we will enhance the climate resilience of China's economic and social systems.

Section One Agriculture and Food Security

Optimize the pattern of agricultural climate resource use. We will: Carry out dynamic assessment and precise zoning of agricultural climate resources, adjust and optimize the industry layout, planting structure, and crop variety distribution, and rationally plan and adjust the pattern of agricultural trade; moderately increase the multiple cropping index in middle and high latitudes, expand warm temperature-loving crops in the north and adjust the maturity [rates] of crop varieties, and fully exploit agricultural production potential by expanding the scale of winter planting in lower latitudes; select and breed high-yielding and high-quality stress-resistant crops, livestock, poultry, and aquatic products, as well as varieties of fruit trees and ornamental plants with good adaptability; and promote farmers' income by carrying out certification of climate-friendly, low-carbon agricultural products, and developing agricultural products with local characteristics and geographical indications.

Strengthen the climate change adaptation and disaster mitigation work system for agriculture. To address the new characteristics of agricultural disasters and hazards caused by extreme weather and climate events such as droughts and floods, frost damage, heat damage, wind, and hail, we shall improve disaster monitoring and early warning and response mechanisms, as well as disaster diagnosis technologies and standards. Disaster mitigation plans for different regions and different kinds of disasters and agricultural species shall be prepared, protection standards will be improved, and reserves of disaster prevention and mitigation materials will be bolstered. We will develop technical systems for intelligentized farmland drainage and irrigation, climate-adapted crops, emergency planting of forests and fruit trees, and healthy breeding of livestock, poultry, and aquatic products, and

extend adaptation techniques such as water-saving irrigation, dry farming, drought resistance and moisture conservation, drainage, etc. Training of agricultural producers and operators in disaster prevention, mitigation, and adaptation techniques will be strengthened.

Enhance the climate resilience of agricultural ecosystems. Adhering to the ecological priority in agricultural development, we will: Strengthen soil and water conservation and ecological protection, extend conservation tillage in suitable areas, develop mixed forest agriculture and three-dimensional agriculture in mountainous areas, and extend rational intercropping systems; promote pesticide reduction and efficiency and implement integrated prevention and control technology, based on climate change-induced changes in ecological relationships and new characteristics of pests and diseases; do a good job in the prevention and control of invasive exotic organisms, and to protect agricultural biodiversity; promote chemical fertilizer reduction and efficiency, and integrate and extend scientific fertilization techniques; strengthen the improvement of arable land quality, and implement the action plan for arable land protection and quality improvement, so as to increase soil organic matter and improve soil fertility; strengthen the construction of climate change-adapted germplasm conservation bases and seed banks to protect endangered species of agricultural plants and animals; preserve the cultural heritage of traditional agriculture, optimize farm landscape design, and enhance the ecosystem service function of agriculture.

Establish a climate change-adapted food security assurance system. Implementing the strategy of preserving farmland and improving agricultural technology (“藏粮于地、藏粮于技”战略), the layout of agricultural infrastructure construction will be adjusted according to changes in the spatial and temporal distribution of agricultural climate resources and climate-related disasters. We will: Establish and improve monitoring, forecasting, supply and demand, and risk estimation systems for food production and production potential in major domestic and foreign producing areas; strengthen arable land protection and quality improvement, adhere to the red line of 1.8 billion *mu* [300 million acres] of arable land, put into effect the strictest possible arable land protection system, strengthen arable land use controls, and implement special protection of permanent basic farmland; and promote the construction of high-standard farmland, achieving 1.075 billion *mu* [177 million acres] of high-standard farmland by 2025. Climate-smart agriculture will be vigorously developed to improve overall agricultural production capacity. For agricultural climate change adaptation, technological innovation will be strengthened to achieve disruptive technology breakthroughs, and demonstration bases for climate change adaptation technologies will be established in major agricultural production areas. We will also

improve the agricultural weather service system and risk-sharing mechanisms, gradually promote weather index-based insurance, and explore agricultural catastrophe insurance mechanisms.

Column 3 Climate change adaptation initiatives for agriculture and food systems
Carry out demonstrations of climate change adaptation technologies for agriculture: By 2025, coupled with the construction of national agricultural high-tech industry demonstration zones and national modern agricultural S&T demonstration bases, we will carry out climate change adaptation technology demonstrations in typical sensitive and vulnerable areas affected by climate change and build national-level demonstration bases. By 2035, coupled with the construction of national agricultural S&T parks and national modern agricultural S&T demonstration bases, a number of national-level demonstration bases for climate change adaptation technologies in agriculture, forestry, animal husbandry, fisheries, and aquaculture will be established. **Carry out climate-smart agriculture pilot demonstrations:** By 2025, we will have initially built a climate-smart crop planting technology system, and established a number of experimental demonstration bases in the main grain-producing areas of North and Northeast China. By 2035, a perfected climate-smart agricultural technology system will be constructed and promoted in well-positioned agricultural production areas (农业优势产区) nationwide. **Carry out certification of climate-friendly low-carbon agricultural products:** By 2025, climate-friendly, low-carbon agricultural product certification standards will be drawn up, synergies between adaptation and mitigation will be fully reflected, high value-added economic crops will be selected to carry out climate-friendly, low-carbon quality agricultural product certification pilots, and quality climate-friendly, low-carbon agricultural product brands with local characteristics will be launched in key agricultural counties and cities. By 2035, certification of climate-friendly, low-carbon agricultural products will be fully promoted.

Section Two Health and Healthcare

Carry out assessments of climate change health risks and adaptation ability. We will research and develop climate change health risk assessment programs and guidelines, establish a comprehensive and regular assessment mechanism, and effectively clarify and identify climate change health risks and vulnerable populations. Based on the results of climate change health risk assessments, and fully taking into

consideration the climate characteristics of each region and the health risk exposure levels of vulnerable populations, we shall assess the ability of the healthcare system and key vulnerable populations to adapt to climate change, and formulate plans to raise adaptation ability.

Strengthen the monitoring, warning, prevention, and control of climate-sensitive diseases. We will strengthen departmental linkages and data sharing, fully integrate the use of new technologies, improve surveillance networks and data reporting systems for climate-sensitive diseases and zoonotic diseases, and strengthen real-time surveillance, quarantining, and early warning, thereby effectively enhancing surveillance and early warning capabilities for key infectious diseases such as plague, dengue fever, and Japanese encephalitis, and chronic non-communicable diseases such as cardiovascular and respiratory diseases. Planning will be strengthened for prevention and control of climate-sensitive diseases and health risks under extreme weather and climate events, and emergency plans and emergency treatment management methods will be developed to improve health emergency response capabilities. Labor protection standards will be raised for work in extreme weather and climate event environments such as heat waves.

Enhance the climate resilience of the healthcare system. The health risks caused by climate-sensitive diseases and extreme weather and climate events will be fully considered in accelerating the capacity expansion and balanced regional distribution of high-quality medical resources. We shall: Establish and improve the nationwide reserve system for public health emergency supplies and medical materials, increase the emergency reserve production capacity of pharmaceutical and medical device production systems, and provide assurance for the research and development (R&D) and installation of mobile emergency medical equipment; promote informatized (信息化) energy resource management in the healthcare system; establish a hierarchical network of emergency care, treatment, nursing, and rehabilitation for climate-sensitive diseases; and establish a mental health service system for extreme weather and climate events.

Fully promote climate change health adaptation actions. Climate change health adaptation action programs shall be developed and implemented to comprehensively improve health adaptation to climate change and extreme weather and climate events. We will: Carry out pilot climate change health adaptation actions in cities, villages, communities, and key sites (schools, hospitals, nursing homes, etc.), and derive replicable adaptation models; establish such platforms as climate change and health expert advisory committees, technology alliances, and key laboratories to strengthen basic and applied research on health risks and responses under climate change and extreme weather and climate events; carry out propaganda and education on climate

change and health risks under extreme weather and climate events through various formats, and provide health and nutrition guidelines for key populations under climate change conditions, so as to improve the public's awareness and ability to adapt to climate change.

Column 4 Health-oriented climate change adaptation initiatives
Carry out focused research on health and climate change adaptation: By 2025, in response to climate change and major extreme weather and climate events such as heat waves and floods, we will have conducted health impact research, clarified the characteristics of extreme weather and climate events in terms of the main health risks, vulnerable areas, and vulnerable populations, and established adaptation strategies, technologies, and measures. By 2035, we will have carried out basic and applied research on adaptation strategies and technologies for climate change and major extreme weather and climate events, and we will have launched adaptation strategies, technologies, and plans for climate change and major extreme weather and climate events. **Study and draw up climate change and extreme weather and climate event health risk assessment guidelines, standards, and adaptation implementation plans:** By 2025, China's climate change health risk assessment guidelines, standards, and adaptation implementation plans will be formulated. By 2035, we will have formulated health risk assessment guidelines, standards, and adaptation implementation plans for major extreme weather and climate events such as heat waves, floods, and extreme cold weather in different regions of China. **Carry out demonstrations of health adaptation to climate change and extreme weather and climate events:** By 2025, taking into account factors such as climate, ecological environment, and population characteristics across China, we will establish pilot actions for health-oriented adaptation to climate change and extreme weather and climate events in cities, rural areas, communities, and key sites (schools, hospitals, nursing homes, etc.), derive adaptation models, and compile health and nutrition guidelines for people at health risk from climate change. By 2035, implementation of actions for health-oriented adaptation to climate change and extreme weather and climate events in cities, communities, rural areas, and key sites (schools, hospitals, nursing homes, etc.) will be fully promoted nationwide, and the capacity to adapt to climate change will be significantly improved everywhere.

Section Three Infrastructure and Major Engineering Projects

Strengthen risk management for infrastructure and major engineering projects. Combining new-generation information technology (IT) such as the Internet of Things (IoT), big data, and artificial intelligence (AI), we will strengthen the monitoring and risk warning of climate change impacts on infrastructure and major engineering projects, effectively monitor the weak links and various risk points, and dynamically assess the level and intensity of risks. We will implement climate change risk zoning for infrastructure and major projects, adopt measures suited to local conditions, and form a whole-chain risk management system of "real-time monitoring - information transmission - risk assessment - dynamic scheduling - effect analysis."

Push construction of climate-resilient infrastructure and major engineering projects. Construction of resilient transportation infrastructure will be strengthened, effectively integrating greenhouse gas emission control and climate change adaptation requirements into the transportation infrastructure construction process. By 2035, a national three-dimensional transportation network that is modern, high-quality, and comprehensive will basically have been built. We will build a digitalized, networked, and intelligentized smart hydropower and water resources system to improve the ability to respond to water disasters of different levels and intensities. Assurance for the normal operation of energy infrastructure shall be strengthened to improve the ability to withstand extreme weather and climate events such as storm surges, high temperatures, and freezes. The level of energy supply assurance will be improved through the in-depth integration of "energy + meteorology" information. We will combine urban and rural infrastructure construction with nature-based solutions, push the upgrading and renovation of urban and rural infrastructure, and build smart cities and digital villages. Giving full consideration to the adverse impacts of climate change on major engineering projects, the layout of engineering projects will be adjusted and the level of construction and scheduling operations will be raised.

Refine the technical standards system for infrastructure and major engineering projects. Based on the whole life cycle concept, climate change adaptation will be effectively integrated into the process of making and revising technical standards for infrastructure and major engineering projects. Taking assessments of climate change and its impacts and risks into consideration, we will review the existing technical standards and revise them in a timely fashion according to the review situation, and gradually refine the technical standards system for infrastructure and major engineering projects so that it is adapted climate change. Plans for future adjustment and revision of engineering technical standards will be prepared, and preliminary studies will be conducted, taking into account projected medium- and long-term climate change trends.

Make breakthroughs in key adaptation technologies for infrastructure and major engineering projects. Monitoring and early warning capabilities will be improved, focusing on research and development of climate impact monitoring and risk early warning technology for infrastructure and major engineering projects. In the transportation infrastructure field, we will focus on achieving breakthroughs in technologies to prevent permafrost melting, freezing snow and ice, storm surges, etc., as well as in products, materials, and equipment R&D technology, and technologies to improve the foundation, stability, and performance of the Qinghai-Tibet, Sichuan-Tibet, and Yunnan-Tibet railways and highways. In the hydropower infrastructure field, the focus will be on the research and development of adaptation technology and corrosion-resistant new dam materials suitable for adverse operating conditions such as drought and high temperatures, abrupt swings between drought and flooding, and extreme low temperatures. The focus for energy engineering and power grid security facilities will be on improving multi-grid joint grid connection, consumption, and power dispatching technology. In urban and rural infrastructure, we will focus on improving technology for the comprehensive adaptation capacity of water supply, power supply, transportation, and emergency communications.

Section Four Urban and Residential Environments

Strengthen urban climate risk assessment. We will: Scientifically analyze the current urban climate change situation, identify the main social, economic, and ecological impacts and risks of climate change for cities based on projected regional climate change trends, and rationally assess the vulnerability of different urban fields, areas, and populations; establish and improve an urban physical examination and assessment system of "physical examinations annually, assessment every five years;" and push cities at the prefecture level and above to prepare urban climate risk maps.

Adjust and optimize the layout of urban functions. Taking climate resilience fully into consideration, we will arrange the construction, industrial development, ecological conservation, infrastructure, and public services of cities in an orchestrated manner, rationally plan urban distribution patterns and functions, and curb disorderly expansion that may lead to regional climate deterioration, increased disaster risks, and worsening urban ills.[5] Urban building and infrastructure construction projects will be planned, designed, and reviewed for approval giving full consideration to the medium and long-term effects of climate change. We will coordinate urban and rural infrastructure and public service facilities, and promote the linked development of

[5] Translator's note: The term "urban ills" (城市病) refers to common problems the residents of Chinese cities face, such as overcrowding, traffic jams, environmental degradation, unavailable or unaffordable housing, and a lack of employment opportunities.

urban and rural facilities. We will also rationally lay out public firefighting and civil defense facilities and disaster prevention and sheltering sites, rationally allocate basic public service facilities of communities, and strengthen construction of an accessible environment.

Assure the safe operation of urban infrastructure. We will: Fully carry out urban infrastructure censuses and archiving, along with physical examination and assessment, to establish baselines, rank risks, pinpoint shortcomings, and implement precise measures; set or revise construction standards for urban underground facilities with regard to drainage, ventilation, wall strength, and foundation stability according to the impact of climate change on urban precipitation, temperature and humidity, wind speed, groundwater levels, soil water content, and foundation stability; adjust the design requirements for relevant protective facilities of coastal cities according to changes in sea levels; promote the construction of urban power cable tunnels and the burying of overhead lines in areas with suitable conditions, and continuously upgrade and renovate old gas pipeline network facilities in cities and towns; and promote the construction of new urban infrastructure so as to assure the systematic, intelligentized, and green construction of infrastructure and its safe and stable operation.

Improve the service functions of urban ecosystems. We will: Build composite ecological networks with blue skies, fresh air, and clean water, and continuous and complete ecological security barriers with sound functions; enhance the service functions of ecosystems in terms of water source containment, water purification, flood water storage and drought control, climate regulation, and maintaining biodiversity; and effectively alleviate urban heat island effects, pluvial flooding, and severe weather-related air pollution; prioritize implementation of nature-based solutions, and strictly protect important ecosystems such as forests, rivers and lakes, wetlands, and grasslands; scientifically plan and lay out urban green rings, green corridors, green wedges, and greenways; and continuously promote urban ecological restoration, and optimize and enhance urban green space systems. We will enrich the variety of urban parks, build distinctive park systems with a combination of small, medium, and large, system connectivity, and a balanced distribution, and achieve “a green space every 300 meters and a park every 500 meters.”

Strengthen the building of urban flood defense capability and water supply assurance. Above-standard urban flood control and drainage systems will be constructed that feature emission reduction at the source, combined storage and drainage, and flood drainage hazard removal. Systematically promote the construction of "sponge cities" in all regions. By 2025, rainfall within the standard for urban flood prevention and control will have been dealt with effectively, flood-prone water accumulation points that historically have seriously disrupted production and life will

be completely eliminated, and the phenomenon of "watching the waves rolling into the city" (“城市看海”) will no longer appear in new urban areas. By 2035, the drainage and flood control engineering system of all cities will be further improved, and their drainage and flood control capacity will be better matched to the requirements of building climate-adapted cities, sponge cities, and resilient cities. Multi-water source patterns of water supply will be created, and the construction of emergency backup water supplies will be strengthened. Construction of water-saving cities will be promoted, leakage from urban public water supply networks will be controlled, and the resource utilization of urban sewage will be promoted.

Raise the ability of cities to respond to climate risks. We will: Establish a routine management system of inter-ministerial and inter-regional joint prevention and control, improve emergency handling and disaster relief response mechanisms, and make urban climate risk management more scientific, refined, and intelligentized; strengthen the monitoring, risk investigation, and hidden danger management of old buildings, manhole covers, tunnels, bridges, underground spaces, dangerous rural buildings, and other bearers of disaster risk in cities under extreme weather and climate events; establish and improve an extreme weather and climate event information management system and early warning information release platform to ensure the accessible, timely, and effective release of early warning information. Connection of government service platforms, community sensing facilities, and home terminals will be promoted, and community services will be developed, including intelligent early warning, emergency rescue and relief, post-disaster psychological recovery, and intelligent elder care. The focus shall be on improving risk protection for vulnerable populations such as children, pregnant women, patients with chronic diseases, people over 65, and the urban poor.

Column 5 Climate change adaptation initiatives for cities
Urban communities and metropolitan areas: We will promote infrastructure interconnection in city clusters and metropolitan areas, as well as mutual recognition and sharing of public services, joint protection and management of ecological environments, and joint prevention and control of climate risks. **Climate-adaptable city construction pilot projects:** To address the prominent problems faced by cities in adapting to climate change, we will provide differentiated guidance, coordinate promotion, and actively explore management models for urban climate change adaptation-oriented construction that conforms to actual local situations. By 2035, cities at the prefectural level and above will be fully developed into climate-resilient cities, and we will have created a number of beautiful China templates with harmonious coexistence between people and nature (人与自然和谐共生). **Urban flood control and drainage:** Taking 31 key flood control cities and cities along large rivers as the focus, we will improve and renovate urban flood control and drainage facilities such as flood water storage spaces, embankments, revetments, river channels, flood control engineering, drainage networks, etc., build sponge cities according to local conditions, and eliminate all city sections that are seriously prone to flooding and runoff accumulation. **Shore up weaknesses of county seats:** We will promote efforts to shore up the weaknesses of county seats, county-level urban areas, and mega-towns, and improve general hospitals, disease control centers, senior centers, kindergartens, municipal pipeline networks, municipal transportation, parking lots, charging stations, sewage and waste treatment facilities, and industrial platform support facilities.

Section Five Sensitive (敏感) Secondary and Tertiary Industries

Raise our assurance capability for climate services. We will: Develop weather service products based on big data and AI, create new smart meteorological service models, and improve the intelligentization level of meteorological services; build a "smart forecasting + meteorological services" business system and develop commercial meteorological services; promote the construction of a meteorological service assurance system covering multiple fields, and improve the ability of sensitive secondary and tertiary industries to cope with extreme weather and climate events and their secondary disasters.

Prevent climate-related financial risks. In a step-by-step, differentiated manner, we will establish a mandatory disclosure system for climate and environmental information covering all types of financial institutions and financing entities, and push listed companies and debt-issuing enterprises to disclose climate and environmental information in accordance with law. The carbon emission information disclosure framework will be improved. Financial institutions will be encouraged to disclose exposure to high-carbon assets and establish emergency disclosure mechanisms for climate-related risks and emergencies. We will promote climate risk stress tests for financial institutions, and support the banking, securities and insurance industries in developing regulatory measures and response plans for climate risks. We will encourage the use of financial technology and other means to perform dynamic management of climate risk. Enterprises and financial institutions will be encouraged to develop transformation strategies, pathways, and targets that are consistent with the carbon emission peak and carbon neutrality goals. By 2035, early warning mechanisms for climate change-related risks will be promoted across the board, and the ability of financial institutions to identify, assess, and manage climate change-related financial risks will be significantly enhanced.

Boost the energy industry's climate resilience. Focusing on extreme weather and climate events such as high temperatures, freezes, and torrential rains, we will assess climate change impacts and risks for the production, transportation, storage, and distribution of energy. The energy structure and land use patterns will be optimized based on changes in climate resources and energy demand. We will strengthen transmission and distribution system protection and emergency dispatching under extreme weather and climate events, enhance the monitoring, inspection, and maintenance of electric power equipment, promote the application of technologies such as energy storage, smart grids, and digitalization, perfect the emergency planning system, and enhance the ability to predict, warn of, defend against, respond to, and quickly recover from electric power infrastructure security risks.

Develop a climate-adapted tourism industry. We will: Improve the systems for tourist safety management and emergency response to extreme weather and climate events in travel destinations; identify and assess the potential risks of climate-sensitive tourism resources, and scientifically carry out interventions for the protection of tourism resources such as ancient trees, bridges, villages, ancient buildings, and ruins and relics; scientifically grasp climate warming opportunities, unlock the potential of climate resources, and rationally develop new modes of temperature-sensitive tourism, popular science, and vacationing based on escaping heat and cold, flora appreciation, winter weather attractions, etc. Local governments will be encouraged to implement systems for the release of climate comfort indexes for tourist places, including

temperature-humidity indexes, wind effect indexes, and clothing indexes.

Strengthen disaster prevention and emergency response assurance in the transportation sector. We will: Promote the combining of climate change adaptation and transportation, improve emergency response linkage mechanisms based on weather warning information, and improve and perfect the scientific and effective suspension of work, school, business, and transportation under extreme weather and climate events; establish a natural disaster prevention and control system for transportation, and improve the transportation sector's ability to prevent and resist disasters; improve transportation safety risk warning, prevention, and control mechanisms, improve the traffic safety supervision system and the search and rescue and salvage system, and establish and improve a comprehensive transport management coordination mechanism and assurance contingency plan system for transportation emergencies; coordinate the building of land, water, and air emergency rescue capabilities, strengthen the construction of important regional emergency equipment, emergency communication facilities, and material storage and transportation facilities, and improve the disaster prevention and mitigation levels of important infrastructure.

Chapter VI Create a Regional Pattern of Climate Change Adaptation

Considering the differences between locations in terms of climate change, natural conditions, and economic and social development, and taking into account the relative consistency of climate characteristics and the principle of relative integrity of administrative regions, we will promote the creation of a focused regional pattern of climate change adaptation with comprehensive coverage.

Section One Building a Climate Change-Adapted Territorial Space

Taking into consideration the distribution of natural resources, the resilience of resources and the environment, and climate adaptability, and fully considering climate factors in territorial spatial planning, we will strengthen assessment of climate resource conditions and climate change impacts and risks, lay out agricultural, ecological, urban, and other functional spaces in a scientific and orderly fashion, and delineate arable land and permanent basic farmland, as well as ecological protection red lines, urban development boundaries, and other spatial control boundaries, and various types of sea protection lines. We will strengthen the integration of climate impact and overall disaster risk assessment information with territorial spatial information, enriching the "One Map"[6] of territorial spatial planning.

[6] Translator's note: The "One Map" (“一张图”) is an ongoing project to survey and create a unified,

We will also refine and implement the main functional area (主体功能区) strategy, comprehensively improve the adaptability of different main functional areas, and assure the security of our territorial spaces. In the urban space, the focus will be on reducing climate risks with respect to populations, social and economic development, and infrastructure, building climate-resilient cities, and improving urban climate risk prevention and control capacity. In the agricultural space, the focus will be on enhancing the ability of agricultural production to adapt to climate change, thereby assuring national food security and the supply of important agricultural products. In the ecological space, the focus will be on protecting the ecological environment, enhancing biodiversity, and providing a supply of ecological products to maintain national ecological security.

Section Two Strengthening Regional Climate Change Adaptation Initiatives

Northeast China The distribution pattern of crop varieties will be adjusted and moderately expanded northward in a timely manner, and appropriately increase the multiple cropping index in southern Liaoning province. We will: Prevent and control the northward expansion of pests and diseases; implement the National Black Soil Conservation Project, establish a long-term mechanism for conservation of black soil, and consolidate its status as a national food security "ballast stone;" coordinate the planning of key water source and water resource allocation projects to alleviate water shortages in central and western China; strengthen ecological restoration and forest fire prevention, and protect biodiversity and wetland habitats of rare migratory birds; develop ecotourism and build the country's largest summer getaway and world-class ice and snow tourism destinations; strengthen monitoring and early warning, and improve risk control capabilities in response to new characteristics of disasters such as spring droughts, summer floods, extreme winter cold, wind-blown sand in the west, and typhoons with strange paths; adjust the layout of construction and transportation projects according to the degree of winter warming, and revise technical standards.

North China We will: Implement rigid constraint requirements on water resources, build a water-saving society, develop and utilize unconventional water sources, promote comprehensive management of groundwater over-extraction in North China, and improve the aquatic ecological environment; strengthen monitoring and early warning of extreme weather and climate events, improve emergency plans and responses, revise technical standards for disaster prevention engineering, and improve flood control and drainage, and water detention and drought resistance; extend water-saving irrigation techniques and agronomy, prevent and control the spread of invasive pests, construct an agricultural disaster mitigation and adaptation

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updated map of all of China's natural resources, farmland, and land use patterns.

technology system, and build the North China Plain into a high-yield, high-quality agricultural product base, and the largest base in China for green food processing and manufacturing and high-quality food ration supply; strengthen monitoring of the health impacts of climate change, and prevent and control the northward expansion of vector-borne diseases; bolster emergency management mechanisms for communities in public health emergencies; strengthen management of the grassland-livestock balance in pastoral areas, and strengthen grass fire prevention and rodent and pest control; coordinate promotion of key tasks such as forest and grassland vegetation restoration, and comprehensive management of Beijing-Tianjin sandstorm sources, and build the ecological agriculture, animal husbandry, and tourism industry system and the Green Great Wall ecological barrier.

East China Adhering to scientifically planning the pattern of urban clusters, we shall improve infrastructure, increase the proportion of blue and green spaces, create climate-adapted communities, and build resilient and livable cities. We will: Increase monitoring, early warning, and emergency prevention capabilities for typhoons, pluvial flooding, heat waves, cold snaps, tornadoes, and storm surges, and extend experience gained in using water to regulate temperature and mitigate heat wave hazards; raise coastal protection standards, control man-made shoreline expansion, prevent and control inshore red tides, seawater erosion, and salt tide intrusion, and improve our ability to cope with rising sea levels and marine disasters; implement nature-based solutions to raise the level of protection of coastal wetlands and seagrass beds in the Yellow Sea, and mangroves and coral reefs along the southeast coast; develop climate-smart agriculture, moderately expand double-cropping rice cultivation, and mitigate moisture damage to overwintered crops and heat damage to rice in the summer; and raise the level of meteorological security assurance for marine economic activities, transportation, tourism, etc.

Central China We will: Strengthen soil and water conservation and hydropower and flood control development in mountainous areas, improve the joint dispatching capacity of water bodies and flood storage areas, reinforce embankments in plains, remove flood flow obstacles, and improve drainage and irrigation systems and emergency plans; adjust building heating and cooling codes and labor protection standards, implement three-dimensional green coverage in cities, and improve residential thermal insulation, ventilation, and shade; moderately return reclaimed farmland to lakes and protect wetland biodiversity; moderately expand double-cropping of rice to the north, develop three-dimensional special forest product and fruit cultivation in mountainous areas, and build the largest high-yield, high-quality base for grain, oil, and fish in the south; improve the disease prevention and control system, and prevent and control the northward expansion of Schistosoma and other vector-borne

diseases and harmful organisms; and strengthen the monitoring and early warning of climate-sensitive disease conditions in vulnerable populations, as well as weather comfort-level forecasting, to improve the health of residents.

South China We will: Strengthen construction of meteorological and marine disaster monitoring and early warning, risk assessment, and protection facilities, so as to mitigate typhoon, storm surge, and red tide hazards; implement nature-based solutions to protect the natural coastline, mangroves, coral reefs, and marine biodiversity in the South China Sea; build a modern meteorological system for the Guangdong-Hong Kong-Macau Greater Bay Area with the world's most advanced levels of operation, service, S&T innovation, and management, and extend it throughout the entire South China region; monitor dengue fever and other vector-borne diseases and biological invasions, and strengthen weather services for heat wave warning and protection of vulnerable populations; promote cyclical and efficient ecological agriculture and fishery models, expand winter agricultural production, and build an internationally advanced seed industry base; combine biological and engineering measures to control soil erosion and rocky desertification, moderately expand tropical and subtropical forest and fruit product cultivation northward, and revitalize the economies of mountain villages; and develop winter weather getaway tourism and coastal marine tourism.

Northwest China In the Loess Plateau, we will consolidate soil and water conservation achievements and promote rain catchment supplemental irrigation, mulching, and conservation tillage to improve the efficiency of water utilization and prevent the emergence of a dry soil layer. Increasing heat will be used to adjust crop varieties and sowing periods, and special forest and fruit tree products will be developed. We will protect rare species in the Qinba Mountains and protect the South-to-North Water Diversion Project’s Central Line Water Source Conservation Area, and create a beautiful and livable countryside with verdant hills and clear water, suitable for employment and tourism; and we will coordinate promotion of agricultural water conservation and efficiency improvement, industrial water conservation and emissions reduction, and urban water conservation and loss reduction. In the Gansu-Xinjiang arid zone, we will construct valley reservoirs, refine water transfer and irrigated area projects, promote the building of a Northwest China weather modification ability, and practice basin-wide coordination of water resource development and utilization. A base for grain and cotton, melons, and other high-quality specialty agricultural products will be built. We will: Improve desertification prevention and control, and disaster monitoring and early warning capabilities, and develop the sand industry in accordance with local conditions; strengthen the monitoring, early warning, and emergency management of disasters such as snowmelt floods, dust storms,

snowstorms, heat waves, and glacial hazards (glacial surges, ice avalanches, meltwater, etc.); protect biodiversity and the natural heritage, and develop characteristic landscape tourism and ecotourism, and historical and ethnic minority-related cultural tourism.

Southwest China We will: Strengthen the management of nature reserves, establish buffer zones, and limit disturbance from human activities; protect endangered species, establish seed banks and gene banks, prevent and control biological invasions, and relocate and protect when necessary, creating a template for world-class biodiversity conservation; adjust afforestation and dry season forest fire prevention deployments in accordance with rising tree lines; restore vegetation in karst mountainous areas and comprehensively manage rocky desertification; strengthen the protection of our natural heritage, characteristic landscapes, historical culture, and ethnic minority customs in climate-sensitive and ecologically fragile areas, and build a world-renowned ecotourism and minority ethnicity cultural tourism destination; carry out precise agricultural climate zoning, develop high-efficiency three-dimensional agriculture, and alleviate winter and spring droughts in plateaus mainly by means of small-scale projects such as rain collection, impounding, and water pumping and water-saving irrigation, creating an advantageous production area for special economic crops; improve urban and rural infrastructure, strengthen the climate feasibility demonstration of infrastructure and major engineering projects in plateaus and mountains, and revise engineering technical standards.

Qinghai-Tibet Plateau Monitoring of the climate system and ecological and environmental conditions of the plateau shall be comprehensively strengthened. We will: Strengthen monitoring, early warning, and emergency response for water source ecosystems, ice and snow disasters, and geological disasters, strengthen climate risk assessment and meteorological protection services for permafrost that is melting, unstable, and subject to frequent disasters, and adjust layouts and technical standards to ensure safe operation of major engineering projects and infrastructure; improve the plateau ecological protection system, build ecological corridors, improve the environment of rare animal habitats, and protect the plateau's biodiversity and Tibetan ecological and cultural heritage; strengthen alpine grassland protection and climate resilience assessment, and set livestock numbers according to the amount of forage; improve the structure of forest stands, prevent and control forest fires and insect and rodent infestations, and comprehensively control land desertification and grassland degradation; adjust the layout of crops and varieties, and moderately expand the planting scale and irrigated area of river valley floors; moderately develop ecotourism and ethnic minority cultural tourism, extend adaptation technologies for climate-sensitive industries, diversify the livelihoods of farmers and herdsmen, accelerate the

urbanization process, and achieve prosperous development in railway economic belts.

Section Three Enhancing the Ability of Major Strategic Areas to Adapt to Climate Change

Beijing-Tianjin-Hebei Coordinated Development Strategic Area In regional territorial spatial planning, we shall give deeper consideration to important matters such as water resources, climate resilience, and environmental capacity, rationally distribute the population load of Beijing-Tianjin-Hebei, explore new models for optimal development of areas with high population and economic density, and take the lead in achieving climate-smart economic transformation. We will: Implement the strictest water resource management policy, implement the red line warning mechanism for total water consumption, strengthen the resource utilization of rainwater in major cities in Beijing-Tianjin-Hebei, and promote development of the seawater desalination industry; coordinate protection and management of the ecological environment, and strictly implement the "Three Lines and One List"[7] requirements, in conjunction with the requirements of territorial spatial planning, zoning, and use control; strengthen the monitoring and early warning of extreme weather and climate events, and strengthen the coordination and linkage of disaster prevention and mitigation. Taking advantage of its S&T, educational, and cultural resource advantages, Beijing-Tianjin-Hebei will lead the nation in climate change adaptation scientific research and technology development. By 2035, an internationally advanced climate-adapted livable urban agglomeration will basically have been built.

Yangtze River Economic Belt Development Strategic Area In the Yangtze River basin, we will continuously improve the quality of the ecological environment, insist on making natural restoration the main focus, and coordinate the promotion of water system connectivity, the return of farmland to forests and wetlands, and other important ecosystem conservation and restoration projects. We will: Carry out surveys and evaluations of the integrity of water ecosystems in the basin, and strengthen the conservation and restoration of aquatic biodiversity; assure water resource security, strengthen the unified management and allocation of water resources in the Yangtze River basin, and carry out in-depth joint operation of water projects, strengthen assurance, monitoring, and early warning for the ecological flows of key rivers and lakes, so as to assure their ecological flows. To promote the realization of ecological product value, we shall establish and improve the mechanisms, policies, and

[7] Translator's note: The "Three Lines and One List" (“三线一单”) refer to a red line for ecological protection, a bottom line for environmental quality, a maximum line for resource utilization, and an ecological and environmental access list (生态保护红线、环境质量底线、资源利用上线和生态环境准入清单).

institutional system for ecological product value realization. Relying on the Yangtze River Golden Waterway, we will improve the comprehensive three-dimensional transportation network, strengthen the coordinated development and organic connection of various transportation modes, such as in railway-river and river-ocean intermodal transport, so as to improve the ability to support smooth domestic and international circulation.

Guangdong-Hong Kong-Macau Greater Bay Area Strategic Area We will: Build ecological corridors and a biodiversity conservation network in the Guangdong-Hong Kong-Macau region, strengthen controls on the use of natural ecological spaces, and carry out cross-boundary joint preservation of coastal wetlands; optimize urban greenways, woodland and wetland trails, and other public walking and biking systems, and build quality living areas with beautiful environments suitable for living, working, and visiting; refine mechanisms for disaster consultation, information sharing, and collaborative handling among Guangdong, Hong Kong, and Macau, and focus on strengthening collaborative monitoring, early warning, and emergency response for sea level rise, typhoons, and marine disasters. The capacity of reservoirs in the upper reaches of the Pearl River will be expanded to enhance the ability to suppress salt water with fresh water during the dry season. Real-time high temperature health monitoring will be strengthened, high temperature warning information will be issued for the thresholds of different populations, and we will strengthen monitoring and early warning of climate-sensitive disease transmission risks, and plan health actions. Coordinated planning and scientific deployment of urban green space construction will be carried out in Guangdong, Hong Kong and Macau, and urban wetlands, green areas, and water bodies will be increased to alleviate heat island effects; and we will optimize the networkized (网络化) spatial pattern of efficient inter-city connections to create vibrant, world-class, climate-resilient urban agglomerations.

Yangtze River Delta Integration Strategic Area Innovative mechanisms will be established for joint ecological and environmental monitoring and enforcement among governments, and actions within urban agglomerations will be implemented, such as inter-jurisdictional compensation for ecological protection, and development of areas elsewhere. We will: Strengthen the construction of marine reserves in the Yangtze River Delta region, optimize the spatial distribution of ecological functions to improve the quality of the ecological environment, and create Chongming World-Class Ecological Island; raise and strengthen sea dikes, and build the Huangpu River estuary tidal barrier project, to prevent inundation from rising sea levels and prevent and control salt tide intrusion; promote implementation of joint actions such as regional risk data sharing, prediction, and early warning, joint prevention and control, and collaborative scientific research; establish a digital platform for climate change risk

monitoring and climate governance technology, and refine the monitoring and emergency response platforms for heat waves and climate-sensitive diseases; establish and improve emergency plans and supporting systems for responding to extreme weather and climate events, enhance professional search and rescue and salvage capabilities, and improve emergency linkage and social response systems; and establish a coordination mechanism for the Yangtze River Delta to take full advantage of scale effects and lead in the development of climate-smart economic transformation and the construction of a climate-resilient society.

Yellow River Basin Ecological Protection and High-Quality Development Strategic Area The Campaign for In-Depth Water Conservation and Water Control in the Yellow River Basin will be comprehensively implemented to promote the intensive and economical use of water resources. We shall: Accurately identify the functions of ecological spaces, strengthen ecological restoration and treatment, and coordinate the integrated protection and systematic management of mountains, rivers, forests, farmland, lakes, grassland, and desert; promote basin-wide, networked, and integrated monitoring, assessment, and refined prediction of climate change, deepen inter-regional data sharing and technical cooperation, and improve disaster warning capabilities; refine public safety, health, disaster prevention, and emergency management infrastructure, and rely on prevention supplemented by punishment. To prevent climate-induced return to poverty, in upstream regions, we will focus on ecological protection and water conservation, develop regional specialty industries, and promote ecological construction in key ecological functional areas and less developed areas. We will build an integrated transportation road network, infrastructure, and public service system in the basin, and comprehensively promote synergistic cross-regional development and cross-industry linkages.

Chapter VII Strategy Implementation

Adhering to the overall leadership of the Party, we will improve mechanisms to assure implementation of the Strategy, strengthen S&T support, promote international cooperation, stimulate the vitality and creativity of various entities to the maximum extent, and create a positive atmosphere for comprehensive adaptation to climate change.

Section One Strengthening Organizational Implementation

Strengthen organizational leadership. The Ministry of Ecology and Environment shall be responsible for taking the lead in coordinating the implementation of this Strategy, studying and developing guidelines for the preparation of local action programs for climate change adaptation, and coordinating promotion of all relevant

departments and local governments to strengthen climate change adaptation actions. All relevant departments shall, in accordance with the division of responsibilities, further refine the implementation of initiatives, prepare action programs for climate change adaptation in their own fields, and implement them conscientiously. The ecology and environment departments (bureaus) of all provinces, autonomous regions, municipalities directly under the Central Government, and the Xinjiang Production and Construction Corps shall take the lead in the preparation of provincial climate change adaptation action programs, and work with relevant departments to organize implementation.

Strengthen construction of mechanisms. We will: Establish and improve institutional systems and laws and regulations related to climate change adaptation; strengthen overall guidance and coordination, improve mechanisms for coordinating climate change adaptation work, and form synergies between climate change adaptation policies and actions; explore the establishment of a national information sharing mechanism and platform for climate change adaptation, and promote the exchange and sharing of resources, information, and data; establish a mechanism for assessing the effectiveness of climate change adaptation work, conduct regular assessments of climate change adaptation policies and actions, properly carry out task implementation, supervision, and inspection, analyze implementation effectiveness, and promptly study and solve problems.

Promote pilot demonstrations. Taking overall consideration of climate types, regional characteristics, city positioning, working foundations, and other factors, we will provide differentiated guidance and deepen construction of climate-resilient city pilot projects according to local conditions. By 2035, a good situation will be created in which the concept of climate change adaptation in pilot cities is widely popularized, abilities are significantly improved, and experience is effectively extended. We will explore carrying out climate change adaptation-related pilot demonstration actions in key vulnerable areas and regions, and summarize and promote replicable experiences and practices.

Section Two Strengthening Fiscal Support

Refine fiscal and finance support policies. We will build a government fiscal policy system that is conducive to addressing climate change. By means of carbon emission reduction support tools, financial institutions will be guided to expand green capital investment. Commercial financial institutions such as banks, securities, insurance firms, and investment funds will be channeled to invest in the construction of climate adaptation projects. Research and formulation of transformational financial standards will be accelerated, and the financial system will be pushed to make a

systematic response to address climate change goals.

Promote green financial market innovation. We will encourage the development of innovative products such as sustainable development-linked bonds, catastrophe insurance, and climate risk insurance in key fields, and fully utilize the positive role of financial markets in providing funds for climate change adaptation. Diversified funding mechanisms for supporting climate change adaptation will be refined, and market resources such as venture capital funds, private equity funds, and trust funds will be guided to seek international funds, and bilateral or multilateral cooperation loans and grants, for investment in the field of climate change adaptation.

Build a climate financing and investment assurance system. We will carry out local pilot projects on climate investment and financing, establish a collection of climate investment and financing projects, and promote innovation in climate investment and financing models and mechanisms. The role of national industrial and financial cooperation platforms will be fully utilized, and financial institutions will be channeled to precisely match the financing requirements of enterprises. We will construct an assurance system for adaptation-oriented investment and financing, establish mechanisms to prevent and defuse climate risks, and strengthen the disclosure of climate adaptation statistical data and information.

Section Three Strengthening S&T Support

Strengthen basic scientific research. We will organize prediction of and preliminary research on medium- and long-term climate change scenarios, and improve the quality of climate change observation and reconstruction data, so as to accurately portray key climate change processes and trends. Basic research on climate change adaptation will be systematically conducted, and research will be strengthened on major issues such as climate change monitoring and early warning, impact analysis and risk assessment, and assessment of vulnerability and adaptation ability. Research on standards related to climate change adaptation will also be strengthened.

Accelerate technology R&D and extension. We will: Strengthen research and development of key technologies for climate change adaptation, promote integrated innovation of adaptation technologies, bring core adaptation technologies to maturity, and build a climate change adaptation technology system differentiated by fields, industries, and regions. To promote the conversion and extension of adaptation technologies, we will strengthen construction of a platform for the conversion of achievements in climate change adaptation technology into practical applications, and select climate change adaptation technologies for demonstration. We will conduct preliminary research on adaptation technologies based on long-term future climate

change scenarios, so as to build reserves of necessary technologies.

Strengthen the allocation of S&T resources. We will strengthen the collaboration and sharing of S&T resources for climate change adaptation in key industries and regions, improve the construction of scientific research infrastructure and S&T platforms, and strengthen long-term, stable, and basic support for S&T resources for climate change adaptation. And we will strengthen international and interregional S&T exchanges on climate change adaptation, and promote experience learning and information sharing.

Section Four Strengthening Capacity Building

Strengthen propaganda and education. Taking into account important time points, propaganda activities will be carried out on climate change adaptation themes. A series of popular science education books on climate change adaptation will be created, and climate change adaptation will be promoted in schools through subject education, extracurricular activities, and lectures and seminars. Experience sharing and promotion using case studies of climate change adaptation will be strengthened. We will use innovative means and modes of propaganda to popularize the concept of climate change adaptation, and guide people towards green consumption and climate-adapted lifestyles, and will strengthen the external propaganda on China's climate change adaptation measures and effectiveness.

Strengthen team building. We will strengthen the building of a grassroots talent contingent for climate change adaptation, and form a contingent of cadres with firm political convictions, proficiency getting the job done, strict discipline, and a sterling work style. A cross-disciplinary and multi-level pool of climate change adaptation experts will be established, and special initiatives will be carried out to assist climate change adaptation experts. To improve the ability to implement climate change adaptation decisions, regular training on climate change adaptation knowledge and operations will be organized.

Strengthen public participation. We shall broadly mobilize enterprises, communities, associations, and citizens to actively participate in climate change adaptation, and promote diversification of participants in adaptation initiatives. We will organize the formation of networkized coordination mechanisms for communities and enterprises, develop and expand volunteer teams, mobilize the strength of the whole society, and create an atmosphere of extensive participation by the whole society.

Section Five Deepening International Cooperation

Actively participate in climate change adaptation work under multilateral frameworks. We will: Deeply participate in the global adaptation governance process

within main channels such as the UNFCCC and the *Paris Accord*, and properly coordinate international and domestic efforts; deeply participate in the IPCC assessment process and enhance China's climate change scientific assessment ability; enhance relief capacity and actively participate in international humanitarian relief operations for climate change-induced disasters; and strengthen the training and exchange of international talents in the field of addressing climate change.

Broaden opportunities for international cooperation on climate change adaptation. We will actively participate in international cooperation on climate change adaptation, so as to tell China's climate change adaptation story and enhance China's influence in the field of adaptation to climate change. We will further expand the areas of cooperation with the Global Center on Adaptation, the United Nations Environment Program, and other international institutions, strengthen practical cooperation with developed countries, multilateral financial institutions such as the World Bank, the Asian Development Bank, the Asian Infrastructure Investment Bank, and the New Development Bank, and performance funding mechanisms such as the Green Climate Fund and the Global Environment Facility, enhancing synergies with the performance of other international environmental conventions, and boosting climate change adaptation ability.

Strengthen South-South cooperation on climate change adaptation. We will strengthen policy exchanges and experience sharing with relevant developing countries, and carry out exchanges and training of climate change adaptation talents. South-South cooperation on climate change adaptation will be strengthened in such areas as agricultural production, water resource management, disaster monitoring and early warning, and infrastructure construction. To the best of our ability, we will increase support for developing countries that are seriously affected by climate change, such as least developed countries, small island states, and African countries.