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**Report Highlights:**

China's first National Plan to Adapt to Climate Change was issued in 2007 and was followed by a series of policy and strategy documents to manage the challenges caused by climate change, including those in the agricultural sector. This report provides an overview of China's national-level guidance and adaptation policies relevant for agriculture along with information on goals for major agricultural development areas and examples of related efforts.

## Background

Non-carbon greenhouse gas (GHG) emissions make up about 20 percent of China's total GHG emissions, with agricultural sources—both cropland and livestock—accounting for a sizable share, according to a September 2019 report by the World Resources Institute. In addition, a variety of environmental factors impacting agricultural production have been attributed to climate change, including more frequent and more severe droughts, floods, typhoons, and pest and disease outbreaks. Climate change has contributed to agricultural yield and cost-of-production instability. Additionally, climate change is associated with expanded crop production areas and longer growing seasons for some regions.

The 2007 National Plan to Adapt to Climate Change ([http://www.gov.cn/zhengce/content/2008-03/28/content\\_5743.htm](http://www.gov.cn/zhengce/content/2008-03/28/content_5743.htm)) was China's first comprehensive policy paper addressing the issue. The plan sets out guidelines, principles, goals, and mitigation and adaptation measures in key areas, including agriculture. In November 2013, the National Development and Reform Commission (NDRC) and eight other government agencies jointly issued the National Climate Change Adaptation Strategy (<http://www.gov.cn/gzdt/att/att/site1/20131209/001e3741a2cc140f6a8701.pdf>). Meanwhile, China has published annual reports on Policies and Actions for Addressing Climate Change since 2009, with the latest report coming out in November 2019 (<http://www.mee.gov.cn/ywgz/ycqhbh/qhbhlf/201911/P020200121308824288893.pdf>). In addition, the Ministry of Ecology and Environment is currently drafting the National Strategy for Addressing Climate Change 2035.

This report provides a summary of China's stated policy measures to adapt to climate change in agriculture, including adaptation goals for major agricultural development areas.

## Major Climate Change Policies and Goals for the Agricultural Sector

### *1. Strengthen the monitoring and early warning system and enhance disaster prevention and mitigation measures*

Use modern information technology to improve the monitoring network of agricultural conditions and establish a sound system for early warning and prevention of agricultural disasters. Construct a technical system on agricultural disaster prevention and mitigation with preparedness plans. Intensify the monitoring, early warning, prevention, and control of animal diseases induced by climate change. Vigorously improve capabilities for the monitoring, early warning, prevention, and control of crop pests and diseases and facilitate the unified and sustainable prevention and control of pests and diseases through mitigation technologies.

### *2. Improve the adaptability of crop production*

Continue to carry out farmland construction, soil fertility improvement, and prevention and control of pests and diseases. Promote adaptive technologies such as water-saving irrigation, dryland farming,

drought resistance and moisture conservation, and conservation tillage. By 2020 [Note: the most recent official update was November 2019 covering 2018 efforts], the ratio of unified prevention and control of major crop pests and diseases will reach more than 50 percent, the effective utilization coefficient of farmland irrigation water will be increased to more than 0.55, and the water use efficiency of crops will be increased to more than 1.1 kg/m<sup>3</sup>.

Refine the agricultural climate zones and adjust the northern boundary of crop planting, the layout of crop varieties, and planting systems to take advantage of increased heat resources due to climatic warming. Moderately increase the multiple cropping index and use varieties with longer growth periods in the transitional climatic areas. Strengthen the construction of crop breeding capacity; cultivate high-light-efficiency, heat-tolerant, cold-resistant, and drought-resistant crop varieties; and establish a gene bank of stress-resistant varieties and a seed bank for disaster relief.

### *3. Guide the rational development of livestock, poultry, and aquaculture*

Implement area rotation, seasonal grazing, and winter/spring house feeding in animal production. Increase efforts to improve pastureland, forage bases, and grassland animal husbandry. Encourage cooperation between farming and pastoral areas and facilitate improvements in soil fertility through land exchange. Adopt adaptive technology systems for livestock breeding in major agricultural areas. Adjust the species, density, and feeding cycle of aquaculture and rationally deploy the ocean fishing industry. Strengthen the construction of fishery infrastructure and equipment and improve capabilities for the prevention and control of fishery diseases.

### *4. Strengthen the protection of agricultural development*

Promote appropriate scale operations and improve the level of intensified agricultural operations. Expand the scope of pilot programs for agricultural disaster insurance and explore an agricultural disaster insurance system adapted to local conditions. Intensify farmer training in adaptation skills so that the coverage of adaptation skill training in the rural labor force will reach 70 percent by 2020.

## **Main Goals for the Key Agricultural Development Areas**

Agricultural development areas refer to the primary agricultural production areas for key commodities. These areas are characterized by favorable production conditions, relatively small population densities, and the absence of large-scale urban clusters. The Chinese government identified the following agricultural development areas and corresponding climate change goals based on differing climate patterns, geographic locations, and importance for domestic agricultural production.

### *1. Northeast Plain Area*

Make full use of the favorable conditions of increasing heat resources and appropriately develop rice planting while coordinating agricultural production and wetland conservation. Build high-quality corn and soybean planting belts focused on increasing crop yields. Moderately adjust the sowing time to earlier in the season and switch to crop varieties with longer growing seasons, adjusting planting

structure and variety layout accordingly. Strongly facilitate farmland water-saving technologies. Intensify the construction of ecological forestry to reduce soil erosion, conserve soil fertility, and promote the sustainable use of nutrient-rich soils.

Strengthen river basin water resource management and build water resources allocation projects in areas where conditions allow. Control over-extraction of groundwater in cities and rice-producing areas and facilitate water-saving irrigation and cultivation techniques. Strengthen the unified prevention and control of crop pests and diseases. Enhance rural land management by optimizing the layout of farmland, water, roads, forests, and villages. Strengthen wetlands conservation and complete major land renovation projects such as in the Sanjiang Plain and eastern region to improve the rural environment.

## *2. Yellow River, Huai River, and Hai River Plain Area*

Expedite water-saving renovation in irrigation areas; improve farmland irrigation and drainage systems; facilitate water-saving irrigation technologies such as pipe irrigation, sprinkler irrigation, and drip irrigation based on local situations; and make full use of non-traditional water resources such as rainwater, reclaimed water, and brackish water. Increase water-saving awareness among rural residents. Intensify the construction of rural drinking water projects. Control the excessive exploitation of underground water resources and use rainwater to replenish underground water.

Adjust the planting structure, increase the varieties of drought-tolerant and water-saving crops, and appropriately expand the double cropping area of wheat and corn in the north. Intensify management practices to mitigate the impacts of worsening winter droughts and spring frosts for wheat. Taking advantage of winter and spring warming, expand sheltered crop production (such as greenhouse cultivation). Greatly promote the unified prevention and control of major diseases, pests, weeds, and rodents. Optimize land use in agricultural areas and renovate salinized land. Make overall plans to improve the efficiency of agricultural land use and improve the living conditions of farmers.

## *3. Yangtze River Basin*

Strengthen soil and water conservation in the middle and upper reaches of the Yangtze River and the conversion of farmland to wetlands in the middle reaches. Advance the construction of key reservoirs and dikes along the main and tributary streams as well as the construction and management of flood storage and detention areas to reduce flood damage. Strengthen the construction of farmland water conservancy works, adjust the planting system according to local conditions, and improve the ability to resist seasonal drought and spring/winter flood damage. Revise the building standards for breeding facilities, including heat-prevention and cooling systems. Facilitate healthy breeding models, intensify the prevention and control of animal diseases, and accelerate environmental conservation in the aquaculture industry. Expedite rural housing renovation and resettlement in high-risk flooding areas.

#### *4. Fen River and Wei River Plain Area (Shanxi and Shaanxi Provinces)*

Strengthen construction of water-saving facilities in irrigation areas and maintain water conservancy projects. Coordinate the management of industrial-, agricultural-, and domestic-use water and promote water-saving irrigation techniques. Appropriately expand the sequential cropping of wheat and corn and increase the multiple cropping index. Intensify the comprehensive prevention and control of pests and diseases. Reduce wheat planting area in water-deficient areas and expand the planting of drought-tolerant crops. Improve rural disaster prevention and mitigation capacity.

#### *5. Hetao Region (Northwest Plain)*

Improve water conservancy projects and irrigation scheduling in irrigation areas. Adjust planting structure, reduce water-consuming crops such as rice and wheat, and expand planting of drought-tolerant and water-saving crops. Facilitate water-saving irrigation techniques and the timely diversion of irrigation water to increase soil moisture in fall when there is less water demand in other agricultural areas.

Moderately advance the wheat sowing period to avoid springtime soil collapse (unique to this region), appropriately adjust the corn and sunflower sowing period to earlier, and switch to varieties with longer growing seasons. Make full use of the light and heat resources due to the warming winter to moderately expand sheltered crop production (such as greenhouse cultivation) in winter and spring. Improve the early warning system for ice-melt flooding in early spring so that ice breaking efforts can be performed in a timely manner.

#### *6. Gansu and Xinjiang Region*

Make full use of the favorable light and heat conditions to develop cotton, fruit, and other specialty crops while maintaining stable grain production. Strengthen river basin integrated water resource management and coordinate water use between the upper, middle, and lower reaches of the rivers. Control the scale of excessive reclamation in the upper and middle reaches. Appropriately shut down wells and convert farmland to forest and grass in areas where underground water is over-exploited. Vigorously promote water-saving technologies such as drip irrigation under film, plastic mulching, and ridge film with furrow irrigation. Build water-retention projects to mitigate snowmelt flood disasters and increase available water resources.

Promote rainwater harvesting for supplementary irrigation and water-saving technologies in the eastern part of Gansu and expand the planting of drought-tolerant and high-yield crops such as hybrid millet, potatoes, and specialty fruit. Intensify the prevention and control of agricultural and forestry pests and diseases. Preserve and restore forest vegetation. Adopt comprehensive measures to prevent and control desertification. Strengthen the integrated prevention and control of wild animal epidemics in border areas. Speed up the construction of the "Enrich the People and Prosper Animal Husbandry Project" to improve the living conditions of the poor.

## *7. South China Region*

Taking advantage of regional climatic advantages, expand the production of tropical and subtropical cash crops, fruit crops, and winter vegetables while maintaining stable grain production. Rationally determine the northern boundary of tropical and subtropical crop cultivation in accordance with the warming winter and climate fluctuations. Intensify the prevention of cold damage to crops in the central and northern parts of South China. Deploy monitoring of migratory and epidemic diseases and pests. Encourage the development of vertically distributed agriculture in mountainous areas, with a gradient layout of cropland, forestry, animal husbandry, and aquaculture. Strengthen the early warning and prevention of typhoons, storms, and floods in mountainous areas.

### **Examples of Adaption Measures in Agriculture**

#### *1. Agricultural Research*

The Ministry of Agriculture and Rural Affairs (MARA) issued Technical Guidance for Agricultural Green Development (2018-2030) that facilitates research and demonstration of agricultural technologies such as rainwater capture for irrigation, fertilizer and pesticide reduction, and recycling of agricultural waste. In addition, MARA has launched research projects on topics such as the response of rice, wheat, and corn production systems to climate change and adaptive cultivation methods.

#### *2. Demonstration of Adaptation Measures in Key Agricultural Areas*

In northwest, north, and northeast China, MARA promotes dryland farming technologies such as film cover, rain refill irrigation, drip irrigation under film cover, irrigation with fertilization, and drought resistance and stress resistance. Irrigation and fertilizer integration technology has reportedly been applied to more than 26.7 million hectares. The ministry integrates and promotes sustainable and efficient technologies such as deep tillage and co-sowing of fertilizer and seed. Pilot projects have focused on organic fertilizer substitution in 175 counties that produce fruit, vegetables, and tea.

#### *3. Climate Smart Agriculture Trial Projects*

To facilitate carbon sequestration in agriculture and rural development, MARA worked with the World Bank to set up two “climate smart agriculture” projects in Yexian and Huaiyuan, two major grain producing counties in Henan province and Anhui province, respectively. Beginning in 2013, the two demonstration projects—focused on rice, wheat, and corn—demonstrated new technologies including optimized varieties, water-saving irrigation, fertilizer and pesticide reduction, and eco-friendly cultivation and breeding. The five-year demonstration projects reportedly achieved both improvements in soil organic carbon content and crop yields.

#### *4. International Cooperation*

China has promoted climate change projects through the Belt and Road Initiative, including the Climate Change South-South Cooperation Program led by the Ministry of Ecology and Environment and aimed

at supporting climate change adaptation in developing countries. In addition, MARA worked with the Departments of Agriculture of Vietnam and South Korea on migratory pest prevention and control in rice production. China signed a Memorandum of Understanding on Plant Pest Control with Pakistan that covers monitoring and early warning, research and development, training, mutual recognition of standards, and other topics.

**Attachments:**

No Attachments.