Study Report

Support and Protection of Modern Agriculture in China – an Overview of Document No. 1, 2017

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Summary

The No. 1 Document is China’s central annual policy document in agriculture. Besides the focus on environmental protection, land property rights and rural development, agricultural supply-side structural reform is the main theme of 2017.

It stresses promoting the reform centered on market demand, and targets to optimize the distribution of agricultural resources, expand the effective supply of agro-food products, and enhance the adaptability and flexibility of the supply system for agricultural products. According to the Document No.1, the authorities responsible for agricultural policy making should optimize the structure of agricultural production and regional distribution, coordinate the development of agro-food, cash crops and fodder, and provide diversified and high-quality agricultural products to consumers. The authorities should also promote integrated development of the agricultural value chains from production, processing and distribution, as well as agricultural tourism, and new industries in rural areas.

However, promoting agricultural supply-side structural reform doesn’t mean cash crops, and thus food security, are losing their significance in agriculture. China further wants to enhance and improve its food production capacity, but focus more on quality rather than only quantity. Agricultural production should respect the law of the market and comply with changes in supply and demand. The crop planting structure should be adjusted accordingly.

Along the six main heading themes of the 2017 No. 1 Document, the following chapters (chapter 2-7) describe the main policy targets and its underlining challenges and problems, starting with some fundamental features of China’s agricultural policy system (chapter 1).

1. Fundamental Features of China’s Policy System for its Modern Agricultural Development

1.1. A comprehensive policy system that supports and protects the agricultural sector has taken shape

After the founding of the People’s Republic of China, the Chinese government promptly launched the process of industrialization. As this process mainly relies on agriculture for its primitive accumulation of capitals, the state adopted a negative protection policy over agriculture, and transferred any remaining values of the sector through applying price scissors, agricultural tax and various fees, which became a common practice for nearly half a century. Since the inception of China’s reform and opening-up policy, the national economy has enjoyed extremely rapid growth, which helped prepare for the introduction of agriculture protection policies. In the 21st century, China started to work on a comprehensive system of policies that support and protect the agricultural sector. Major changes include the abolition of the agricultural tax and fees, increase of fiscal subsidies to farmers, agriculture and rural area, and a growing number of preferential policies for agriculture.

1.2. Agricultural support and protection policies mainly feature domestic support

China formally entered the WTO in November 2001. This triggered a shift in its agricultural policy from providing negative protection to neutrality, as the WTO does not allow price protection for agricultural products. The Chinese government has undertaken a commitment that it would not maintain or introduce any export subsidies on agricultural products. China’s average tariff level of agricultural products is 15.2%, which is less than 1/4 of the global average. Soybean imports are assessed only a 3% tariff. China sets tariff rate quotas on major agricultural products including wheat, corn, rice, sugar, cotton and wool, while the out-of-quota tariff level is only up to 65%. China has also agreed to limit its subsidies (classified as “amber box”) for agricultural production to 8.5% of the
value of farm output. In the last decade, China has established many bilateral and multilateral free trade zones, all of which have contributed to a high degree of trade liberalization of agricultural products. In conclusion, the agricultural support and protection policies in China focus on domestic support, but especially the "green box" subsidies need to improve.

1.3. The increasingly diverse objectives of agricultural support and protection policies

In over 30 years after the founding of the PRC, China’s agricultural policy primarily aimed at increasing the quantity of agricultural products in response to a shortage in supply. After the introduction of the reform and opening-up policy, a new objective was added to increase farmers’ income. In the 1990s, the improvement of farmers’ income became a top priority of the state government, followed by the quantity increase of agricultural products. In the 21st century, China's agricultural policies have become more extensive with objectives to improve farmers' income and quality of life, increase quantity and quality of agricultural products, improve market competitiveness of agricultural products, protect the ecological environment and maintain social harmony. Agricultural policies with diverse objectives are in line with the sustainability concept to a greater extent, yet conflicts may arise between different objectives, which remain to be addressed.

1.4. The multiple levels of agricultural support and protection policies

Agricultural support and protection policies consist of the following levels:

1) **National agricultural laws.** These include the Agriculture Law, Land Administration Law, Land Contract Law in Rural Areas, Law on the Popularization of Agricultural Technology, Food Safety Law, Agricultural Product Quality Safety Law, Animal Epidemic Prevention Law, Law on Specialized Farmers Cooperatives, Animal Husbandry Law, Fisheries Law, Forestry Law and Seed Law, all of which are adopted at meetings of the Standing Committee of the National People’s Congress.

2) **Agricultural administration regulations:** Pesticide Management Regulation, Regulations on Safety Supervision and Administration of Agricultural Machinery, Regulations on Live Pig Slaughter Management, Regulations on Plant Quarantine, Regulations on Administration of Feeds and Feed Additives and the Regulations on Administration of Agricultural Genetically Modified Organisms Safety, which have been drawn up by the State Council or relevant agricultural ministries for specific regulation over management and technical aspects.

3) **Mid- and long-term development plans.** Such plans include the Thirteenth Five-Year Plan for National Economic and Social Development, the National Sustainable Agriculture Development Plan, the National Agricultural modernization plan, which are formulated by the State Council and relevant agricultural ministries. Among national plans, five-year plans are most common, and they help guide agricultural ministries and local governments in their planning and policy-making process.

4) **The No.1 Central Document.** From 2004 to 2017, China has published 14 No.1 Central Documents in a row that focus on agriculture. It is the first policy document in every year that is jointly released by the Central Committee of the Communist Party of China and the State Council, and is seen as an indicator of policy priorities in agriculture and rural areas. Its focus or topics may vary each year that attend to both annual agricultural and rural development tasks as well as long-term issues. The No.1 Central Document plays an important role in the development and revision of agricultural legislation, formulation of mid and long-term planning as well as preparation and implementation of annual agricultural policies at all levels of governments.

5) **Guidelines and projects from agricultural ministries.** Agricultural ministries implement agricultural policies through guidelines and projects (one year or ongoing projects). Guidelines include the Guiding Opinions for Public-Private Partnerships in the Agricultural Sector, Opinions on Advancing the Comprehensive Reform on the Agriculture Water Price, Opinions on Promoting Sustained and Healthy Development of Safe Agro-products, Green food, Organic Agro-products and GI Agro-
products, Guidelines on Promoting Supply-side Structural Reforms in the Food Industry, Opinions on Integrated Development of Primary, Secondary and Tertiary Industry in Rural Areas. These guidelines support and guide local governments to implement national laws, regulations, planning and No.1 Central Documents for the agricultural sector.

1.5. The multiple channels of supervision over agricultural support and protection policies

China’s agricultural support and protection polices shall be implemented by central agricultural ministries and their local agencies at all levels. Supervision over the policy implementation process is achieved through the following channels: (1) Hierarchical supervision within the government over implementation of agricultural policies. (2) The NPC Standing Committee shall supervise over the central and local governments, while the Standing Committee of local the People’s Congress supervises over governments at the same and lower levels. (3) NPC deputies, CPPCC members and farmers shall oversee the implementation of agricultural policies.

2. Reasons for and Policies on Deepening Supply-Side Structural Reform in Agriculture

On February 5, 2017, the CPC Central Committee and the State Council issued the “Several Opinions on Cultivation of New Development Engines for the Agricultural Sector and Rural Areas to Further Promote Agricultural Supply-side Structural Reform”, marking it the 14th year in a row that the No.1 Central Document focuses on the “Three Rural” issues (farmers, agriculture and rural areas) since the turn of the century. Why is it so important to introduce such a key policy for supply-side structural reform in agriculture?

2.1. Reasons for Deepening Supply-Side Structural Reform in Agriculture

According to the No.1 Central Document of 2017, years of unremitting efforts have contributed to the growth of agriculture and rural areas in China to constantly reach a new level, and finally enter a new stage of development. Major problems facing China’s agricultural sector are structural ones rather than insufficient total output as was in the past. Among them, the most prominent is excess or shortage of supply that occurs periodically, whose root cause remains mostly on the supply side. In recent years, China has been actively working on agricultural transformation, structural adjustment and reform, which have helped lay a foundation for further agricultural restructuring and upgrade. However, outstanding issues still remain in the form of structural imbalance of supply and demand of agricultural products, irrational allocation of factors, environmental pressures as well as weak income growth for farmers, just to name a few. Solutions are most needed to help increase output with enhanced quality, identify a balance in rising costs and low prices, solve the situation of high inventory in the event of sluggish sales, bring small production up to scale for big markets and price inversion. It is of great importance to deepen supply-side structural reform in agriculture in order to cultivate new engines for the modern development of agriculture and rural areas.

2.2. Objectives and methods for supply-side structural reform in agriculture

According to the No.1 Central Document, supply-side structural reform in agriculture shall first of all ensure national food security. Following the changing market demand, the reform shall aim to increase farmers’ income while securing quality of agricultural supply. Through institutional and systematic innovation, efforts shall be made to optimize the agricultural industrial system, production system and management system so as to improve land output, resource utilization and labor productivity. The agricultural sector’s over-reliance on resource consumption and quantity increase shall become a thing of the past, whereas the reform pursues green, ecological, sustainable and quality development.
2.3. Major topics of supply-side structural reform in agriculture

2.3.1. Adjust the structure of food crop, cash crop and forage crop production

With the aim to stabilize food crop, improve cash crop and increase forage crop production, China shall strive to establish a well-balanced growing structure that integrates all three aspects. For food crops, the focus shall be to stabilize rice and wheat production for absolute food security, while enhancing the production of high-quality rice and high/low gluten wheat. For Chinese people, main staple foods include rice and wheat flour. Southerners like rice, and northerners prefer noodles. However, early indica rice produced in the south is not popular among consumers due to its poor quality, while wheat production lacks specialization which fails to meet special processing demand. In China, 60% of corn output is used for feed production, and there is a growing demand for corn silage as forage for ruminant animals. Soybean and whole grains also become increasingly popular among Chinese people. Thus, it is necessary to reduce the disadvantaged growing areas of corn kernels, while increasing the output of quality soybeans, potatoes, whole grains and beans. As for cash crops, China will optimize crop quality, varieties and their regional distribution with efforts to reinforce the main producing areas for cotton, oil-yielding crops and sugar production, which are critical crops to China yet still lack international competitiveness. China shall also improve the value and efficiency of horticultural crops. The acreage of forage crops shall be expanded with more corn silage, alfalfa and other high-quality forage grass so as to cultivate a modern, industrial and sufficient system for livestock feed production.

2.3.2. Develop highly-efficient animal husbandry industries

China is the world's largest live pig producer, and pork accounts for over 60% of its meat consumption. Live pig production is a top priority in its animal husbandry industry. China will stabilize live pig production by providing optimal areas for pig breeding in the waterway-dense south while guiding the transfer of production to areas of higher carrying capacity and maize production. China’s demand for beef and mutton is showing a growth trend, which falls beyond domestic capacity, as the domestic beef and mutton industry faces serious constraints of variety, nutrition, resource and environmental conditions. Therefore, necessary efforts shall be made to boost the red meat industry. Chinese people’s demand for dairy products is so high that domestic production is unable to keep up. The dairy industry shall be revitalized and family ranches of a moderate scale will be supported. China needs to support the increasing fresh milk consumption, introduce a strict system of reconstituted milk labeling and foster high-quality domestic brands. Efforts shall be made to determine a rational scale of aquaculture in inland waters, lakes and reservoirs to promote higher efficiency with less capacity. China will optimize partially or fully closed seasons of fishing and applicable areas in rivers, lakes and the sea, while implementing the first comprehensive ban in the aquatic biological protected areas in the Yangtze River Basin. Intensive and healthy marine aquaculture shall be supported so as to develop modern marine ranches. Regional collaboration shall be enhanced to monitor and control reasonable inshore and offshore fishing. A total quantity management system for marine fishery resources shall be established to standardize all types of marine fishing activities and support fishermen to reduce boat quantity and transfer to fishery production.

2.3.3. Scale up and strengthen competitive industries and business operations with distinctive local features

China’s vast territory and varying natural conditions have given rise to distinctive agricultural production in different areas. China will implement the action plan of quality and efficiency enhancement for characteristic agriculture including whole grains, beans, fruits, vegetables, tea, mulberry, flowers, seedling, edible mushrooms, traditional Chinese herbs and the specialty breeding industry, which will become the major powerhouse for increasing farmers’ income. Vigorous efforts shall be invested in developing green industries involving special forests as cash crops, rare timber trees, flowers, bamboo and forest foods. China will put in place a labeling system for ecological forest products. It will demonstrate the standard production process of characteristic agricultural products.
and strive to establish a number of products under protection with geographical indications and designations of origins. This way, China supports the growth of regional agricultural brands for more popularity and recognition.

2.3.4. Further optimize the regional layout of agricultural areas

Agricultural production in China has developed into different regions. China will focus on the planning of main functional areas and layout for outstanding agricultural products, as it designates functional areas for rice, wheat and corn in a scientific way and design protected areas for key agricultural products such as soybeans, cotton, rapeseed, sugar cane and natural rubber. This helps improve the regional specialization of agricultural production, thus promoting scale operation, private sector participation, standard development, industrialization and branding, with the aim to achieve integrated development of primary, secondary and tertiary industries.

2.3.5. Enhance overall quality of agricultural products and food safety

With income improvement, people are increasingly concerned about food quality. Following the principle of revitalizing agriculture through quality, China will implement the strategy of standardized development with a focus on quality, safety and green, so as to formulate a standard system for quality and safety of agricultural products. It is a major task of supply-side structural reform in agriculture. The Chinese government will support new agricultural business entities in their application of the SAGO&GI (Safe Agri-product, Green Food, Organic Agri-product and Geographic Indication of Agri-products) certification and trade mark registration, with special attention to brand protection. China will implement concrete measures to protect the production area and origins of products. Sound agricultural production practices shall be promoted with production record ledger systems. China shall also strictly reinforce relevant regulations on production, sale and application of agricultural additives. It will pay special attention to the excessive pesticides and veterinary drug residue issue, especially the misuse of antibiotics in animal husbandry, and crack down on the excessive use of pesticides and veterinary drugs and on the illegal application of food additives, among other practices. China will establish an integrated service platform that enables full traceability, connectivity and sharing of the process. The quality and safety supervision system for agricultural products shall be further improved with enhanced risk management at different levels, identification of territorial responsibilities and increased spot checks and monitoring efforts.

2.3.6. Actively develop appropriate scale operation and management

As China has a large population with relatively little (arable) land, farms tend to be of small scale, averaging at only 0.7~0.8 hectare, which leads to a slow increase of its productivity in the face of rising costs. In recent years, with the surplus agricultural labor transferring to non-agricultural industries, arable land circulation has been increased to more than 30%. Therefore, it is necessary and adequate to actively develop appropriate scale operation and management. To cultivate new agricultural business entities and service providers, China shall adopt methods including transfer of business rights, shareholding cooperative, contract farmers and land trusteeship to promote diverse modes of business operation that are driven by land transfer and service. China will encourage farmers, on a voluntary basis, to transfer the land within the village to form a larger connected plot for scale farming. It will improve the certification process for family farms so as to support their development into an appropriate scale. Farmers’ cooperatives shall be standardized for comprehensive cooperation in production, supply and marketing and credit. Building on pilot projects of using one-stop service providers for the entire agricultural production process, China will continue to cultivate commercial service providers for agricultural machinery operation, farmland irrigation and drainage, disease prevention and treatment, drying, storage, etc. Service platforms and tools such as the supply/marketing agencies, postal services and agricultural machinery will play a role in changing from traditional agricultural materials distribution networks to modern and comprehensive service providers of agricultural materials. Local authorities shall work to put in place guarantee insurances that help ensure land transfer compliance. China will formulate an
evaluation and indicator system for agricultural operations of moderate scale for their healthy development.

2.3.7. Establish modern agricultural industry parks

According to the Chinese government, leading industrialized agricultural enterprises shall play a key role in large scale growing and breeding bases to bring together modern factors of production and establish modern agricultural industry parks that practice the “production + processing + technology” model, where technologies, industrial integration, entrepreneurship platform and key radiation effects come together. Such industry parks require scientific planning and sufficient consideration of functional layout including production, processing, logistics, R&D, demonstration, service, etc. China will encourage local authorities to adopt an overall perspective in allocating project funding for high-standard farmland construction, comprehensive agricultural development as well as modern agricultural production and development, with a focus on industry park infrastructure and the supporting service system. Industry parks will work to attract leading enterprises and research institutions for support of its construction and operation. Items for development include protected agriculture, precision agriculture, intensive processing and modern marketing, with the aim to cultivate new types of agricultural business entities and farmers with professional, standard and intensive production processes. Thus, China will upgrade the agricultural sector throughout the entire industrial chain with added value. Farmers and migrant workers returning to the countryside will be encouraged to join the development to share the proceeds through contract farming, share-holding cooperative as well as employment or entrepreneurship in industry parks.

2.3.8. Create a favorable environment for international trading of agricultural products

Since 2004, China has been suffering from a continuous trade deficit in agriculture, which is on a row to further expand. It regularly imports large quantities of soybeans, cotton, beef, sugar and other agricultural products, and now even has increased corn and pork imports, which result in enormous pressure on the domestic structural adjustment of the sector. Meanwhile, China’s agri-food exports are subject to various sanctions from many countries. China will take advantage of international markets in a coordinated way while optimizing the domestic supply structure of agricultural products, so as to establish a level playing ground for agricultural imports. It will improve laws and regulations on agricultural trade countervailing, anti-dumping and safeguard measures. Trade remedy investigations will be carried out according to law. China will encourage further expansion of agricultural product exports with enhanced promotion overseas. International cooperation in agriculture shall continue to develop as a way for the sector to go global. Focusing on countries and regions along the “One Belt and One Road” initiative, China will support agricultural enterprises in their cross-border operations, establishment of overseas production and processing bases as well as acquiring storage and logistics facilities, with the aim to cultivate internationally competitive large-sized enterprises and groups. It will actively participate in the revision of international trade rules and standards and promote mutual recognition of certification results for agricultural products. China will adopt comprehensive control against smuggling of agricultural products and implement special campaigns for the matter.

3. Reasons for and Policies on Practicing Green Production for Sustainable Agricultural Development

The No.1 Central Document of 2017 pointed out that China shall practice green production for sustainable agricultural development. The so-called green production makes full use of advanced science and technology, industrial equipment and management concepts to secure agricultural products, ecology and resources while improving the overall economic efficiency of the agricultural sector. It strives to introduce standard agricultural practices and products with the aim to establish an agricultural mode that promotes comprehensive, harmonious and sustainable social-economic
development. Sustainable agricultural development aims to meet the demand of both current and future generations without any compromise. It is an agricultural strategy that adopts production methods which would not deplete resources or harm the environment. Through technological innovation and institutional reforms, it helps reduce the impact of agricultural production on the environment while maintaining land, water and life. It shall adopt appropriate technologies and be both economically viable and socially acceptable.

3.1. Reasons for practicing green production for sustainable agricultural development

China has achieved tremendous progress in its agriculture and rural economy. However, there are still prominent issues that remain to be solved, which include over-exploitation of agricultural resources, over-use of agricultural additives, excessive groundwater extraction and increasing agricultural pollution, resulting in major challenges to the sustainable agricultural development.

3.1.1. Increasing resource constraints burden the task of securing agricultural product supply such as grain with more difficulty

China's basic national conditions feature a large population with limited land and water supply. Every year, around 4.8 million mu (320,000 ha, 15 mu = 1 ha) farmland is turned into construction land, which wastes a large area of cultivated soil layer while the substitute land through the requisition-compensation scheme proves to be of low quality, increasing the pressure on keeping the 1.8 billion mu “red line” that the country’s total area of farmland should not fall below. Issues such as decline in the quality of farmland, thinning black soil, soil acidification and shallower topsoil depth are on rise. The farmland irrigation water use coefficient is 0.2 lower than the average level of developed countries. In North China, groundwater extraction is excessive. China’s demand for food crops and other major agricultural products is growing, despite the decrease in water and land resources. How to ensure national food security and sufficient supply of agricultural products under the current resource constraints becomes an increasingly acute issue.

3.1.2. Increasing environmental pollution adds to the difficult task of ensuring quality and safety of agricultural products

The “three wastes” of industries (waste gas, waste water, industrial residue) and urban waste proliferate into agricultural and rural areas. As cadmium, mercury, arsenic and other heavy metal pollutants continue to contaminate the soil of agricultural production; heavy metal concentrations exceed the standards at soil monitoring sites nationwide by 16.1%. Agricultural practices create a great amount of pollution as the utilization rate of chemical fertilizer and pesticides is lower than 1/3, the recovery rate of plastic film sheeting is below 2/3, only less than half of livestock and poultry manure is being effectively treated, and straw burning is prevalent. Prominent marine eutrophication gives rise to constant occurrence of red tides and green tides, causing ecological deterioration to the fishery environment. The treatment of rural waste and sewage is largely inadequate. The aggravation of environmental pollution in agriculture and rural areas directly affects the quality and safety of agricultural products.

3.1.3. Significant degradation of ecosystems brings forward a pressing task to conserve ecosystem in agricultural development

The water and soil erosion area in China totals 2.95 million square meters. The average annual soil erosion amounts to 4.5 billion tons. There are 1.73 million square meters of desertified land and 120,000 square meters of stony desertification area. Intensive and extensive production methods lead to imbalanced and degraded farmland ecosystem. Solutions are most needed to establish a comprehensive ecosystem that encompasses agriculture, forestry and animal husbandry. Grassland overgrazing remains an outstanding issue as part of the overall deteriorating grassland ecology. Lakes and wetlands shrink in size, resulting in a much weaker ecosystem. Biodiversity is seriously
threatened, as the numbers of endangered species continue to increase. The significant degradation of ecosystems results in a large number of challenges to conserving the ecosystem in agricultural development.

3.1.4. The current incompetent system adds extra task to establishing an effective system for sustainable agricultural development

There lacks a management system for resources including water and soil, hence no available standard protection and restoration efforts for mountains, waters, forests, farmlands and lakes. A market-oriented agricultural resources allocation mechanism has not yet been established, in particular, a pricing mechanism that can help identify water scarcity. The incentive program for circular agriculture shall be further improved, as farming and animal husbandry are experiencing uncoordinated development. The utilization rate of agricultural waste remains relatively low. The eco-compensation mechanism remains to be improved. Subjects liable for agricultural pollution remain unclear, while there is lack of a monitoring mechanism and the cost of pollution is too low. Moreover, there are none or incomplete mechanisms clarifying the social and economic value of relevant resources, e.g. for pricing of agricultural resources, benefit compensation and reward/punishment, thus restricting rational use of agricultural resources and ecological protection (see the National Sustainable Agricultural Development Plan (2015-2030)).

3.2. Policies for practicing green production for sustainable agricultural development

3.2.1. Promote cleaner production in the agricultural sector

(1) The action plan for zero growth in the application of chemical fertilizers by 2020

① Status quo and problems in the application of chemical fertilizers.

China is a big consumer and producer of chemical fertilizers. According to the National Bureau of Statistics, China produced 70.37 million tons of chemical fertilizer (net, the same below) and used 59.12 million tons in its farmland in 2013. Due to a relatively low productivity rate of farmland, experts pointed out that China has benefited greatly from chemical fertilizers, which contributed over 40% to its output increase. However, China’s use of chemical fertilizers is faced with four issues: (1) Excess application of fertilizer per unit of land, currently at 21.9kg/mu as compared to the worldwide average of 8kg/mu, which is 2.6 times of that in the U.S., and 2.5 times of that in the European Union. (2) Uneven fertilizer use across regions and products, with excessive use observed in the developed Eastern China, the lower reaches of the Yangtze River and suburban areas, as well as for cash and horticulture products such as vegetables and fruit trees. (3) Low utilization rate of organic fertilizers at around 40% of the estimated 70 million tons that are available. Wherein, only around 50% of livestock manure and 35% of crop stalk are returned to fertilize the farmland. (4) Unbalanced structure of fertilizer uses. Chinese farmers prefer chemical fertilizers to organic fertilizers, macro element fertilizers to micronutrient fertilizers and nitrogen fertilizers to phosphorus/potassium fertilizers. The traditional manual application is prevalent and fertilizers are spread to the surface of the ground. Only 30% of farmland is fertilized with machinery facilitation.

② The general idea behind the action plan for zero growth in the application of chemical fertilizers by 2020.

To effectively ensure national food security and supply of major agricultural products, China will firmly establish the concept of “fertilizer application for better yield, cost-effectiveness and environment”. Relying on scientific and technological progress, as well as the new agricultural business and service entities, it will focus on extensive promotion and application of scientific fertilization methods, with the aim to better protect and improve farmland conditions. Moreover, China shall increase the use of organic fertilizers instead of chemical options, and organize training
programs on how to better manage fertilizer use, so as to achieve sustainable development along with high yield and quality environment. Thus, it will support increase in grain production, farmers’ income and quality of the eco-environment.

3 Basic principles, goals, methods and key tasks of the action plan for zero growth in the application of chemical fertilizers by 2020.

The action plan for zero growth in the application of chemical fertilizers by 2020 brings forward 4 basic principles: (1) Ensure production with less costs and higher efficiency; (2) Adjust measures to local conditions and put them to action progressively; (3) Coordinate and implement in a comprehensive and consolidated manner; (4) The government shall take the lead and engage relevant stakeholders. The goal is to establish a scientific management system for fertilizer use by 2020 that helps improve the efficiency of fertilization practices. The action plan strives to restrict the annual growth of chemical fertilizer use to be below 1% for the 2015-2019 periods and to achieve zero-growth by 2020 for major agricultural crops. Implementation methods include precision fertilization, adjustment of fertilizer use structure, change of fertilization methods and use of organic fertilizers instead of chemical fertilizers. The action plan brings forward the following key tasks: (1) Promote formula fertilization on the basis of soil testing; (2) Support transformation of fertilization methods; (3) Encourage the application of new fertilizers and application methods; (4) Promote the use of organic fertilizers; (5) Improve farmland conditions (see the Action Plan for Zero Growth in the Application of Chemical Fertilizers by 2020).

(2) The action plan for zero growth in the application of pesticides by 2020

1 Status quo and problems in the application of pesticides.

As China’s crop acreage continues to increase each year with higher demand for pest control, the use of pesticides has been on a rise. According to statistics, a total of 311,000 tons of pesticides have been used every year during the 2012-2014 periods, which is 9.2% more than that in the 2009-2011 periods. The excessive use of pesticides not only increases production costs but also has an impact on food safety and the eco-environment. Main problems are as follows: (1) Diseases and insect pests are worsening. Due to climate change and changing method of cultivation, diseases and insect pests of agricultural crops are more likely to occur or return. Currently, pest control is largely dependent on chemical pesticides, which in fact enhances pest resistance and reduces the outcome effect. As a result, more pesticide use actually creates a more difficult situation for pest control. (2) The increased pesticide use threatens the quality and safety of agricultural products. Currently, the main method of pest control and prevention is through use of chemicals. However, unscientific and irrational applications are likely to cause excessive pesticide residues, affecting the quality and safety of agricultural products. (3) Increased use of pesticides adds extra costs to agricultural production. Pesticides are important additives that require manual labor to apply. Excessive pesticide use inevitably leads to an increase in agricultural production costs. According to a survey, costs of using pesticides for vegetables and apples in 2012 have increased by about 90% as compared to 2002. (4) The effective utilization rate of pesticides is quite low. At present, the average effective utilization rate of pesticides in China is only 35%, most of which is lost via runoff, leakage and drifting, causing pollution to the soil, water and the eco-environment of farmland.

2 The general idea behind the action plan for zero growth in the application of pesticides by 2020.

China shall adhere to the principle of “prevention first in combination with comprehensive pest control and management”. Following the concept of “plant protection through science, public participation and green development,” it will take advantage of scientific and technological progress as well as new agricultural business and pest control service entities to extensively and widely transform current practices. China will promote new pesticides coupled with better equipment, so as to accelerate the transformation of pest prevention and control methods, and to vigorously promote green and comprehensive pest prevention and control. Thus, it strives to establish a resource-saving,
environment-friendly and sustainable pest control system to reduce use of pesticides for protection of agriculture, quality/safety of agricultural products and environmental integrity.

③ Basic principles, goals, methods and key tasks of the action plan for zero growth in the application of pesticides by 2020.

The action plan brings forward 4 basic principles: (1) Reduce use of pesticides while maintaining agricultural yield; (2) Emphasize both quantity and quality; (3) Care for agricultural production as well as the eco-environment; (4) Increase efficiency with less costs. The action plan aims to achieve the following goals: China will establish a resource-saving, environment-friendly and sustainable pest control system with scientific methods for pesticide application. It will limit the use of pesticides so that the average use per unit of land falls below that of the last three years, thereby realizing the target of zero-growth by 2020. The action plan identifies 4 implementation paths: keep diseases and pests under control; substitute high-toxicity pesticides with low toxicity options and replace small-sized equipment with large- and medium-sized equipment; apply pesticides in a scientific way; implement comprehensive and coordinated disease and pest prevention and control. The action plan includes the following key tasks: (1) Establish a pest monitoring and alert system; (2) Promote scientific application of pesticides; (3) Support green pest prevention and control; (4) Promote coordinated and comprehensive pest prevention and control (see the Action Plan for Zero Growth in the Application of Pesticides by 2020).

(3) Prevention and control of pollutions from livestock and aquaculture operations

Given the carrying capacity of the environment and requirements for preventing and controlling pollutions from livestock and aquaculture operations, the government calls for all localities to follow the principle of balanced development in order to scientifically plan their livestock and aquaculture capacity. China will promote standardized scale operation of animal husbandry with supporting facilities for storage, treatment and utilization of animal manure and waste water. It will improve technology and equipment while supporting central collection and treatment of animal manure where free-range operations are prevalent. China will plan and establish large-scale biogas facilities in areas with intensive agricultural operations or in the new countryside. It will also support different modes of development for such large-scale projects. Technologies for utilization of animal manure will be adapted to local conditions so as to standardize and guide livestock and poultry farms in reusing their animal waste. China will develop aquaculture demonstration farms with the aim to promote aquaculture technologies including the recirculating aquaculture system, the pond recirculation system and the floating cage system.

(4) Efforts to eliminate agricultural film residues

According to the Chinese government, efforts are being made in revising standards for agricultural film, with strict provisions on film thickness and tensile strength. It is strictly prohibited to produce and use film thinner than 0.01mm, a measure that ensures film recycling at a later stage. China will increase subsidies for dry-farming techniques, i.e. subsidizing the use and recycling of thick ground films. It will put in place regional demonstration zones for recycling of agricultural films, support film recycling outlets, enhance the local capacity of processing waste film, and gradually establish an extensive and comprehensive recycling and processing network with innovative collection and recycling methods. China will also develop eco-friendly and biodegradable ground films as well as the pick-up and processing machines for used films. Efforts will be made to establish an evaluation system for degradable ground film. China shall initiate campaigns to recycle and reuse ground films in key areas, and strive to first achieve zero-growth in ground film in the black soil region of Northeast China.

(5) Expand utilization of straws
The government will further enhance demonstration and policy guidance to support returning straws to fields and utilize straws as a fertilizer, feed, base material, raw material and source of energy. China will work to establish a straw collection, storage and transport system involving the government, enterprises and handlers in a market-oriented manner, with the aim to bring down costs for the process. It will accelerate comprehensive, scale and industrial utilization of straws. China will work on incentives as well as supporting policies and measures, e.g. apply agricultural electricity tariff for the initial straw processing operation, straw collection and storage sites will be treated as agricultural land, expand the scope of tax incentives and credit support. Beijing, Tianjin and Hebei regions, key air pollution control zones, will start with demonstration projects for comprehensive straw utilization in an effort to solve the open straw burning issue (see the Implementation Opinions on the Fight to Prevent and Control Agricultural Nonpoint Pollution from the Ministry of Agriculture).

3.2.2. Implement agricultural water conservation projects on a large scale

(1) Status quo and problems of China’s water resources

The distribution of water in China is highly variable in both space and time. Most parts of China have rainy summer and autumn but dry spring and winter, with 1/2 to 1/3 of annual precipitation concentrated in summer and autumn. The amount of precipitation also differs in each year, which is especially prominent in northern regions. From the spatial distribution, due to the monsoon climate, precipitation varies greatly in different regions. Annual precipitation in the southeast coastal area is above 1,600mm, and drops below 400mm in the northwest inland areas, or even less than 200mm in some parts of the region. In addition, there remains a serious mismatch between the spatial distribution of water resources and irrigation land across China. Four Southern China regions (including the Yangtze River, Southern Rivers area, Southwest Rivers area and Southeast Rivers area) accounted for 81% of the country’s total water resources, but have only 36.4% of the total national land area and 35.9% of total arable land. Four Northern China regions (including the Northeast Rivers area, the Hai River area, the Huai River and Shandong rivers area and the Yellow River area) have 28.2% of the national land area, 58.3% of arable land, but only 14.4% of water resources. China lacks abundant water resources. According to the World Bank’s "World Development Indicators 2013", China’s per capita fresh water resources was 2,093 cubic meters in 2011, which was less than 1/3 of the world average and ranked behind after the 120th on the list of surveyed countries. As China has a large area of arable land, the water resources per mu are 1,440 cubic meters, about half the amount of the world average. China is facing four major water resource issues: imbalance in supply and demand of water resources, serious water pollution, degradation of aquatic ecosystem and frequent extreme incidents.

(2) Measures for implementing agricultural water conservation projects on a large scale

According to the No.1 Central Document of 2017, water conservation in agriculture shall be a major strategic priority. State support will be introduced in the form of a policy system for the matter. China will further implement medium and large-sized irrigation, drainage and water conservation projects, while at the same time improve water-saving facilities in the fields for development of modern irrigation areas. It will vigorously carry out highly-efficient and water-saving irrigation projects on a regional scale, with the aim to establish a number of centralized and efficient irrigation projects. China will steadily develop efficient and water-saving irrigation systems for forage land, and strictly restrict extraction of groundwater for irrigation in ecologically fragile areas. It will put in place a well-developed standard system for water-saving technologies in agriculture. China will speed up the development of diverse, complete and reliable water-saving irrigation technologies and products, with a special focus on sprinkler irrigation and drip irrigation to promote the integrated application of water and fertilizers. It will comprehensively carry out the reform of agricultural water pricing, identify the accountability of local governments and establish a reasonable water pricing mechanism.
and a water-saving incentive mechanism. China will fully implement water resources quota management with corresponding compliance assessment at the county level. It will also conduct the third national survey and assessment of water resources.

3.2.3. Enhance the development of major ecological projects

(1) Projects for grassland ecological protection

① Status quo and problems of grassland ecology and economic development

As China’s largest green ecosystem, grassland is one of its most important natural resources and the most basic source of livelihood for herdsmen in pasture areas. During the “12th Five-Year Plan” period, the state issued a grassland ecological protection subsidy policy to implement major projects for grassland protection and to establish a policy system for optimal utilization and protection of grassland. The policy greatly benefited the grassland ecosystem, livestock production and living quality of herdsmen. However, there still exist the following problems: (1) It remains an arduous task to better manage and use grassland resources. Despite the fact that China abounds in grassland coverage, it lacks efficient tools to make better use of grassland resources, lagging far behind the international best practices in terms of utilization methods, carrying capacity for grazing and management. In Northern China, it used to take 50 mu of natural pasture on average to support one sheep unit, and now 8 mu after improvement, which is still far behind the level of certain developed countries. (2) It remains a difficult task to consolidate achievements of grassland ecological protection projects. Deterioration to the ecosystem in China’s vast grassland has not been halted or reversed, as over 1/3 of the area remains moderately or severely degraded. The overall ecosystem is fragile. As industrialization and urbanization progress, the pressure on grassland resources and environment will continue to grow. It remains a difficult task to consolidate achievements of grassland ecological protection projects. (3) Transformation and upgrade of grassland animal husbandry requires more efforts. There has been a chronic investment deficiency in facilities such as livestock shed, silage silo/pit and hay warehouse, which require a long process of transformation to improve the current low productivity. Grassland animal husbandry, as the main source of local farmers’ income, is facing shortage and low quality of forage. (4) Grassland disaster prevention and control remains a challenging task. In recent years, global climate change has led to an increase in China’s extreme weather events including high temperature, drought, storms and blizzard in main pasture areas. The occurrence of diseases, insects, and mice becomes more frequent as well. They pose a serious threat to the grassland ecosystem, and affect the local livestock production and herdsmen’s income, resulting in a bottleneck issue that hinders sustainable and healthy economic and social development in pasture areas. (5) Grassland ownership in Southern China remains unclear. In China’s southern provinces, only less than 20% of pasture has been contracted. Some provinces have not even started the process yet. This shows that certain areas lack sufficient awareness of how important grassland is, and thus are not motivated to identify and determine ownership/user rights of grassland pasture (see the “13th Five-year Plan” for National Grassland Protection and Construction).

② Major policies for grassland protection and utilization

The Chinese government has introduced 4 basic principles for grassland protection and utilization: (1) Protection first with restoration efforts; (2) Scientific planning with localized management; (3) Solutions fit for local conditions; (4) Step by step implementation with focal points.

The policies strive to, by 2020, effectively halt grassland degradation at the national level, improve grassland ecosystem, steadily increase grassland productivity, enhance scientific utilization of grassland, significantly reduce losses in animal husbandry due to disasters, enhance infrastructure construction as well as optimize the economic structure of agriculture and animal husbandry. Thus, animal husbandry shall develop into a new phase, bringing higher income to local farmers and herdsmen.
—The grassland ecosystem will be vigorously enhanced. China will increase vegetation coverage on grassland to 56%, locate 3.6 billion mu of essential grassland, and improve up to 900 million mu of grassland. Thus, the grassland’s capacity for water conservation as well as carbon and nitrogen sequestration will be improved significantly.

—Grassland productivity will increase steadily. China will increase the total national grass production to 1.05 billion tons; areas reserved for artificial grass planting will reach 450 million mu; forage seed breeding field will maintain at 1.45 million mu, while the number of high-quality forage breeding base will amount to 35.

—Scientific utilization of grassland resources will continue to improve. China will maintain an area of 1.2 billion mu under the grazing ban, 1.944 billion mu for deferred grazing, and 420 million mu for rotational grazing. In key natural grassland pasture areas, the average livestock overloading rate shall not exceed 10%, and the grass to livestock ratio will be well balanced. Counties, townships and villages will significantly improve their management and protection system for grassland.

—Grassland disaster prevention and control capacity will be strengthened. China will put in place necessary storage warehouses (fire station) for grassland fire-fighting supplies that support all cities (counties) 100% that have an extremely high or high fire risk. 95% of grassland fire incidents will be extinguished within 24 hours. In critical areas, 60% of ranches will establish standard sheds for fertile female animals. China will ensure over 90% of forecast accuracy for short-term mice and pests damages. The percentage of mice and pests damages under control and prevention will be 85% and 60% respectively. China will also enhance its capacity in the prevention and control of snow disaster and drought.

—Grassland infrastructure will further improve. The total area of fenced grassland in China will reach 2.25 billion mu. There will be another 1 million households in pasture areas with livestock sheds, hay warehouses and silage silos. In addition, 50 new nature reserves will be established on grassland, while efforts will be put in to continue with 5 existing reserve projects.

The government strives to improve the institutional systems for cultivating grassland ecological civilization, including a grassland property rights system: Grassland contract management systems (system of ownership by the whole people with regards to grassland resources at various levels; system of compensated use of grassland resources owned by the whole people); grassland protection systems (regulatory system for the use of grassland territorial space, basic grassland protection system, grassland ecological compensation mechanism); grassland monitoring and early warning systems (grassland dynamic monitoring and early warning system, monitoring and early warning mechanism for the carrying capacity of grassland, grassland ecological value assessment system); grassland scientific utilization systems (system for grazing bans, rest and rotation as well as grass-livestock balance, grassland national park system); grassland supervision systems (grassland resources balance sheet, audit system for outgoing government cadres with regards to grassland natural resources, system for grassland ecological damage assessment and compensation, system for evaluation of grassland ecological protection projects).

The State also proposed to implement a series of projects for grassland protection and utilization, including policies and projects for grassland ecological protection (grassland ecological protection subsidy policy, projects for turning marginal grazing land into grassland, the sandstorm source control project of Beijing and Tianjin, projects for comprehensive management of Karst rocky desertification, a new round of turn marginal farmland into forest or grassland project, projects for the management of cultivated grassland in the northern agriculture-animal husbandry ecotone, projects for the establishment of grassland nature reserve); for rational utilization of grassland resources (modern grass seed industry upgrade project, modern grassland animal husbandry development projects for the Southern area, grain to forage project, initiatives for the revitalization of dairy and alfalfa development, pilots for grassland animal husbandry development, demonstration projects of transformation of grassland animal husbandry, projects of developing and utilizing grassland in agricultural areas); for grassland disaster prevention, mitigation and support (projects
for grassland disaster prevention and mitigation, project that aims to establish a grassland supervision and monitoring system, water conservancy project for grassland pasture areas, subsidies for grassland animal husbandry development) (see the “13th Five-year Plan” for National Grassland Protection and Construction).

(2) Projects for forestry ecological protection

① Status quo and problems of forestry ecology and economic development

Forest is another important ecological safeguard system of China. During the “12th Five-Year Plan” period, China accelerated its afforestation and greening progress with a number of forestry projects for ecological conservation and restoration, including protection of natural forest resources, turning marginal farmland into forest, shelterbelt development, wetland protection and recovery, desertification control, rocky desertification control, wildlife protection and nature reserve development. According to the 8th National Forest Inventory (2009-2013), forest area in China now stands at 208 million hectares with a total standing stock volume of 16.433 billion cubic meters, of which forest stock has reached 15.137 billion cubic meters. Compared with the 7th inventory, forest area has increased by 12.23 million hectares, of which natural forest area accounted for 2.15 million hectares. The total biomass of the national forest vegetation is 17.002 billion tons, and the total carbon sink amounts to 8.427 billion tons, accomplishing the two binding targets of the “12th Five-Year Plan” period, i.e. 21.66% forest coverage rate and 14.3 billion cubic meters of forest stock.

Green growth requires that forestry play an important role in generating green wealth and ecological assets. Forestry shall provide more high-quality ecological products and help enhance the ecological value and public service functions of forests, wetlands, deserts and biodiversity. However, forestry development still faces many difficult problems: (1) Ecological restoration proves to be a difficult task. China has a total of 49.46 million hectares of potential land for afforestation, including barren land suitable for planting trees, sparse forests as well as slope farmland and barren sandy farmland to be turned into forests. Among them, nearly 80% are located in the north, northwest arid and semi-arid regions and southern karst rocky desertification area with poor site conditions that are challenging for afforestation. (2) The pressure on resource conservation is mounting. With the economic-social development and urbanization, forest resources in certain areas become severely damaged, resulting in increasing pressures on their conservation. Ecological issues emerge including forest fragmentation, wetland disappearance and species extinction. During 2009-2013, 2 million mu of forested area was illegally occupied on a yearly basis. Between 2004 and 2013, the average annual reduction in wetland area was 5.1 million mu, nearly 20% of national land became desert or rocky desert and more than 900 species of vertebrate and 3,700 species of higher plants were threatened. Over the past decade, 7,600 forest fires have occurred on average every year, and forest diseases and insect pests have affected an area of 175 million mu. The ecological space becomes massively intruded, with the ecological carrying capacity being close to or over the critical point. (3) Relevant systems and mechanisms lack vitality. Root causes that inhibit forestry development include inefficient system, inflexible mechanism and unclear property rights. State-owned forest zones and forest farms have just started their reform process and are facing a great number of difficulties as they carry heavy historical burdens and low motivation. As they haven’t been fully integrated into local economic and social development, current issues include low income workers, weak social security and challenging industrial transformation. Reform of the current collective forest tenure system is met with issues such as missing management rights and incomplete power of disposition. Development of scaled-up operations and new business entities remains sluggish as they are not intensive operations that are specialized, well organized and commercialized. The property right mode remains backward and corresponding investment and financing mechanism is not flexible, resulting in difficult entry of private capitals. (4) Forest products fall short of supply. Product supply and public service capacity of forest, wetland and other natural ecosystems are incapable of fulfilling expectations of the general public. The distribution of eco-space, production space and living space is imbalanced as the carrying capacity of ecosystem in densely populated areas is insufficient. There is
an increasing demand for neighborhood green space and forestry recuperation and care support. There is a lack of facilities for eco-experience such as wetland visits. Ecological resources have not been effectively translated into high-quality ecological goods and public services. The value of ecosystem services is not yet sufficiently explored and quantified. A serious shortage of domestic supply of wood has led to high dependence on imports. There exists an outstanding shortage in supply of woody oil plant, forest food and forest medicinal plants. The proportion of high value-added products remains low. The huge production potential of forestry is yet put into full play (see the 13th Five-Year Plan for Forestry Development).

② Major policies for ecological conservation and development of forestry

**Main goals of China’s forestry development by 2020**

—Stabilize the national ecological safety barrier. China will further optimize forest productivity, significantly enhance the ecological carrying capacity and improve the overall quality of the eco-environment so as to form an ecological safety barrier. Natural forests, wetlands and critical resources will be under full protection. China will work to increase forest coverage by 23.04%, improve forest stock by 1.4 billion cubic meters, stabilize wetland area at 800 million mu, maintain natural forest reserve at 17% of the national land area and treat an additional 10 million hectares of desertified land.

—Improve ecological public services of forestry. China will promote green development for the people, fair share and better services, so as to provide a wider selection of quality ecological and forest products. It will strive to achieve 15 trillion yuan of forest ecological service output, increase the annual number of leisure tourists to exceed 2.5 billion, and establish over 200 national forest cities, so as to significantly improve the living environment. Efforts will be made to enhance and promote eco-culture among the general public.

—Secure forestry-related livelihoods. China will transform and upgrade forest industries to improve the income of forest workers and farmers for better working and living conditions. Thus, more talents will be attracted to forest related jobs, and the domestic timber capacity will also be significantly increased. Forest industries are expected to reach 8.7 trillion yuan in output. Ecological compensation incentives will be carried out to support certain local residents in shaking off poverty.

—Significantly enhance forestry management capacity. China will steadily promote forestry reform, with state-owned forest zones and farms as the main force of the process, to further release vitality of forestry collectives. It will enhance scientific and technological innovation as well as rule of law in forestry management, improve infrastructure and facilities, optimize personnel building and well establish institutional system for forestry.

**Forestry development outlook in China**

China should devote major efforts to the ecological safety strategy of building the “two shields and three belts” (an ecological shield on the Qinghai-Tibet Plateau; an ecological shield spanning the Loess Plateau, Sichuan, and Yunnan; a forest belt in the northeast; a sand entrapment belt in the north; and a hilly and mountainous belt in the south). China will focus on three major strategies, namely coordinated development of Beijing, Tianjin and Hebei, development of the Yangtze River economic belt as well as the “One Belt and One Road” initiative. Taking into consideration forestry development conditions and demand, it will, in accordance with requirements of harmonious development among mountains, water, forests, farmland and lakes, optimize forestry productivity and the spatial layout of forests, wetlands, desert vegetation and wildlife habitats, so as to guide forestry industries towards regional agglomeration and transformation. Thus, China will achieve a new pattern of forestry development that consists of “one circle, three areas and five belts”. The “circle” refers to the Beijing-Tianjin-Hebei ecological collaborative zone that also radiates to the
neighboring Taihang Mountains, Yanshan Mountain and Bohai Bay, with the aim to enhance the carrying capacity of urban ecology, improve the living environment and enhance China’s international image. "Three areas" refer to the Northeast conservation area, the Qinghai-Tibet ecological barrier area and the Southern restoration area. As China's main ecological safety areas, they play an important role in the comprehensive protection of natural forests, wetlands and important species. In addition, they also serve as strategic bases for protecting ecological safety and timber security. "Five belts" refer to the Northern sand break belt, Silk Road Ecological Protection Belt, Yangtze River ecological conservation belt (economic zone), the Loess Plateau-Sichuan and Yunnan ecological restoration belt and coastal protection and disaster mitigation belt. As an important ecological safety structure of China, the 5 belts serve as an ecological corridor that supports improvement of natural environment along the border, rivers, the Silk Road, mountains and coasts. They are also a green “Great Wall” that expands the ecological space and the corresponding carrying capacity.

**Strategic tasks for ecological conservation and development of forestry**

(1) Accelerate land greening action plans. China will carry out afforestation actions on a large scale with key forestry projects, restore the ecosystem in forests, wetlands and deserts, increase coverage of forest and wetland as well as forest stock, consolidate and expand the eco-space, enhance ecological functions, and build a national green ecological safety barrier.

(2) Enhance and improve forestry industries. China will fully tap into the advantages and potential of forestry industries in green growth, and guide with policy, demonstration projects and best practical cases for the development of unique, emerging or traditional industries. It will upgrade traditional industries, build industry brands, optimize the industrial structure, cultivate leading enterprises and grow industry clusters so as to promote integrated development of primary, secondary and tertiary forestry industries.

(3) Improve the quality of forests. According to sustainable forest management principles that focus on local conditions, adaptive strategies, simultaneous afforestation and management as well as focus on quality and quantity, China will strengthen management systems, implement scientific management methods and accelerate the development of multi-functional and healthy forest.

(4) Enhance protection over resources and biodiversity. Forest resources and biodiversity are valuable assets from nature, the basic conditions for human survival, and the basis for sustainable economic and social development. China must first of all protect the ecological resources and biodiversity and establish a network of eco-corridors and biodiversity conservation.

(5) Deepen the forestry reform. China will comprehensively promote the reform of state-owned forest zones and farms and further deepen the transformation of the collective forest tenure system so as to give play to state-owned forest land in leading the greening development with endogenous motivation.

(6) Vigorously promote innovation as a driving force for development. Driven by vigorous demand for forestry development, China must explore new models for development with science and technology, foster new growth momentum and encourage the public to start businesses and make innovations, so as to guide forestry development to a new level with innovation.

(7) Strengthen the rule of law in forestry management. China will improve legislation for forestry development and enhance the rule of forestry law so as to provide for reliable guarantee for modernization of forestry with the most strict and stringent law system.

(8) Improve ecological public services of forestry. China will meet new expectations of the general public of sound ecological environment. It will work to effectively transfer ecological achievements and benefits into public services, with the aim to establish a public service network with diverse
offerings, appropriate scale and reasonable layout that meets the needs of different groups of people.

**Major national forestry projects**

(1) Land greening action plans. China will carry out intensive afforestation activities on a large scale to give rise to large green space for ecological conservation and green corridor. Thus, it will work to put in place a land greening network.

(2) Forest quality improvement projects. China will promote forest management, strengthen forest cultivation and restoration of degraded forests, enhance quality of major river sources, key state-owned forest zones, state-owned forest farms and collective forest zones, and promote healthy, efficient and stable forest ecosystems.

(3) Natural forest protection projects. China will put a full stop to commercial logging of state-owned natural forests, and negotiate to stop commercial logging of collective and private natural forests. Natural forests, immature cultivated forest land, sparse forests and shrub forests will all fall under protection as natural forest. China will work to restore forest cover in areas where natural regeneration is difficult.

(4) Projects for turning marginal farmland into forest or grassland. China will stabilize and expand scope and scale of the new round of turning marginal farmland into forest. China has identified 15 key zones with issues in water conservation, soil erosion, karst stony desertification and sandy desertification in the Loess Plateau-Sichuan and Yunnan ecological restoration belt, the joint ecological circle of Beijing, Tianjin and Hebei, the Northern sand break belt, the Silk Road Ecological Protection Belt and the Yangtze River ecological conservation belt (economic zone). China will return marginal farmland to forest, which includes 25+ degree slope farmland, farmland with severe desertification, farmland on a slope of 15 to 25 degrees near important water sources and heavily polluted farmland. It will also increase vegetation to control soil erosion. By 2020, China will turn 5.34 million hectares of marginal farmland into forest, and significantly reverse the serious situation of soil erosion and desertification.

(5) Wetland conservation and restoration projects. In key areas of natural and artificial Wetlands of important ecological value, China will work to establish a sound Wetland management system, a science education system and a monitoring and evaluation system. Efforts will prioritize conservation and restoration to recover and increase Wetland coverage.

(6) Projects to protect endangered wildlife and establish nature reserves. China will identify zones for important habitats of wildlife, optimize the nature protection system, promote nature reserve development while managing and educating local residents with relevant facilities and capacity. In the heart of weak, fragile and insufficient areas, China will establish nature reserves, protected areas and eco-corridors where necessary.

(7) Projects for desertification control. Focusing on the Northern sand break belt and the Silk Road ecological protection belt, China will strengthen sand control with demonstration zones and conservation area of desertified land. It will carry out pilot projects for national desert parks with decentralized, scale and local base management, with the goal to put in place 10 million mu bases, one hundred 100,000 mu bases and one thousand 10,000 mu bases for sand control.

(8) Develop forest industries. In areas with sound natural conditions and key state-owned forests in the Northeast and Inner Mongolia, China will work to establish national reserve forests and strategic timber reserve bases. It will further develop forestry resource bases, speed up industrial restructuring and upgrading and develop high-end and unique industries with brand recognition so as to meet people's demand for quality green products.

(9) Develop supporting system for forestry. China will enhance the 3 systems for forest fire prevention, firefighting and fire protection. China will put in place forest fire brigades, aviatic
firefighting facilities, large equipment, water facilities, forest fire barrier system, fire emergency access, forest fire early warning and monitoring system, communication system and information system. It will improve the 3 systems for pest monitoring and early warning, quarantine and prevention, disaster prevention and mitigation to enhance pest control in key ecological areas. Other infrastructure and commercial service systems (see the 13th Five-Year Plan for Forestry Development).

4. Reasons for and Policies on Growing New Industries and Forms of Business and Expanding Agriculture’s Industrial and Value Chains

4.1. Develop the recreational tourism industry in rural areas

4.1.1. Reasons for developing the recreational tourism industry in rural areas

Recreational agriculture, as a new form of business for modern agriculture and a new form of consumption for modern tourism, brings about new growth points to many fields, e.g. agriculture, forestry, stock farming, fishery, etc. Since the start of the 12th Five-Year Plan Period, there has been tremendous growth of recreational agriculture in China, showing a positive momentum characterized by “faster development, optimized planning, better quality and expanded application”. It has already become a new highlight of economic and social development. Developing recreational agriculture helps push forward supply-side structural reform for agriculture and tourism and a coordinated development of primary, secondary and tertiary industries of the countryside. It is an important channel for farmers to increase earnings through employment and overcome poverty, as well as a crucial media for promoting holistic tourism and integrated urban-rural development. During the “13th Five-Year Plan” period, with the increase in people’s living standards in urban and rural areas, their leisure time and consumption demands, there has been continuously enormous demand for recreational agriculture, which will still be at a golden stage for further growth. Currently, the current development of recreational agriculture is still not aligned with the explosive growth in market demand. Its growth model remains inefficient, facing various problems such as lack of mental preparedness, lagging infrastructure, insufficient deep-dive in cultural connotation, the need to improve service quality, etc., calling for an urgent upgrade.

4.1.2. Basic principles and main goals for developing the recreational tourism industry in rural areas

(1) Basic principles

(1) Increase income based on agriculture. China should, based on agriculture, farmers and rural areas, enhance planning and guidance, scientifically establish profit sharing mechanisms, increase farmers’ spontaneous awareness for development and encourage their entrepreneurship and innovation.

(2) Mutual integration and improvement by multiple aspects. China should promote integrated urban-rural development through strengthening the dynamic integration among farming culture inheritance, countryside tourism, protection of traditional villages and residences, targeted poverty alleviation, development of forest-related economy, forest tourism, tourism in water conservancy scenic areas and ancient water conservancy projects, as well as development of the beautiful countryside.

(3) Develop with local features in light of regional conditions. China should avoid repeated low level construction by carrying out moderate development in appropriate areas with a focus on special features in light of local conditions, while taking into account resource endowment, human culture and history, traffic location and business features.
(4) Government guidance with participation by multiple stakeholders. The government’s role in policy support, regulation and management, public services and environment creation should be strengthened. Markets should play a decisive role in resource distribution. Private capitals should be channeled and encouraged to develop recreational tourism projects with high farmer involvement and widely beneficial. Women should also be encouraged to be proactively engaged in the development of recreational agriculture.

(5) Environmental protection and sustainable development. China should follow the principle of balancing development versus protection, and production versus ecology. In view of considering the carrying capacity of resources and the environment in a coordinated way, China should double its efforts in ecological environment protection and walk a path of civilized development characterized by growing production, wealthy life and good environment.

(2) Overall goals

By 2020, the business scale is to be further expanded, with 3.3 billion tourist visits and a revenue over 700 million yuan; an industrial landscape with optimized layout, versatile forms, complete functionality and distinct features is to be created; social benefits are to be increased sharply with a fast growth in farmers’ income in recreational agriculture business; the quality of the development is to be improved significantly, with greatly enhanced services and a stronger sustainability. It should become an emerging pillar industry that expands agriculture, prospers rural areas and enriches farmers.

4.1.3. Main tasks for developing the recreational tourism industry in rural areas

The Ministry of Agriculture pointed out seven working tasks in its Guiding Opinions on Vigorously Developing Recreational Agriculture.

(1) Strengthen planning and guidance. China should follow the rules of countryside development, make planning based on local conditions, and proactively implement the practice of “integration of multiple planning”.

(2) Diversify products and forms of business. China should encourage various rural recreation and vacation products, e.g. leisure farms, countryside hotels, featured bed & breakfast businesses, outdoor sports, etc., and explore business forms such as agriculture theme parks, agricultural carnivals, towns with local features, fisherman’s wharfs, etc.

(3) Improve infrastructure. China should implement improvement projects for recreational agriculture and rural tourism, support the construction of a group of villages focusing on recreational agriculture, as well as recreational agriculture parks and cooperatives in an effort to improve base service infrastructure.

(4) Alleviate poverty through industry development. China should support poor households in developing recreational agriculture cooperatives, village bed & breakfast and small picking gardens. Priority should be placed on “one village one product” business promotion initiatives for villages archived and registered in the national poverty alleviation information network.

(5) Carry forward the excellent farm culture. China should carry out the census on agricultural cultural heritage, better tap into its value, strengthen dynamic monitoring of identified agricultural cultural heritage, and implement the revival plan for traditional Chinese crafts and techniques.

(6) Protect traditional villages. China should enhance the protection of traditional villages and residences, improve the protection and management mechanism, and execute and supervise the traditional Chinese village protection program. The seventh task is to develop renowned brand names. China needs to prioritize the building of a dimensional brand system for recreational agriculture, and encourage different regions to develop their local brands.
4.2. Promote agricultural E-commerce development

4.2.1. Basic reasons for promoting agricultural E-commerce development

E-commerce has a proven ability to inject IT-based elements into the production and sales of traditional agricultural products, drive flows of logistics, technology, talents and finance with the flow of information, reflect the status of supply and demand in real time, solve unbalanced market information, increase the say of agricultural producers, expand new channels, new customer base and new markets. Promoting agricultural e-commerce, incorporating modern management concepts such as industrial chain, value chain and supply chain, etc., and working towards a full and in-depth integration between modern information technology and traditional agriculture, are inevitable requirement for improving and perfecting the modern agricultural production circulation system. However, China’s agricultural e-commerce is still at the fledgling stage of development, faced with difficulties and issues such as poor infrastructure, low level of standardization, incomplete circulation chain, irregular market order, insufficient trust system, relevant policies, etc. Effective and concrete measures need to be taken to solve these problems.

4.2.2. Basic principles and overall goals for promoting agricultural E-commerce development

(1) Basic principles

(1) Market players with government guidance. China should correctly handle the relation between the market and the government, take full advantage of the roles of market players, and improve resource allocation efficiency for agricultural e-commerce. China should also strengthen the guidance of policies, planning and information, as well as regulation development and market oversight in an effort to build a beneficial environment for agricultural e-commerce development.

(2) Develop in a coordinated way with breakthrough in focal areas. China should focus on the combination of rural and urban areas, agricultural products and means of production and consumer goods, online and offline, and expand and promote the application of agricultural e-commerce by category, in different stages and areas. It should explore e-commerce model for fresh agricultural products and means of production to support the development of markets in producing areas, urban and rural warehousing, cold chain logistics, terminal delivery, in an effort to break through the development bottleneck.

(3) Driven by innovation and led by examples. China should promote innovation in technology, management, service and governance, incorporate the mobile Internet, cloud computing, big data, Internet of things and other new information technology into various areas and stages of agricultural e-commerce, and effectively enhance the ability of independent innovation. It should focus on leading examples and demonstrations, and develop agricultural e-commerce models suitable to local conditions.

(4) Develop in an orderly, standardized and healthy manner. Standardization should be sought during development, which also helps development. China should ensure a fast, healthy and sustained development of agricultural e-commerce while adhering to a demand-oriented development, necessary and feasible principles, with clear direction and priorities, a step-by-step strategy, a precise point of entry, and a strong and orderly progress to avoid becoming blind followers.

(2) Overall goals

According to the Ministry of Agriculture, by 2018, agricultural e-commerce infrastructure conditions will be improved significantly, the institutional system and policy environment will be basically sound, a number of important influential agricultural e-commerce enterprises and brands will be developed, e-commerce will play a bigger part in the circulation of agricultural products and means of production and assume a significantly stronger role in improving the market circulation system of
agricultural products and means of production, increasing consumption demand and prospering urban and rural economy.

4.2.3. Key tasks for promoting agricultural E-commerce development

(1) Actively nurture market players of agricultural e-commerce. Aiming at promoting the e-commerce capabilities of new agricultural operation entities, supporting online marketing of agricultural products and means of production, promoting online exchange and trade of agricultural production services, and growing agricultural e-commerce enterprises, China should cultivate agricultural e-commerce market players, and encourage various market players to proactively develop agricultural e-commerce. To this end, it will undertake capability enhancement initiatives, platform docking initiatives and e-commerce expansion initiatives.

(2) Improve the agricultural e-commerce online and offline public service system. China should explore a concerted development model between the online and the offline for agricultural products and means of production, improve the monitoring and early warning of agricultural products, quality standards and traceability systems, promote data and information sharing for agricultural e-commerce, achieve data linkage and connection in the entire industrial chain in agriculture, improve online and offline public service system for agricultural e-commerce in a bid to provide public service support for agricultural e-commerce. In this regard, China will carry out online goods collection initiatives, product promotion initiatives, information sharing initiatives, quality supervision initiatives and operational guarantee initiatives.

(3) Open up channels for agricultural e-commerce. China will strengthen communication and coordination with relevant departments to form synergy to accelerate the construction of infrastructure such as network, logistics, cold chain and warehousing, and encourage relevant business entities to carry out technology, mechanism and model innovations, and further bring information into villages and households, carry out the “e-commerce in rural areas” demonstration projects, providing beneficial conditions and experience for the comprehensive development of agricultural e-commerce. In this regard, it will carry out channel extension initiatives, market transformation initiatives, model innovation initiatives and foundation support initiatives.

(4) Earnestly increase the application of agricultural e-commerce technology innovation. In accordance with the principle of making innovations and leapfrog advances in key areas supporting development and creating a better future, China should carry out agricultural e-commerce development strategy research, break through the critical core technologies, develop and improve relevant standards and regulations, vigorously promote the application of advanced and practical information technology in circulation and other fields, and comprehensively enhance the technological innovation application ability in agricultural e-commerce. In this regard, China will carry out technological innovation initiatives, demonstration and popularization initiatives, standards promotion initiatives, policy research initiatives and think tank application initiatives.

(5) Accelerate the improvement of the agricultural e-commerce policy system. In accordance with the principle of “government guidance and market player engagement”, China should strengthen the top-down design and policy creation, optimize agricultural e-commerce related approval items and procedures with relevant departments, implement support polices for agricultural e-commerce development, give full play to the market in the allocation of resources, in a bid to provide a good policy environment for the growth of agricultural e-commerce. In this regard, China will carry out policy support actions, hardware support actions and operational support actions (see the Ministry of Agriculture’s Action Plan to Promote Agricultural E-Commerce Development).
4.3. Promote the growth of agricultural product processing industry and the integrated development of primary, secondary and tertiary industries in rural areas

4.3.1. Reasons for promoting the growth of agricultural product processing industry and the integrated development of primary, secondary and tertiary industries in rural areas

The agricultural product processing industry serves as a link between industry and agriculture as well as urban and rural areas. It has a wide coverage of businesses, and high interaction among industries. In addition, it is very effective in helping increase farmers’ income. Therefore, it is the inevitable choice for industrial integration and has become a significant symbol of agricultural modernization, a crucial pillar of the national economy, and an important livelihood industry that helps build a healthy China and ensure nutrition and health for the general public. China's agricultural products processing industry is developing rapidly and has become an important force of industrial integration. In 2015, the number of agricultural product processing enterprises above designated size was 78,000. Their main business income was nearly 20 trillion yuan. The annual growth rate in the 12th Five-Year Plan period was over 10%, and the conversion rate of agricultural products reached 65%. New urbanization, upgrading of consumption structure, and constant changes in information technology and other high and new technologies, along with the comprehensive deepening of rural reforms, bring about rare opportunities and momentum for the development of agricultural product processing industry and industrial integration. However, the restructuring and upgrading of the agricultural product processing industry are still lagging behind and lack driving ability. The agricultural product processing industry is not coordinated and aligned with the scale of agricultural production. Although the ratio of total revenue between the agricultural product processing industry and agriculture in general has increased from 1.7:1 to around 2.2:1, it is significantly lower than the ratio of 3~4:1 in developed countries. In addition, the level of technology and equipment is behind developed countries by 15~20 years. The agricultural industry system is imperfect. The development of production and sale is not sufficiently coordinated. The interconnection between rural industries is poor with a relatively low degree of integration.

4.3.2. Basic principles and critical goals for the growth of agricultural product processing industry and the integrated development of primary, secondary and tertiary industries in rural areas

(1) Basic principles

(1) Innovation should drive and initiate the integration. Innovation should become No.1 driver of the industry’s integrated development. Therefore, the strategy of innovation-driven development should be well implemented.

(2) Development should be coordinated to optimize distribution of industries. Coordination should be treated as the intrinsic requirement for integrated industrial development. Therefore, major efforts should be focused on cross-integration of industries.

(3) Growth should be environment-friendly to promote sustainable development. Being green and environment-friendly should be a basic criterion of integrated industrial development, and thus sustainable development should be pursued.

(4) Open cooperation is essential to the expansion of room for integration. Opening up is a path China needs to take to realize integrated industrial development. Therefore, China need to “go global” with the industries and cooperation with international capacity.

(5) Benefits should be shared to improve people’s well-being. Sharing should be an intrinsic requirement for integrated industrial development with an aim at increasing farmers’ income.

(2) Overall goals
According to the Ministry of Agriculture, by 2020, the overall level of integrated industrial development will be significantly enhanced, when a new landscape with a complete industrial chain, versatile functionality, a rich variety of forms of business and a more stable interest-coalition. By 2020, the production structure in agriculture will also be more optimized, where agricultural product processing industry will play an increasingly leading role, the growth of new forms of business models will accelerate, the industrial integration mechanism will be further perfected, major economic indicators will be relatively coordinated, businesses will have better performance, and the industry will gradually enter a mid- to high-level, significantly improving agricultural competitiveness, continuously helping increase farmers’ incomes and better lift farmers out of poverty with targeted measures.

4.3.3. Main tasks and major projects for the growth of agricultural product processing industry and the integrated development of primary, secondary and tertiary industries in rural areas

(1) Major tasks

(1) Enhance the primary industry in rural areas to lay a firm foundation for integrated industrial development. China should promote coordinated development of the well-balanced growing structure that integrates all three aspects: food, cash crops and fodder grass, make tremendous efforts to grow circular agriculture combining planting and stock farming, accelerate the development of the modern agriculture industrial system characterized by coordinated growth of food, cash crops and fodder grass, well-combined planting and animal husbandry, integration of planting, stock farming and processing as well as the integration of primary, second and tertiary industries. Agricultural product processing business should take the lead to steadily develop agricultural production and promote the production of quality agricultural products.

(2) Strengthen agricultural product processing industry to drive integrated industrial development. China should support preliminary processing in producing areas of agricultural products, comprehensively improve overall capability of deep processing of agricultural products, and promote comprehensive utilization of agricultural products and processing by-products.

(1) Create a more flexible tertiary industry in rural areas to expand the path for integrated industrial development. China should vigorously develop all kinds of professional circulation services, improve the marketing system for place of origin of agricultural products, promote production and sales interfacing with supermarkets, communities (districts), enterprises, schools, military, etc., encourage new types of agricultural entities to set up direct sale outlets for fresh agricultural products in urban communities or suburbs, and to conduct e-commerce for agricultural products.

(4) Innovate in the integration mechanism to trigger endogenous motivation for integrated industrial development. China should cultivate diversified industry integration players, strengthen the fundamental functions of family farms and farmer cooperatives, promote the standardized development of farmer cooperatives, develop leading enterprises in industrial integration, develop multiple types of industrial integration, and establish the interest-coalition mechanism of multiple forms.

(2) Major projects

(1) Special raw material base construction project. China should arrange the construction of the special raw material base to adapt to market demand and align with resource endowment, on the premise of ensuring self-sufficiency of grains and absolute food security, providing quality
agricultural products for post-production stages such as agricultural product processing industry, leisure agriculture, rural tourism, etc. Priority should be given to special species, raw material base and standardization in agricultural production.

(2) Restructuring and upgrading of the agricultural product processing industry. China should implement the restructuring and upgrading of the agricultural product processing industry, and promote integrated and cross development between the agricultural product processing industry and rural businesses. In view of changing the growth model, adjusting and optimizing the structure, and improving quality and profitability, it should promote the shift from scale expansion to quality improvement, from factor-driven to innovation-driven, and from a loose distribution to concentrated development, striving to achieve new breakthroughs, progress and results in key areas, e.g. technological integration of preliminary and deep processing, comprehensive utilization of by-products, staple food processing, quality and brand improvement, processing park construction, etc.

(3) Pilot demonstration programs for industrial integration. China should implement pilot demonstration programs for industrial integration to promote deep integration of rural industries. While undertaking the tasks of cultivating carrier of integrated development, exploring the models of integrated growth, and perfecting the mechanism of integrated development, it should proactively carry out the construction of demonstration areas and pilot zones for industrial integration, speed up the formation of new technologies, new forms of business and new models for integrated industrial development through effective measures such as planning guidance, policy support, project support, environment creation, etc. (see the National plan for Agricultural Product Processing Industry and Integrated Industrial Development of Primary, Second and Tertiary Industries in rural areas (2016-2020)).

5. Status of and Policies on Enhancing Innovation of Science and Technology, Guide Modern Agriculture for faster Development

5.1. Status and goals of agricultural science and technology development

5.1.1. Status of agricultural science and technology development

During the 12th Five-Year Plan period, China's modern agricultural construction has been accelerated; grain production and farmers' income have continued to grow. Full coverage of major fine crop varieties has been substantially achieved. The comprehensive mechanization level for the farming of major crops has reached 63.8%. The contribution rate of agricultural science and technology progress has reached 56%. Agricultural science and technology has made significant contributions to ensuring national food security, increasing farmers' income and sustainable agricultural development. Achievements in agricultural science and technology are impressive. China’s overall R&D level enjoys a leading position among developing countries. Fundamental and frontier technology research has achieved leapfrog progress. Fundamental researches such as rice functional genomics and major technological researches such as super rice, transgenic phytase maize, avian influenza vaccine, etc. also lead the world. Development and application research have made considerable progress, cultivated a large number of fine agricultural varieties, rolled out a number of efficient, energy saving, and green production technologies, significantly enhancing the supporting capacity for the industry.

A new round of technological revolution and industrial transformation is poised to take the lead. Technological progress is having a more direct driving effect on improving the land output, labor productivity and resource utilization, leading the modern agriculture’s growth model towards profound changes. The rapid development of modern agricultural biotechnology, which has genomics, etc. at its core, especially that of biological breeding technology, has driven a new green revolution of agricultural industry; big data, cloud computing and Internet technology have catalyzed the emergence of wisdom agriculture and the intelligent equipment industry; sustainable agricultural development has increasingly become a global consensus and focal point, where the resource
environment and the application of new energies and materials accelerate the development of low-carbon, circular agriculture; food safety issues draw wide attention; the nutrition, quality and technology of agricultural products develop rapidly, which drives the consumption trend focusing on natural, nutritious and healthy foods; synthetic biotechnology may expect disruptive technologies, which will fundamentally change the forms of agricultural production, living and industry, and lead a major adjustment and revolutionary breakthrough in the layout of the agricultural industry.

China needs to promote the supply-side structural reform in agriculture through scientific and technological innovation, change the agricultural production mode, resolve the structural contradiction in the supply and demand of agricultural products, improve the comparative profit of agriculture, mitigate the pressure of resources and the environment, cope with international competition and promote the improvement of agricultural quality, profitability and competitiveness.

5.1.2. Goals of agricultural science and technology development

According to the Chinese government, by the end of the 13th Five Year Plan period, the innovation of agricultural science and technology will be more vigorous, with higher innovation efficiency and enhanced contribution from science and technology towards agricultural industry; significant achievements will be made in agricultural science and technology investment, personnel training, condition construction, international cooperation, etc.; scientific and technological systems suitable for requirements such as output efficiency, product safety, resource conservation and the development of environment-friendly agriculture will be gradually completed, accompanied by remarkable improvements in supply of effective scientific and technological achievements, and tremendous increase in the level of agricultural technology integration, farming mechanization and IT-based operation. China should strive for early leapfrog achievements in strategically important fields such as fundamental agricultural science and edge technologies, technological leapfrog in critical core technologies in modern agriculture which is still controlled by foreign countries, and leapfrog in the integration of technologies in regional modern agricultural development. The Chinese government also stated systematic core targets regarding significant breakthroughs in 11 critical fields.

5.2. Innovation of agricultural science and technology

5.2.1. Key areas of the innovation of agricultural science and technology

China has identified 11 key areas of agricultural science and technology innovation, including modern seed industry, agricultural mechanization, IT-based agriculture, highly efficient use of agricultural resources, agro-ecology, tillage and cultivation management of agricultural crops, livestock and poultry farming and aquaculture, crop disaster prevention and control, animal disease prevention and control, agricultural product processing and quality and safety of agricultural products. In the 11 key areas, specific research and development work is identified in detail based on three aspects: fundamental work, basic research and technological development.

5.2.2. Demands for major missions for the innovation of agricultural science and technology

China has identified 18 major missions for agricultural science and technology innovation, including regional comprehensive agricultural solutions, major science and technology missions for reducing fertilizers and pesticides, cultivated land conservation and quality improvement, quantity control and efficiency improvement for the use of agricultural water, livestock and poultry breeding, comprehensive mechanization in all processes, precision agriculture and intellectual agriculture, healthy stock farming and aquaculture and key animal diseases, modern marine fishery innovation, transformation, upgrading and sustainable development of freshwater fishery industry, utilization of agricultural waste resources, prevention and control of heavy metal pollution in farmland soil, comprehensive prevention and control of agricultural pollution from non-point sources, identification, risk assessment, prevention and control of major hazardous factors for the quality and
safety of edible agricultural products, comprehensive utilization of by-products from agricultural product processing, e-commerce system building for the circulation of fresh agricultural products, efficient use of grasslands, and tropical agriculture innovation. Under each major mission, detailed science and technology tasks are specified.

5.2.3. Frontier and disruptive technologies of the innovation of agricultural science and technology

China has identified 5 cutting-edge and disruptive technologies, including synthetic biotechnology, C4 photosynthetic path of C3 plants and high photosynthetic efficiency breeding techniques, natural immunization technology for animals and plants, biological nitrogen fixation in agriculture, nutrigenomics and processing regulation of agricultural food products. Specific items to be researched on are specified under each technology.

5.3. Popularize agricultural technology

5.3.1. Improve and perfect the popularization of agricultural technology

China should adapt to the development requirements of market orientation, IT-based development, scale expansion and standardization in agriculture by improving systems and mechanisms, strengthening services, improving the quality of the team, and innovating in methodology. China should pursue the combination between not-for-profit popularization organizations and business service organizations, between not-for-profit popularization teams and new types of agricultural operation entities, as well as the combination between not-for-profit popularization and business service, in order to quickly improve and perfect the system for promoting agricultural technologies characterized by “one primary player with multiple aspects”, which is led by national agricultural technology popularization organization, and widely participated by a concerted effort from multiple popularization entities including agricultural research and educational institutions, farmer cooperatives and agriculture-related enterprises in an effort to provide strong support for the supply-side structural reform and quick agricultural modernization.

5.3.2. Speed up the commercialization and application of agricultural science and technology achievements

In accordance with the Law on Promoting the Commercialization of Scientific and Technological Achievements and relative policy requirements, China should have respect for market rules and thus follow the principle of free will, mutual benefit, fairness and integrity in promoting the transformation and application of agricultural scientific and technological achievements. China will improve the mechanism of quick commercialization and application of scientific and technological achievements in agricultural scientific research institutions and universities, strengthen the construction of specialized institutions and professional personnel, and improve the statistics and reporting system for the transfer and commercialization of scientific and technological achievements. During the implementation of agricultural science and technology application projects, China will identify the project undertaker’s obligations for the commercialization of science and technology achievements. The commercialization result will be a critical content and criteria for project approval and acceptance. China will establish information systems for agricultural science and technology achievement commercialization and application, and select and publish a directory of major agricultural intellectual property items on a regular basis. China will strengthen technical studies in IPR evaluation and infringement assessment, and establish an application platform for major IPR information sharing. It will strengthen the development of agricultural standards, devise national and industry standards, in accordance with the law, for new agricultural technologies, processes, materials, and products on a timely basis, and actively participate in the development of international standards to promote the popularization of applicable advanced agricultural technologies. China will give full play to the leading role of enterprises in technology innovation, commercialization and application, encourage enterprises and agricultural scientific research institutions and universities to build research and development and technology transfer agencies,
and explore new models and mechanisms for agricultural science and technology achievement transfer service, which are driven by the government, led by the market and operated in an enterprise-oriented manner.

5.3.3. Key projects and actions for agricultural technology popularization

China has identified 15 key projects and actions to promote agricultural technology, including integrated demonstration project for key technologies in agricultural disaster prevention and mitigation, production stabilization and increase, promotion actions for major crop production mechanization, integrated demonstration project for conservation tillage technologies, simultaneous nutrition technology demonstration applications, grassland animal husbandry comprehensive supporting technology popularization project, agricultural Internet of things demonstration project, integrated demonstration project for aquaculture water (energy) saving and emission reduction technology, comprehensive rice-fish culture demonstration project, agricultural products processing key technology and business demonstration project, technology popularization and demonstration project for key control for agricultural product safety, technology demonstration and application for comprehensive straw utilization technology, plastic film recycling comprehensive demonstration technology application, livestock and poultry standardized and scaled breeding technology integrated demonstration project, construction of national agricultural science and technology achievement transfer center as well as key action of agriculture science and technology poverty alleviation. Specific items for popularization have been identified for each key agricultural technology popularization project.

5.4. Building talent teams for agriculture and rural areas

5.4.1. Building talent teams for agricultural scientific research

China should give prioritized funding to outstanding innovative teams, based on science and technology projects, key laboratories, modern agricultural industry technology systems, agricultural science and technology innovation alliances, strengthen efforts in cultivating leading agricultural scientific research talents, young scientific and technological personnel, innovation teams and agriculture-related enterprise talents, and build a team of scientific research personnel of reasonable size and structure, which has a good innovative atmosphere.

5.4.2. Building talent teams for agricultural technology popularization

Focusing on supplying the front line and strengthening service, China will make stronger efforts to build talent teams for agricultural technology popularization. China will earnestly implement the “plan for cultivating 10,000 key talents for agricultural technology popularization”, with activities such as technical exchange, study workshops, visits and demonstrations, etc. Together with subsidy policies for community-level agricultural technology popularization system reform and development, China will steadily implement the special post plan and targeted education, encourage and guide agriculture-related graduates from colleges, universities and vocational schools to work for community-level agricultural technology popularization agencies. China will actively develop a diversified and commercial agricultural technology popularization team. China will strengthen the recruitment management for national agricultural technology popularization agencies, strictly follow the requirement for the hiring requirement and employment procedures for agricultural technical personnel, introduce layered and categorized evaluation methods for agricultural technology popularization researchers, and improve the incentive mechanism.

5.4.3. Build teams of rural practical talents

Based on agricultural development needs and farmers' technical demands, China will cultivate a large number of new types of professional farmers, rural practical talents and highly skilled agricultural
talents. China will vigorously implement cultivating programs for new types of professional farmers, comprehensively promote rural practical talent identification management focusing on new types of professional farmers, push forward, in a coordinated way, identification of new type farmers specialized in production operation, professional skills and services, actively promote the link between the identification and relevant support policies in a bid to enhance the attraction and quality of identification. China will make solid progress in the quality improvement plan of leading rural practical talents, carry out training programs for leading rural practical talents and college-graduate village officials as well as training for industry development leaders in poverty alleviation areas designated by the Ministry of Agriculture, and development a number of “rural experts” lifting farmers out of poverty and bringing them wealth and prosperity. China will make more efforts to construct training bases for rural practical talents. It will strengthen the development of agricultural vocational skills, make more efforts to cultivate highly skilled talents in shortage and urgent need, and identify a number of practical training bases for agricultural technology talents.

5.4.4. Promote the flow of agricultural talents

China will improve the compensation and post management system, get rid of the institutional barriers to the flow of human resources, and promote the free flow of agricultural science and technology personnel in accordance so that they can fully display their talents. China will encourage scientific research personnel from agricultural scientific research institutions and universities to, with the approval from their organization, work in enterprises or start their own businesses with their scientific research program and achievements, while retaining basic compensation and benefits. China will encourage agricultural scientific research institutions and universities to set up a number of floating positions for entrepreneurs and corporate science and technology talents to work as part-time employees.

5.5. Establish the innovation incentive mechanism and the funding guarantee mechanism for agricultural scientific and technical personnel

5.5.1. Establish the innovation incentive mechanism for agricultural scientific and technical personnel

In order to mobilize the enthusiasm of scientific and technological personnel for innovation, China should create an environment characterized by diligence and achievements and abundant with emerging talents. China will implement a distribution policy towards increasing the value of knowledge; execute incentive measures such as bonus for achievement commercialization, closely connecting the income of scientific researchers with the scientific, economic and social values that they create. Agricultural enterprises should be encouraged to motivate scientific research personnel to innovate through incentives such as stock rights, share options, profit sharing, etc. China will establish the classification evaluation system for scientific research institutions and personnel based on innovation value, industrial contribution and functional positioning. Fundamental work will primarily be evaluated by its support for technological innovation. Representative achievements in fundamental and application basic research will be evaluated primarily by peer reviews, while the evaluation of application and development researches will primarily be assessed by reviews from the market and the users. The result of evaluation will be linked to performance-related incentives. China should implement third-party evaluation and explore to establish an evaluation system participated by the government, social organizations, the public, etc. China should perfect the performance-related salary system leaning towards key positions, business backbone and personnel with remarkable contributions.

5.5.2. Establish the funding guarantee mechanism for agricultural scientific and technical personnel

China should increase the financial investment in agricultural science and technology at all levels, improve the agricultural research investment model of stable support combined with moderate competition. It should support the independent research projects of agricultural scientific research
institutions and universities, and expand academic autonomy and individuals’ right to choose research subjects. China should adjust the focus of agricultural science and technology investment, and guide agricultural science and technology resources to shift toward transforming the growth model of agriculture and meeting the new requirements for implementing the strategy of giving first priority to land and scientifically protecting land for grain security. China will expand the scope of pilot projects for the performance-based funding for agricultural scientific research institutions, and gradually establish a performance-based funding system for agricultural research institutions with government financial support. China should strive to increase investment of dedicated funding for basic scientific research from not-for-profit scientific research institutes at the central level, encourage local governments to set up dedicated funding for basic scientific research in provincial and municipal agricultural research institutes. China should encourage the establishment of provincial special funding for agricultural science and technology innovation alliances and innovation of agricultural science and technology. It should improve the operation funding guarantee for not-for-profit agricultural scientific research institutes and community-level agricultural technology popularization organizations. China will perfect the management system for scientific research funds suitable for agricultural scientific research, relevant systems regarding payment by government credit cards for scientific research funds, and the supervision mechanism for scientific research programs and the use of funding (see the Ministry of Agriculture’s 13th Five-Year Plan for Agricultural Science and Technology Development).

6. Strengthen Points of Weakness in Agriculture and Rural Areas, Lay a Solid Foundation for Shared Development in Rural Areas

6.1. Continuously strengthen farmland capital construction

Farmland capital construction refers to taking engineering or biological measures on the land and constructs facilities, which can exert long-term benefits for production so as to develop agricultural production. It is the general term that describes measures, which are taken in carrying out farmland transformation and construction for the purpose of using and transforming nature, developing agricultural production and achieving stable yield and high yield. It mainly includes land leveling, terrace construction, slope farmland transformation, soil amelioration, establishing farmland shelterbelts, farmland water conservancy, etc. In order to improve the effectiveness of farmland capital construction, it is necessary, in implementation, to realize multi-project coordination and adhere to the comprehensive management of mountains, waters, land, forests and roads. During farmland capital construction, efforts can be made to open up the unused barren land into farmland, pastures, orchards or woodland, expand agricultural land, improve the quality of farmland, forest land, meadowland and other types of agricultural land, and enhance the ability to resist natural disasters.

As a result, China’s No.1 Central Document states that China will earnestly implement the strategy of giving first priority to land and scientifically protecting land for grain security and promoting scientific and technological innovation in agriculture, set a red line that the country’s total area of farmland should not fall below, and protect and optimize production capacity of food crops. China will fully implement policies and measures on giving special protection for permanent basic farmland, carry out the campaign of cultivated land quality protection and improvement, and continue to promote the transformation of medium- and low-yielding farmland. China will accelerate the construction of high-standard farmland and improve construction quality. In localities where necessary conditions are satisfied, it is advisable to include supporting facilities such as grain-sunning ground, drying equipment, storage sheds of farm implements and collection and composting of organic fertilizers in the range of high-standard farmland construction. China will guide financial institutions to provide credit support for high-standard farmland construction. The cultivated land which is added through land consolidation may be regulated within the province as the quota under the guideline of
requisition-compensation balance of cultivated land. Proceeds generated from quota regulation can be obtained according to regulations or contract terms. China will promote the construction of major water conservancy projects. Efforts should be stepped up to restore and rehabilitate agricultural facilities and water conservancy projects which are destroyed by flood or damaged by disasters. China will strengthen the construction of weak areas in water conservancy and “five small water conservancy” projects (small water cellars, small pools, small pumping stations, small reservoirs and small water channels). It will advance the conversion of driving systems of pumped wells in plain regions from diesel engines to motors in the light of local conditions.

6.2. Work hard to improve rural living environments and build an even more livable and beautiful countryside

China will advance the special campaign of domestic waste management in rural areas, promote waste classification and utilization, choose appropriate modes to carry out domestic management in rural areas, and intensify efforts to support the contiguous and comprehensive management of the rural environment and improvement of latrines. China will carry out the unified campaign of investigating and remediating unlawful waste discharge in urban and rural areas. It will implement the rural new energy campaign, promote photovoltaic power generation, and gradually increase supply of power, gas and clean coal in rural areas.

Efforts should be stepped up to revise the management regulations for village and town planning and development and work out plans on county and rural development. China will organize more architects to design buildings for rural areas and implement demonstration projects of pastoral buildings. Efforts should be intensified to do a good job in rural road construction, management, maintenance and operation, deepen the reform of the rural road management and maintenance system, and actively promote urban and rural transportation integration. China will implement the project of maintaining and improving drinking water safety in rural areas and a new round of projects of rural power grid transformation and upgrading. It will improve the policies of rebuilding dilapidated rural houses and raise the subsidy standard, with the focus on supporting key groups, which have been archived and registered in the national poverty alleviation information network, including poor households, households entitled to subsistence allowances, individual persons living in extreme poverty who are provided for by the government and poor families having members with disabilities. China will identify and eliminate potential safety hazards in dry wells, river ponds, drinking water, self-built houses, passenger transportation and school buses in rural areas. China will promote the construction of fiber to the village and move more quickly to realize the full coverage of the 4G network in rural areas. China will promote direct postal communication in administrative villages. China will improve rural living environments and build an even more livable and beautiful countryside. China will intensify efforts to improve the rural public cultural service system, implement key cultural projects for promoting people’s wellbeing in a coordinated way, improve community-level comprehensive cultural service facilities, and organize more local opera performances in rural areas. China will support the protection of important agricultural cultural heritages.

6.3. Improve the level of basic public services in rural areas

China’s rural public services mainly include rural nine-year compulsory education, rural cooperative medical care, minimum subsistence allowance, pension insurance, social assistance, etc. In the National “13th Five-Year Plan” on Rural Economic Development, the National Development and Reform Commission (NDRC) has proposed to focus the development of social programs on rural areas and cities and towns, which absorb a large number of people with rural household registration and accelerate the extension of urban public services to rural areas. China will comprehensively improve basic conditions in badly built and poorly operated schools providing compulsory education in rural areas, accelerate the development of rural pre-school education, and improve the rural pre-school education service network. China will promote the full coverage of secondary vocational
education and vocational skills training and, type by type, begin waiving all tuition and miscellaneous fees at schools providing secondary vocational education. It will promote the development and application of digital education resources in the field of basic education, expand the coverage of quality education resources in rural areas, and improve the quality of teaching in rural schools. China will integrate the system of basic health insurance of urban and rural residents and achieve complete coverage of basic health insurance. China will fully implement the serious disease insurance scheme for urban and rural residents and expedite the building of a nationwide network for basic medical insurance so that medical expenses can be settled where they are incurred via basic medical insurance accounts. China will strengthen the development of basic medical care in rural communities, capacity in public health and rural doctors and develop remote consultation systems that benefit rural areas. China will include more programs serving farmers, agriculture and rural areas in key cultural projects for promoting people’s wellbeing and enrich public cultural products and service supply in rural areas. It will put in place the temporary assistance system, consolidate and improve the basic pension insurance system for urban and rural residents, and gradually improve the service capacity and security level. China will put in place the system of providing support and services to the children, women, and elderly who remain in rural areas while their family members work in cities. China will step up the construction and transformation of rural homes for the elderly, promote the construction of rural homes of happiness, further promote the pilot projects of rural community development, improve rural community service facilities and service systems, integrate and utilize existing resources, and promote the construction of comprehensive public service facilities in rural communities.

6.4. Secure solid progress in combating poverty

Poverty remains to be the most prominent “point of weakness” in China’s economic and social development. The situation of combating poverty is complicated and grim. As far as the poverty situation is concerned, as of the end of 2015, there were 56.3 million people, living in poverty in China’s rural areas, who have been archived and registered in the national poverty alleviation information network. They are mainly distributed in 832 key counties under the national poverty alleviation and development program and counties in contiguous poor areas (hereinafter referred to as poor counties) and 128,000 poor villages, which have been archived and registered in the national poverty alleviation information network. The incidence of poverty of most western provinces was higher than 10%, and that of 8 ethnic provinces and autonomous regions was 12.1%. The poverty intensity of existing people living in poverty is higher, the cost of poverty reduction is higher, and shaking off poverty is more difficult. It is difficult to get rid of poverty by taking routine measures.

In view of the current situation, the State Council required in the Plan on Combating Poverty in the 13th Five-Year Plan Period that, by 2020, efforts shall be made to ensure that, under the current standards, people living in poverty in rural areas will not be worried about food and clothes and be secured in compulsory education, basic medical care and housing safety (hereinafter referred to as “two no-worries and three securities”). The per capita disposable income of farmers in poverty-stricken areas shall be more than double that of 2010, with the growth rate higher than the national average. The indicators of major areas in basic public services shall be close to the national average. China needs to help lift all rural residents falling below the current poverty line out of poverty and achieve poverty alleviation in all poor counties and areas.

To this end, the state has taken a package of policies and measures. They mainly include shaking off poverty by pursuing industry development, shaking off poverty by shifting employment, shaking off poverty by relocating to other places, alleviating poverty by making education universal, alleviating poverty by promoting health care services, alleviating poverty by pursuing ecological conservation, keeping the lowest standards of the rural subsistence allowance system, alleviating poverty by helping people living in poverty to develop the economy and promote production, enhancing poverty-stricken areas’ ability in carrying out regional development, etc. (for details, see the Plan on Combating Poverty in the 13th Five-Year Plan Period).
7. Policies for Intensifying Reforms in Rural Areas to Boost the Local Inherent Vitality

7.1. Develop a pricing mechanism for grain and other key agricultural products and deepen reform of their sales and storage system

China will follow through and improve the minimum purchase price policy for rice and wheat with a reasonable adjustment of price levels for a rational price ratio. It will resolutely follow the market for corn pricing and separate subsidies from market prices. In the meantime, China aims to improve the producer subsidy system in order to engage a wide range of market players for better sales results. China will adopt comprehensive measures to boost the use of products as such livestock feed or better processing. Thus, China can increase consumption channels to help digest inventory of corn and other products.

China has three major cotton producing areas, namely the Yellow River Basin cotton area, the Yangtze River Valley cotton area, and the Xinjiang cotton area. However, the cotton price subsidy standards of these regions are not the same, with those of Xinjiang being the highest. The state has required that efforts shall be made to adjust and improve the target price policy for cotton with a better subsidy plan in Xinjiang. Nevertheless, no specific policies have been introduced in this regard.

China imposes only 3% tariff on imported soybeans. The price of imported soybeans is far lower than of domestic soybeans. As all imported soybeans are genetically modified soybeans, their oil yield rate is 3 to 5 percentage points higher than that of domestic soybeans. China’s soybean imports reached 85 million tons in 2016. The degree of dependence on foreign soybeans was 87.54%. The state is trying to subsidize the cultivation of soybeans in the northeast and other regions to reduce the amount of cultivated land devoted to growing corn and increase that of cultivated land devoted to growing soybeans. But the policy effect is not obvious. So the state has required that efforts shall be made to adjust the target price policy for soybeans. Nevertheless, no specific policy measures have been introduced in this regard.

The state has required that efforts shall be made to scientifically determine the size of state reserves of grains and other important agricultural products, optimize the structure and regional layout of such grain varieties, reform the management system for central grain reserves, give full play to relevant policies and strictly supervise and manage grains under the policies, so as to prevent leakage or reduction and to ensure secure storage.

7.2. Improve the agricultural subsidy policy

China’s general direction of improving the agricultural subsidy policy is to gradually expand the scale and scope of “green box” subsidies and to adjust and improve the “amber box” policy. China will improve the agricultural policy of “three subsidies” by merging direct subsidies for farmers growing food crops, subsidies for fine crop varieties and comprehensive subsidies for agricultural materials into one subsidy for supporting and protecting agriculture. China will optimize the subsidy policies for purchasing agricultural machinery and increase subsidies for equipment needed for conservation tillage, deep tillage and soil preparation, returning straw to fields and other green yield increasing techniques. China will improve the subsidy policies for structural adjustment, continue to support the growth of forage crops besides food crops and economic crops and grain and bean rotation. It will increase the support of standardized and healthy livestock and poultry raising and aquaculture. China will implement the subsidy policies for oil prices (diesel) in fishery. China will improve the subsidy policies for ecological development and raise the standards of rewards and subsidies for grassland ecological protection. It will carry out pilot projects covering fertilizer reduction and efficiency improvement, pesticide reduction and pest control, increasing the application of organic fertilizers and the utilization of straw resources. China will explore the possibility of establishing a green ecology-oriented agricultural subsidy system. China will improve the benefit compensation policy for major production areas and increase awards for major counties in food crops and edible oil.
production and major provinces in commodity grain production. China will gradually include the agricultural reclamation system in the coverage of national agricultural support and livelihood improvement policies (for details, see the National Agricultural Modernization Plan (2016-2020)). Forestry subsidies are also on the list for improvement, which will result in a bigger scope of application that includes the eco-benefits of wetland.

7.3. Reform the fiscal support system for the agricultural sector

China will resolutely prioritize agriculture and rural areas in their fiscal expenditures, so as to ensure a modest increase in investment to the sector. With an optimized investment structure and innovative methods, it will enhance the effectiveness of fiscal support to the agricultural sector. Investments in fixed asset will also tilt towards agriculture and rural areas. China will plan, coordinate and guide the integration of agriculture-related funds via multiple methods.

It will start with reforming the budget planning phase for specific-purpose transfers, and explore to implement the “major special project + task list” mode of management. The innovative use of fiscal funds as well as cooperation between public and private capital shall be promoted. China will also introduce rewards and interest rate reductions instead of subsidy to support establishment of a guarantee system, and encourage setting up risk compensation funds, aiming to leverage more financial and social capital for investment in agriculture and rural areas.

China will set up an agricultural credit guarantee system, which shall spread to cities and counties from its provincial agencies. Support will be given to cities and counties with ready conditions to establish such agencies in a timely basis for operation.

China will also broaden investment and financing channels for agricultural and rural infrastructure, where private capital is encouraged to get involved in projects of forestry, water conservation, irrigation and state farms on reclaimed land via franchise, equity holding, equity controlling and other methods. Local governments and private capital firms are encouraged to set up all types of agricultural and rural development funds. Bonds issued by local governments will play a bigger role in supporting rural infrastructure construction. In accordance with relevant laws and regulations, China shall explore market-oriented methods for fund-raising, which will then be utilized for rural development in agriculture. China will study and formulate concrete opinions on how to guide and regulate industrial and commercial capital to invest in agriculture and rural areas. For various small projects under fiscal support, China will prioritize rural collective economic organizations and farmers’ cooperatives as the main management and support body to enhance farmers’ participation and supervision throughout the process.

7.4. Step up financial innovation in rural areas

China will improve policies in support of credit. China will strengthen the support of development financing and policy-based financing for agricultural development and rural infrastructure construction, establish a sound incentive and assessment mechanism on commercial banks involved in agriculture-related financial business, and steadily push credit cooperation within farmers’ cooperatives. China will implement differentiated monetary and credit policy measures based on the performance of financial institutions in fulfilling their responsibilities for supporting agriculture. China will improve the nationwide agricultural credit guarantee system and establish a mechanism of supervision and assessment and risk prevention and control in agricultural credit guarantee institutions. China will steadily develop pilot projects of granting loans against land operational rights and farmer’s property. China will provide financial support for high-level farmland, advanced equipment, protected agriculture as well as loans granted to processing and circulation business that play an important role in stabilizing grain yield and increasing farmers’ income. China will establish a credit rating system for emerging forms of agribusiness and adopt measures for those with a high credit level, e.g. giving priority to them in offering loans. China will implement pilot projects of
offering loans to entities, which carry out scaled-up operations of grain production and marketing activities. China will implement the system of policy-based pledge loan in agricultural insurance.

China will reinforce insurance guarantee. It will gradually expand the coverage of insurance for major food crops in major counties in food crops production and increase the types and expand the scope of coverage of animal husbandry insurance. China will explore the possibility of establishing an aquaculture insurance system and support the development of insurance for specialty agricultural products and insurance for protected agriculture. China will introduce the policy of substituting subsidies with rewards by the central government to provide insurance for specialty and superior agricultural products. China will include the insurance for seed production of major food crops in the central government’s financial premium subsidy catalogue. China will innovate on developing the insurance products “basic risks + additional risks” for emerging forms of agribusiness, explore the promotion of income protection insurance, agricultural machinery insurance and index-based weather insurance, and strengthen insurance for foreign agricultural cooperation. National Agricultural Modernization Plan of China will establish a mechanism that combines agricultural subsidies, agriculture-related credit, agricultural futures and agricultural insurance. China will expand the scope of work to pilot “insurance + futures” and study and improve the mechanism of diversifying risks of severe disasters in the field of agricultural insurance (for details, see the National Agricultural Modernization Plan (2016-2020)).

7.5. Deepen the reform of the rural collective property rights system

At the end of 2016, the CPC Central Committee and the State Council promulgated the Opinions on Steadily Promoting the Reform of the Rural Collective Property Rights System, with the aim to explore the effective form of implementing the rural collective ownership, innovate on the operating mechanism of the rural collective economy, protect farmers’ rights and interests for collective assets, and motivate farmers to develop modern agriculture and build a new socialist countryside.

China will work to achieve separation of the three rights, i.e. rural land ownership, farmers’ contract rights and land operating rights. China will register contracted land with certification that indicates its clear ownership, and work to expand the scope of the pilot to cover the whole province. China will also facilitate pilot projects that aim to reform rural land acquisition, collective management of construction land and the homestead system.

China will speed up the consolidated registration and certification of land ownership for rural homestead and collective construction land. China will thoroughly study pilot projects for the reform of the rural homestead system. Under the premise of fully protecting the homestead right of use, and preventing encroachment of external capitals, it needs to implement collective ownership of the homestead and safeguard farmers’ legal right of possession and use. China will explore other means to revitalize the use of idle rural housing and homestead, e.g. rental or cooperation in order to increase farmers’ income from their property assets. China will allow fund-raising through multiple local channels for compensation to farmers who voluntarily give up the contracted land or their homestead for urban residency according to regulations.

China will pay close attention to formulate laws on rural collective economic organizations so as to grant them with legal person status. China will conduct an extensive verification process on rural collective assets and capital. China will advance rural share-holding cooperatives in a steady and orderly manner, starting on a small scale, and verify memberships as well as quantify operating assets so as to safeguard farmers’ rights to collective assets. Taking into consideration the actual situations, China will explore effective pathways for developing the collective economy and encourage local entities to turn resources into assets, capitals into shares and farmers into shareholders. Thus, China can enhance the vitality and strength of the collective economy in rural areas.
7.6. Improve the system for agricultural labor force transfer and employment as well as agricultural entrepreneurship and innovation

China should enhance a fair employment system for urban and rural workers, and improve the service system for agricultural labor force transfer and employment. It encourages a diverse range of employment, while effectively protecting legitimate rights and interests of migrant workers. China makes great efforts to solve outstanding issues facing the new generation of workers and those who suffer from occupational diseases, among others.

China will support migrant workers to return home and start their own business, which can be conducive to emerging industries and business forms in modern agriculture and rural development.

China also advocates for college graduates, business owners, agricultural scientific and technical personnel and people with overseas degree to return to the countryside for entrepreneurial endeavors and innovation, where they can apply modern technologies, production methods and business models to rural areas.

China will introduce a number of preferential policies that support entrepreneurship and innovation efforts in rural areas with market access, taxation, financial services, land use, power supply, entrepreneurship training and social security, etc. For such purpose, business parks, business incubator bases, customer service platforms for entrepreneurs shall be established together with an open service platform, which provides one-stop services.