

## China's Agricultural Modernization - Policy Framework 中国农业现代化政策框架

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## Overview 概述

This issue of Information Sheet brings together five categories of policy documents regarding China's agriculture modernization, these are strategic guiding policies, agricultural development policies, and other three categories of supporting and enabling policies, they are science and technology innovation policies, resource and environmental protection policies, and the finance and incentive policies. Figure 1 shows the connections between these policies.

The strategic guiding policies include “13<sup>th</sup> Five-Year Plan for National Economic and Social Development (2016-2020)”, “No.1 Central Document 2016”, “National Sustainable Agriculture Development Plan (2015-2030)”, and “Plan on National Agricultural Modernization (2016-2020)”. These four policy documents provide the development concepts, development routes, and development targets for the wide national economy and agricultural development in particular.

China adopted the five new development concepts, namely innovation, coordination, green, opening up and sharing, to guide the national economic development in the next five years. In the next five years, China will modernize the agriculture industry system to enhance the productivity and competitiveness; modernize the production system to balance the supply and market demanding; modernize the operation system to develop large scale and various types of farming operation entities. The goal is to develop a high productivity, high efficiency, resource-saving and environmentally friendly agriculture.

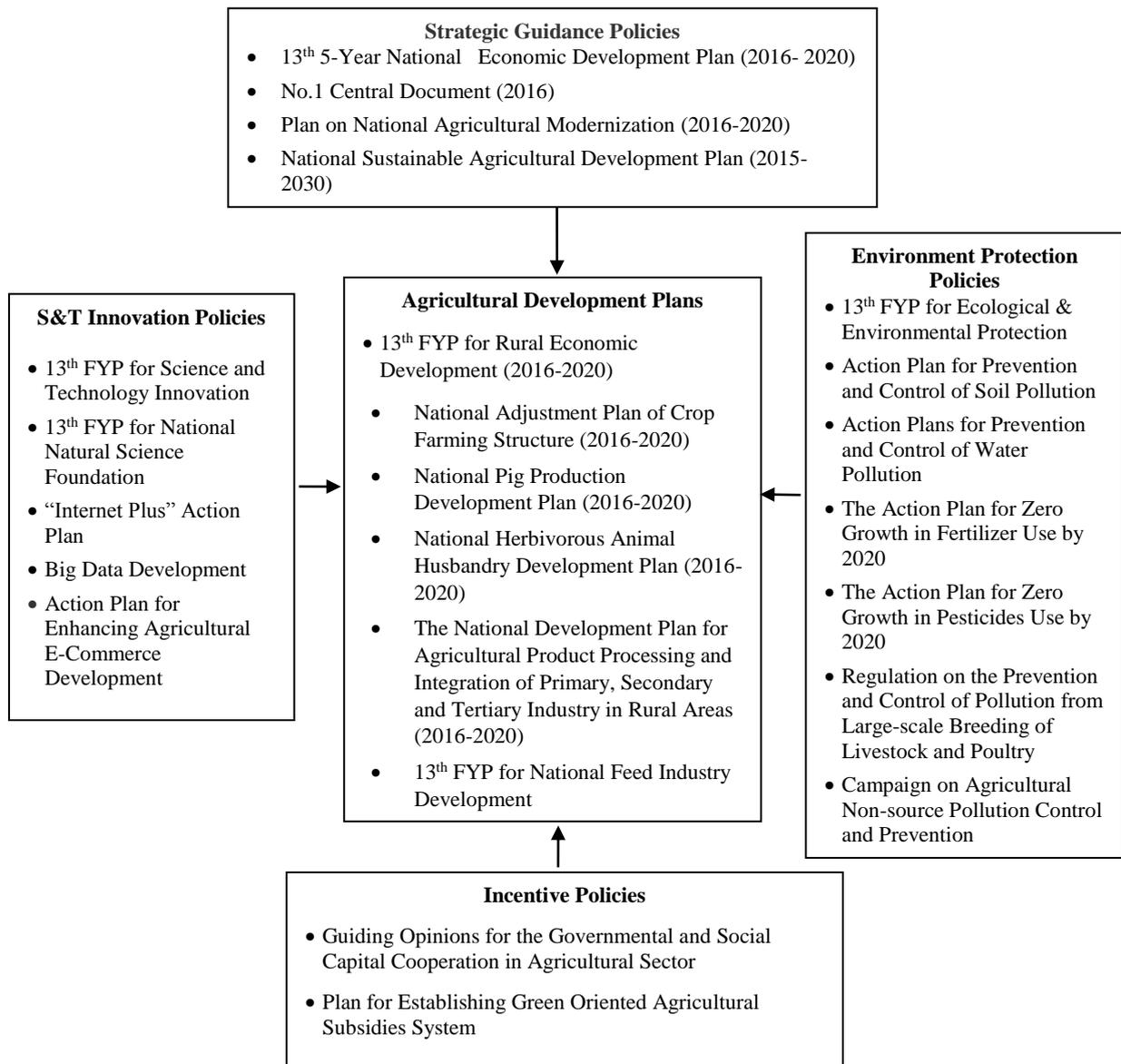
The agricultural development policies which include the “13<sup>th</sup> FYP for Rural Economic Development (2016-2020)” and the sub-sectoral development plans of cropping, livestock and feed industry. As part of the supply-side reform package, China will reduce grain maize grown area, increase soy and silage maize grown areas; China will continue to rely on importing protein feed material. China will encourage the development of the potato industry and grow more tubers and pulses which are more tolerant to drought and poor soil conditions. To increase rural income while improving the rural environment, China will boost the agricultural product processing industry and promote leisure agriculture and rural tourism. China will make coordinated utilization of international and domestic market and resources. China will also encourage international exchanges and cooperation on germplasm resources, epidemic and disease diagnosis, feed, animal products processing, safety and quality, waste treatment.

The National Science and Technology Innovation Plan will support the development of China's independent seed industry, develop cutting-edge technologies of crop and breeding, high efficient and high yield technologies, ecosystem and environment protection, biomass utilization and waste recycling. Within the agricultural sector, new technologies will be applied to support agricultural transformation, such as internet plus agriculture, big data and data sharing, as well as agricultural e-commerce.

The 13<sup>th</sup> Five-Year Plan for Ecological & Environmental Protection, together with national action plans for prevention and control of soil & water pollution, and the regulation on the prevention and control of pollution from large-scale livestock farms, are addressing China's most important natural capital for sustainable (agricultural) development. The action plan for the prevention and control non-point pollution from agriculture, proposed by Ministry of Agriculture (MoA), outlines a comprehensive package of practices to tackle the problem.

China is also innovating financing and incentive mechanism to support the green development. The first Public-Private Partnership (PPP) in agriculture sector opens a door for private capital to fund rural economic growth, which has been reliant on government financing until now. The green oriented subsidies reform aims to shift the policy target from growth in the quantity as priority to equal importance of growth in both quantity and quality of agricultural production.

**Figure 1. China’s Agricultural Modernization Policy Framework (2006-2020)**



## Strategic Guidance Policies 战略指导性政策

### 13<sup>th</sup> Five-Year Plan for National Economic and Social Development (2016-2020) 中华人民共和国国民经济和社会发展第十三个五年规划纲要 (2016-2020)

The 13th Five-Year Plan (FYP) - a blueprint for China's economic and social development from 2016 to 2020 was approved by the 12<sup>th</sup> National People Congress (NPC) on March 16, 2016.

With overarching principles of innovation, coordination, green development, opening up and sharing, which represent the theory of development of China, the plan strives to build a “moderately prosperous society”, by sustaining economic growth with equal emphasis on environment protection, as well as promoting inclusive development (see Table 1 for major targets).

**Table 1. Major Targets in 13th FYP of Economic and Social Development**

Indicator	2015	2020	Average annual growth rate	
<b>Domestic Economy</b>				
GDP (trillion RMB)	67.7	>92.7	>6.5	
Tertiary industry value added (%)	50.5	56	-	
<b>Social Development</b>				
Poverty Population in Rural Area (million)	55.75	0	-	
Basic Pension Insurance Enrolment Rate (%)	82	90	-	
<b>Innovation</b>				
R&D Investment Intensity (%)	2.1	2.5	[0.4]	
Patent ownership per ten thousand population (Number of Items)	6.3	1.2	[5.7]	
Contribution of S&T progress (%)	55.3	60	[4.7]	
Internet Coverage	Fixed Broadband Coverage (%)	40	70	[30]
	Mobile Broadband Coverage (%)	57	85	[28]
<b>Resources &amp; Environment</b>				
Total cultivated land (100 million mu)	18.65	18.65	0	
Reduction of water use per 10,000 Yuan GDP			[23]*	
Energy Intensity per unit of GDP (%)			[15]	
Percentage of non-fossil fuels in primary energy resource consumption	12	15	[3]	
Reduction of CO <sub>2</sub> emissions per unit of GDP (%)			[18]	
Forest growth	Forest coverage (%)	21.66	23.04	[1.38]
	Forest volume (bn m <sup>3</sup> )	15.1	16.5	[14]
Reduction of major pollutants emission (%)	COD			[10]
	Ammonia			[10]
	Sulphur dioxide (SO <sub>2</sub> )			[15]
	Nitrogen oxides (NO <sub>x</sub> )			[15]
“[...]” indicates five-year cumulative amount				

The Plan aims to advance agricultural modernisation. It states that ‘agriculture should be the foundation for building a moderately prosperous society in all aspects and to achieve modernization’. The Plan calls for the acceleration of the transformation of the mode of

agricultural production mode, greater efforts to construct modern agricultural industry, production and operation systems, raising agricultural quality, efficiency and competitiveness, and exploring the pathways to realize a high productivity, high efficiency, safety, resource saving and environmental friendly agriculture.

### **Improving agricultural productivity and increase food safety and security**

China will ensure basic self-sufficiency in cereals (wheat, rice and maize), absolute self-sufficiency in staples (wheat and rice), optimizing agricultural structure, raising the productivity, quality and safety of agricultural production,

- Enhancing grain production capacity and become more able to ensure adequate supplies
- Accelerating agricultural structure adjustment
- Advancing the integration of primary, secondary and tertiary industries in the rural areas
- Enhancing the development of industry chain and value chain, widen the income channels for farmers, let farmers to share more added value.
- Ensuring safety and quality of agricultural produces
- Promoting sustainable agricultural development
- Carrying out international cooperation in agriculture

### **Construction of modern agricultural operation system**

Developing various types of scale agricultural operation system, innovate farming operation modes.

- Developing larger scale farming operating systems
  - Encourage land consolidation; encourage various types of scale farming system.
- Cultivating new farming operating systems
- Developing socialised agricultural service systems

### **Improve agricultural technology, facility and information**

Improving agricultural technology innovation and extension systems, accelerating agricultural mechanisation, enhancing the integration of agriculture and information technologies, and developing smart agriculture.

- Boosting the level of agricultural technology and information
  - Speeding up research on the technologies of biological breeding, agricultural machinery and facilities, and green growth.
- Enhancing the development of agricultural information systems

### **Improve agricultural support and protection system**

- Continually increase agricultural input
  - Gradually expand the scope and the scale of “green box” subsidies, readjust the “yellow box” policies. Establish arable land protection and compensation system.
- Improving the price system of agricultural products

- Innovating agricultural finance services

(The full text (in Chinese) of the 13th FYP is available at: [http://www.gov.cn/xinwen/2016-03/17/content\\_5054992.htm](http://www.gov.cn/xinwen/2016-03/17/content_5054992.htm))

## **No.1 Central Document 2016 中央一号文件 2016**

The first policy document issued by the Central Committee of the Communist Party of China and the State Council every year and has been named the "No. 1 Central Document".

Agriculture, rural community and farmer related issues have been the topic of China's "No. 1 Central Document" for many years.

The 2016 No 1 Central Document was released on January 27, 2016. It reaffirmed that China will apply its new concept of development to agricultural modernization to make the process more efficient, inclusive and environment-friendly. The following key aspects are covered by the document,

### **1. Consolidating the foundation for the modern agriculture, enhancing the quality, efficiency and competitiveness of agriculture**

China will improve the quality and competitiveness of its agricultural products through high-quality farmland and professional farmers catering to the demands of modern agriculture. The following actions will be taken:

- Developing high quality farmland.
- Advancing agricultural irrigation system.
- Strengthening modern agricultural S&T innovation and extension system.
- Accelerating modern seed industry development.
- Making full play of the leading role of large family farm operations. Training professional farmers. Optimising agricultural production structure and regional planning.
- Coordinating and appropriately use of home and abroad resources and markets.

### **2. Protect resources and ecosystem, promote green agricultural development**

Sustainability will come through improved efficiency of resource use and environmental protection. Actions include:

- Strengthening the agricultural resources protection and high efficient utilization.
- Accelerating the pace for tackling the priority environmental problems.
- Intensifying agricultural ecosystem protection and restoration.
- Carrying out food safety strategy.

### **3. Promote the integration of primary, secondary and tertiary industries in rural regions, raise farm income**

China aims to increase farmers' incomes by promoting integrative development of primary, secondary and tertiary industries in rural regions.

- Upgrading the agricultural products processing industry.
- Strengthening the logistic facility and market development
- Promoting and developing rural tourism and leisure agriculture
- Improving agricultural industry value chain and the profit sharing mechanism

#### **4. Promote rural-urban integrated development**

- Accelerating rural basic infrastructure development
- Raising the level of public services
- Encouraging financial institutions to make more loans to agriculture businesses
- Improving rural and agricultural insurance scheme

#### **Box.1 China's No. 1 Central Document Since 2004**

2016 –Accelerating agriculture modernization with new development ideology and achieving moderately prosperous (Xiaokang) society completely

2015 – Reinforcing reform and innovation to accelerate agricultural modernization

2014 - Deepening rural reform to accelerate agricultural modernization

2013 - Speeding up the modernization of agriculture and further strengthening the vitality of rural growth

2012 - Accelerating scientific and technological innovation to strengthen the supply of agricultural products

2011 - Accelerating development of water conservation

2010 - Speeding up coordinated development between urban and rural areas and further cementing foundation of agricultural and rural area development

2009 - Achieving steady agricultural development and sustained income increases for farmers

2008 - Fortifying the foundation of agriculture

2007 - Developing modern agriculture and steadily promoting the construction of a new socialist countryside

2006 - Constructing a new socialist countryside

2005 - Strengthening rural work and improving the overall production capacity of agriculture

2004 - Boosting farmers' incomes

(The full text (in Chinese) of the No 1 document 2016 is available at:

[http://news.xinhuanet.com/politics/2016-01/27/c\\_1117916568.htm](http://news.xinhuanet.com/politics/2016-01/27/c_1117916568.htm))

## **National Sustainable Agricultural Development Plan (2015- 2030) 全国农业可持续发展规划（2015—2030 年）**

China's "National Sustainable Agricultural Development Plan (2015- 2030)" was officially released on 27 May, 2015.

The plan was jointly issued by the Ministry of Agriculture, National Development and Reform Commission NDRC), Ministry of Science and Technology (MOST), Ministry of Finance (MOF), Ministry of Land Resources (MLR), and others. The plan is an important guide for sustainable agricultural development in the future.

### **Three Development Zones**

The Plan divides China into three zones named optimized development areas, moderate development areas, and protected development areas. The categories take into account factors such as agricultural resources, environmental capacity, and ecological types.

*Optimized development areas* include the Northeast region, the Huanghuaihai region, the Yangtze River area and South China, which are the main areas for agricultural production. They benefit from good production conditions and excellent potential.

*Moderate development areas* include the northwest region, southwest region and regions along the Great Wall, which have distinctive features of agricultural production but limited resources and environmental capacity.

*Protected development areas* include the Qinghai Tibet region, Tibet, and marine fishery areas. These are placed in a special strategic position addressing aspects of ecological protection and construction.

### **Five Development Tasks**

The plan puts forward five key tasks from 2015 to 2030 in promoting sustainable agricultural development.

- Optimize development and enhance agricultural productivity.
- Protect arable land resources and promote the sustainable utilization of farmland.
- Use water efficiently and ensure the safety of agricultural water.
- Curb environmental pollution and improve the agricultural and rural environment.
- Restore the agricultural ecology, enhance ecological functions, protect the grassland ecosystem and biological diversity and restore the aquatic ecosystem.

### **Some policy goals**

- Irrigation water use will be limited to no more than 372 billion m<sup>3</sup> by 2020 and 373 billion m<sup>3</sup> by 2030. No less than 64% of irrigated farmland will be equipped with water saving facilities by 2020, and rising to 75% by 2030.
- By 2020, the technology of soil fertilization testing will be applied in no less than 90% of farmlands. Chemical fertilizer use efficiency will be increased to 40%. Chemical fertilizer use will peak by 2020.
- By 2020, coordinated and integrated pest management will be applied in 40% of farmlands, and pesticides use will no longer increase by 2020. Low-toxic pesticides are encouraged.

- By 2020, 75% of animal farm wastes will be treated or utilized, increasing to 90% by 2030. Animal farms will be excluded from drinking water source areas, scenery resorts and other sensitive areas. Existing animal farms in these sensitive areas shall be moved out or closedown by end of 2017.
- By 2020, 85% of crop straws will be utilized and 80% of agricultural plastic film will be recovered. All the crop straw will be utilized properly by 2030.
- Forest coverage rate will be increased to 23% by 2020. The wind-break trees on the edges of farmlands will be installed for 90% of farmlands by 2020.

(The full text (in Chinese) of the (The “National Sustainable Agricultural Development Plan (2015-2030) is available at: [http://www.gov.cn/xinwen/2015-05/28/content\\_2869902.htm](http://www.gov.cn/xinwen/2015-05/28/content_2869902.htm))

## **National Agricultural Modernization Plan (2016-2020) 全国农业现代化规划（2016-2020）**

On 8<sup>th</sup> October 2016, China's State Council reviewed and adopted the National Plan for Agricultural Modernization (2016-2020).

### **The Objectives**

By 2020, to make notable progress in agricultural modernization nation-wide, effectively ensure national food security, significantly improve the quality and efficiency of the supply system of agricultural products, further enhance the global competitiveness of China's agriculture sectors, enable farmers to live a well-off life in all respects and turn the countryside into a more beautiful and pleasant place to live in.

### **Strengthening agriculture through innovation, promoting agricultural transformation and upgrading**

1. Promoting agricultural structure adjustment
  - Adjust and optimize the planting structure.
  - Improve the quality of livestock development.
  - Promote the transformation and upgrading of fisheries.
2. Strengthen and security the supply capacity of grain and other key agricultural products
  - Establish function zones of food production and protected zones of key agricultural products.
  - Promote development of high-standard farmland on a large scale.
3. Improving technical equipment and informatization level
  - Comprehensively improve the capability of independent innovation.
  - Promote innovation and development of modern seed industry.
  - Enhance the capacity of applying scientific and technological achievements.
4. Deepening the reform of agriculture and rural areas
  - Stabilize and improve the basic management system in rural areas.
  - Actively develop various forms of moderate scale management.
  - Deepen the reform of rural collective property rights system.
  - Create demonstration areas for agricultural innovation and development.

### **Benefit farmers through coordinated development and enhance the balanced development of agriculture**

1. Promote the integration of primary, secondary and tertiary industry in rural areas
  - Promote the coordinated development of agricultural production and processing.
  - Improve the market system of agricultural products.
  - Develop new forms of agriculture.

- Explore other functions of agriculture.
- Create new mechanism of agriculture, industry and the tertiary industry integration.

## 2. The Coordinated Development of Regional Agriculture

- In optimized zones where the amount of water resources match that of land resources, improve the production capacity of staple agricultural products, expand the regional speciality industries, and accelerate the realization of agricultural modernization.
- In moderate development zones where the problems of agricultural resources and environmental issues prevail, focus on accelerating the adjustment of agricultural structure, limiting the scale of resource-intensive industries, and steadily promote agricultural modernization.
- In protected zones with ecologically fragile areas, we should highlight the ecological protection red line, and make clear which industries are banned there. Step up ecological construction efforts to enhance the level of sustainable development.

## 3. Promote the Coordinated Development of Business Subjects

- Speed up the nurturing of new professional farmers.
- Enhance the ability of new business subjects to involve farmers.
- Promote the employment and entrepreneurship of rural talent.

### **Strengthen agriculture through green development and improve the level of agricultural sustainability by:**

#### 1. Promoting resource conservation and ecological restoration

- Strictly protect farmland.
- Save water and use it efficiently.
- Strengthen the protection of forestry and wetland resources.
- Restore grassland.
- Strengthen the conservation of fishery resources.
- Biodiversity. conservation

#### 2. Strengthening agricultural environmental protection

- Zero growth of chemical fertilizer and pesticide use.
- Promote the harmless treatment and the utilization of agricultural waste.
- Appropriately dealing with prominent environmental problems.

#### 3. Ensuring the quality and safety of agricultural products

- Enhance the source control ability.
- Promote the capacity of standardized production.
- Enhance brand influence.
- Enhance risk prevention and control capability.
- Improve the supervision of the quality and safety of agricultural products.

### **The opening-up of agricultural industry and the expansion of foreign cooperation**

#### 1. Optimizing the foreign cooperation layout of agriculture

2. Improve the level of the international cooperation on agriculture
3. Promote the healthy development of agro-products' trade

### **Sharing the prosperity and improve people's livelihood**

1. Carrying out targeted poverty elimination
2. Improving the agricultural development in special areas
3. Promoting the equality in the construction of infrastructures and public services

### **Intensifying the policy support**

1. Improving the financial support policies
2. Creating policies to support farmers financially
3. Improving policies on agricultural land use
4. Perfecting the market regulation policy for agricultural products

(The full text (in Chinese) of the “Plan on National Agricultural Modernization (2016-2020)” is available at: [http://www.gov.cn/zhengce/content/2016-10/20/content\\_5122217.htm](http://www.gov.cn/zhengce/content/2016-10/20/content_5122217.htm) )

## **Agricultural Development Plans 农业发展规划**

### **13<sup>th</sup> FYP for Agricultural and Rural Economic Development 全国农村经济发展“十三五”规划**

On 27<sup>th</sup> October 2016, the National Development and Reform Committee (NDRC) released the 13<sup>th</sup> FYP for Agricultural and Rural Economic Development.

The overall objective of agricultural and rural economic development plan in the 13<sup>th</sup> YFP period (2006-2020) are (i) more secure and effective agricultural products supply system; (ii) more prosperous and coordinated rural economic development; (iii) overall improvement in farmers' living standard and quality; (iv) overall quality of eco-environment is improved; (v) rural economic system becomes more mature and stable.

To achieve the objectives, the Ministry of Agriculture will take actions from the following aspects:

#### **Continue to consolidate the modern agriculture foundation, strengthening the capacity to ensure agricultural products supply**

- Improve basic infrastructure and facilities of farmland
- Strengthen agricultural S&T innovation and extension
- Enhance the level of agricultural mechanization and informatization
- Enhance the capability of disaster prevention and reduction

#### **Accelerating agricultural development transformation, raising agricultural quality, efficiency and competitiveness**

- Optimize agricultural production structure and regional layout Develop resource-saving and environmental friendly agriculture Improve the security system for agricultural products quality and safety
- Coordinated utilization of international and domestic markets and resources

#### **Further advancing rural industry integration, enhancing steady and rapid income growth for farmers**

- Promoting the integration of agriculture with secondary and tertiary industries
- Speeding up the establishment of new types of agricultural operation system
- Promoting farmer employment and entrepreneurship
- Carrying out precision poverty alleviation

#### **Developing the countryside that is beautiful and pleasant to live in, promoting coordinated rural and urban development**

- Improving rural basic infrastructure
- Improving rural public services
- Improving rural habitat environment
- Enhancing integrated rural-urban management

#### **Effectively protecting natural ecosystem, construct ecological security barriers**

- Carrying out regulatory system for eco-space utilization
- Advancing ecosystem protection and rehabilitation

- Strengthening the comprehensive management for the priority regions

### **Comprehensively deepening rural reform, stimulate rural development momentum**

- Speeding up the rural collective property right reform
- Improving rural support and protection system
- Establishing modern rural financing system

### **Thirty three major agricultural and rural development projects**

In order to achieve the goal of the Plan, thirty three major projects are going to be implemented in the period of 2016-2020. These projects are categorised under five themes.

#### **Box 2. Thirty three major agricultural and rural development projects during 13<sup>th</sup> FYP period**

##### **Major projects on agricultural modernisation**

1. Development of high-standard farm land
2. Construction of farmland water conservancy
3. Developing modern seed industry
4. Agriculture mechanisation
5. Smart agriculture
6. Establishing animal and plant epidemics and disaster protection and control system

##### **Major projects on sustainable agricultural development**

7. Standardisation of livestock farms
8. Arable land protection and quality upgrading
9. Large scale high efficiency irrigation system
10. Actions on zero growth in fertilizer and pesticides use
11. Recycle and reuse of agricultural wastes
12. Quality and safety of agricultural products

##### **Major projects on increase farmer income**

13. Integrated development of rural primary, secondary and tertiary industries
14. Develop the entrepreneurship **parks** for returning **migrant workers**
15. Improve the grass-root innovation services
16. Develop specialised forestry industry
17. Combat poverty

##### **Major projects on beautiful countryside development**

18. Upgrade rural drinking water safety
19. New round of rural grid upgrading
20. Rural clean and renewable energy
21. Rural highway connection
22. Rural housing safety improvement
23. Rural waste water and garbage treatment
24. Rural broadband

##### **Major projects on ecosystem protection and rehabilitation**

25. Land greening action
26. Protection of natural forests
27. New round of converting arable and grazing land to forests and grassland
28. Rehabilitation of cultivated grassland
29. Wetland protection and rehabilitation
30. Wild plant and animal protection and development of nature reserves
31. Comprehensive control of soil erosion and desertification
32. Ecosystem protection and support system
33. Protection of aquatic ecosystems

**Table 2. The Main Targets for Agriculture and Rural Economic Development in the 13th FYP**

<b>Item</b>	<b>2015 baseline</b>	<b>2020 target</b>	<b>Average annual increase (%)</b>	<b>Nature of the indicators</b>
<b>Agricultural products supply capacity</b>				
Grain (cereals) production capacity (100 million ton)	50000	55000	[5000]	Obligatory
Contribution rate of agricultural technical progress (%)	56	60	[4]	Anticipated
Level of mechanisation in ploughing, sowing and harvesting (%)	63	70	[7]	Anticipated
Irrigation water use efficiency (%)	0.532	>0.55	[>0.018]	Anticipated
Pass rate of regular quality test of agricultural products (%)	97	>97	—	Anticipated
<b>Rural economic development</b>				
Proportion of livestock production value to total agricultural production value (%)	28	>30	[>2]	Anticipated
Proportion of fishery output value to total agricultural output value (%)	10	>10	—	Anticipated
Ratio of the value of agricultural products processing industry to the total value of agricultural output	2.2	2.4	[0.2]	Anticipated
Proportion of land under various forms of appropriate large - scale operations (%)	30	40	[10]	Anticipated
<b>Rural livelihood</b>				
Rural resident per capita disposable income (Yuan)	11422	>15649	>6.5%	Anticipated
Rural population lift out of poverty (10 thousand)	—	[5575]	—	Obligatory
Access to tap water in rural area (%)	76	80	[4]	Anticipated
Proportion of villages connected with optical-fiber network (%)	75	98	[23]	Anticipated
Proportion of villages with household garbage are treated (%)	62	90	[28]	Anticipated
<b>Resource and environment</b>				
Arable land reserve (100 million mu)	18.65	18.65	—	Obligatory
Forest coverage rate (%)	21.66	23.04	[1.38]	Obligatory

Forest stock volume (100 million M <sup>3</sup> )	151	165	[14]	Obligatory
Grassland vegetation coverage (%)	54	56	[2]	Obligatory
Land area with soil erosion control has been completed (10 thousand km <sup>2</sup> )	—	[27]	—	Anticipated
Note: 1 - grain include cereals, exclude tubers and beans; 2 - [ ] five year accumulation.				

(The full text (in Chinese) of the 13<sup>th</sup> FYP for Agricultural and Rural Economic Development is available at: <http://www.ndrc.gov.cn/zcfb/zcfbghwb/201611/W020161117549414436866.pdf>)

## **The National Adjustment Plan of Crop Farming Structure (2016-2020) 全国种植业结构调整规划（2016-2020）**

The Chinese Ministry of Agriculture (MOA) released the National Adjustment Plan of Crop Framing Structure (2016-2020) on 11 April, 2016, in order to adjust the planting of major crops including grains. Cotton, sugar crops, oil crops, vegetables and forage crops during 2016-2020 in China.

For the three main grain crops, there is a minor surplus in rice supply, supply and demand in wheat is basically balanced, and there is an over supply in maize. Therefore, the priority of adjustment is to maintain the planting areas for rice and wheat, at the same time to optimise the variety and quality structure to meet the market demand, reduce maize grown areas in the less advantage regions.

### **Objectives**

According to the plan, China takes "two guarantees", "three stabilization" and "two coordination" as the major goals for the adjustment. "Two guarantees" are to guarantee food grain (wheat, rice) and to guarantee cereals. "Three stabilities" are to stabilise self-sufficient levels of cotton, edible vegetable oil and sugar. "Two coordination" are coordinated development between vegetable production and demand, and coordinated development between forage production and animal husbandry.

### **The tasks**

#### **Grain**

The "bottom line" is basic self-sufficiency in cereal, absolute self-sufficiency in staple grain. The strategy is to develop rice and wheat production as priority, optimize maize production, develop food soy, tubers and other coarse grains and beans.

Rice – by 2020, planting area 450 million mu (1 ha = 15 mu);

Wheat – by 2020, wheat plating area maintained at 360 million mu, of which winter wheat 330 million mu. Develop the high gluten wheat for bread, and low gluten wheat for cake and biscuit baking.

Maize – Reduce grain maize, by 2020, maize planting area to be maintained around 500 million mu; increase silage maize, by 2020, to reach 25 million mu; appropriately develop fresh maize, by 2020, to reach 15 million mu.

Soy – increase planting area and promote rotation between soy and other cereal crops. By 2020, soy planting area reaches 140 million mu, increase by 40 million mu from 2016.

Tubers and coarse grains – replace maize by tubers and coarse grains which are more tolerant to drought and poor soil. By 2020, the planting area of tubers and coarse grains reaches 230 million mu.

#### **Cotton**

Stabilise the planting area around 50 million mu by 2020, in which 25 million mu in Xinjiang. Improve both quality and efficiency.

#### **Oil crops**

Rapeseed and peanut are the priority. The planting areas of these two crops maintained around 100 million and 70 million mu respectively by 2020.

### **Sugar crops**

By 2020, the planting areas of sugar crops are maintained at around 24 million mu, of which sugar cane at 21 million mu.

### **Vegetables**

Maintain vegetable planting area around 320 million mu, of which greenhouse vegetable grown area account 63 million mu. Improve the quality and efficiency of vegetable production through promoting water-saving and environmental friendly technologies, establishing field to table quality and safety tracing system.

### **Forage crops**

Establish the balanced grain-cash crop-forage cropping system. By 2020, silage maize area reaches 25 million mu, alfalfa reaches 35 million mu.

(The full text (in Chinese) of the “Crop growth Adjust Plan (2016-2020)” is available at: [http://www.moa.gov.cn/govpublic/ZZYGLS/201604/t20160428\\_5110638.htm](http://www.moa.gov.cn/govpublic/ZZYGLS/201604/t20160428_5110638.htm))

## National Pig Production Development Plan (2016-2020) 全国生猪生产发展规划（2016—2020）

Chinese Ministry of Agricultural released the National Pig Production Development Plan (2016-2020) in April 2016.

### Objectives

Maintain pork production and basic self-sufficiency; increase the farm scale and efficiency; increase waste treatment and utilization.

**Table 3. Pig production development targets**

	2010	2014	2020
Pork output ( million ton )	50.71	56.71	57.60
Proportion of large scale pig farm with offtake over 500 (%)	38	42	52
Contribution of scale pig farm to total slaughter (%)	66	68	75
Offtake rate (%)	144	155	160
Number of pigs produced per sow per year in scale pig farm	13	15	19
Labour productivity (pig/labour)	500	650	1000
Fattening pigs feed conversion ratio	2.9 : 1	2.8 : 1	2.7 : 1
Overall waste utilisation rate (%)	—	50	>75

### Regional layout

Based on the resource base, environmental carry capacity, consumption preferences, as well as slaughter and processing situations, the Plan proposed four different regions for pig industry development.

*Priority development region* – which includes Hebei, Shandong, Henan, Chongqing, Guangxi, Sichuan and Hainan provinces (and city). In 2014, this region produced 21.666 million ton pork, account 38.2% of the national total. It is expected that in this region the annual growth rate of 1% in pork production and become the major pork supplier in the future.

*Constrained development region* - which include capital cities of Beijing, Tianjin, Shanghai, and the water-net provinces in south China such as Jiangsu, Zhejiang, Fujian, Anhui, Jiangxi, Hubei, Hunan, Guangdong. In 2014, the region produced 21.881 million tons of pork, accounted 38.6% of the national total. Constrained by resource and environment, the potential of pig industry development in this region is limited. In the future, this region will maintain its current pork production level.

*Potential growth region* – which include Liaoning, Jilin, Heilongjiang, Inner Mongolia, Yunnan and Guozhou. In 2014, this region produced 10.544 million ton pork, accounted 18.6% of the national total. It is expected 1-2% annual growth in pork production in the region, which will become the major region of increased pork production.

*Moderate development region* – includes Shanxi, Shaanxi, Gansu, Xinjiang, Tibet, Qinghai and Ningxia provinces. In 2014, this region produced 2.622 million tons of pork, accounted 4.6% of national total. This region has rich land resources and agricultural by products resources, but with weak infrastructure for pig breeding and farming. The priority for these

regions is to encourage large enterprises to establish breeding and farming base, promote standard farming, develop brand name products.

### **Key tasks**

1. Establish modern pig breeding industry. Further implement the national pig genetic improvement plan, based on the national breeding farms, regional boar stations and the national genetic evaluation centres, promote enterprises group breeding and regional joint breeding; enhance pig genetic resource protection and utilization.
2. Enhance the development of feed and veterinary medicine industries. Speed up the development of new feed additives, develop environmental friendly feed products, and cultivate veterinary medicine industry groups.
3. Promote standard scale farming. Raise the level of automated facilities, standard production and modern management in the large scale farms
4. Promote comprehensive utilization of pig farm wastes. Adjust and optimise the regional layout of the pig industry, promote the coordinated development between pig production and environment protection.
5. Strengthen pig slaughter management. Adjust the structure of slaughter industry with emphases on concentrated slaughter, brand development, cold chain logistic, and cold fresh meat retailing.
6. Construct quality and safety tracing system
7. Push on the industrial management and socialized services
8. Strengthen pig epidemics and diseases prevention and control.
9. Carry out international exchange and cooperation. Continue to strengthen the cooperation with countries which have advanced pig industries on varieties selecting and breeding, feed research and development, farming management, and waste treatment.

(The full text of “Pig Industry Development Plan (2016-2020)” is available at:  
<http://www.moa.gov.cn/zwillm/ghjh/201604/P020160420572695452091.ccb>)

## **The National Herbivorous Animal Husbandry Development Plan (2016-2020) 全国草食畜牧业发展规划（2016-2020）**

Chinese Ministry of Agricultural released the National Pig Production Development Plan (2016-2020) in July 2016. This Plan covers dairy cattle, beef cattle, lamb sheep, as well as special herbivorous animal such as rabbit, donkey.

### **Key tasks**

The Plan proposed five key tasks on breeding, farming, feed, management and industry development.

1. Advance the breeding system for the improved varieties, further implement the genetic improvement plan, improve the quality and quantity of domestic top sire
2. Promote standard large scale animal farms, upgrade the existing farms.
3. Consolidate the feed and forage production base, promote integrated forage breeding and extension system, support the forage germplasm collection, preservation and breeding of improved varieties.
4. Improve quality and safety supervision, epidemic and diseases prevention and control. Improve the safety and quality accountability tracing system.
5. Speed up the health development of new industry system, promote the integration of “Internet Plus” with livestock production and management system.

The Plan calls coordinated utilization of international and domestic market and resources. Encourage international exchanges and cooperation on germplasm resources, epidemic and disease diagnosis, feed, animal products processing, safety and quality. Improve the advisory system for import of herbivorous animal products, meet consumption demand. Facilitate enterprises establishing direct and stale trade relationship with foreign enterprises; support enterprises establishing overseas feed and forage production bases, beef and lamb production and processes bases and milk bases. Encourage the enterprises carrying out investment and cooperation in the areas of R&D of animal vaccine and veterinary medicine, feed production, animal products processing and trading.

The full text (Chinese) of “National Herbivorous Animal Husbandry Development Plan (2016-2020)” is available at: <http://www.moa.gov.cn/govpublic/XMYS/201607/P020160711394507833451.ccb>

## **The National Development Plan for Agricultural Product Processing and Integration of Primary, Secondary and Tertiary Industry in Rural Areas (2016-2020) 全国农产品加工业与农村一二三产业融合发展规划（2016—2020年）**

On 17<sup>th</sup> November 2016, the Ministry of Agriculture released the “National Development Plan for Agricultural Product Processing and Integration of Primary, Secondary and Tertiary Industry in Rural Areas (2016-2020)”. This Plan forms part of the 13<sup>th</sup> FYP for Agricultural and Rural Economic Development.

### **Objectives and targets**

By 2020, the agricultural products processing industry will be significantly improved in its role in leading the rural economic development; the new industry mode will be formed; and the primary, secondary and tertiary industry in rural areas will be further integrated. The Plan proposed a number of targets which include:

- the prime operating revenue of the industry reaches 26 trillion Yuan by 2020, rise by an annual average of over 6%;
- processing rate of main agricultural products reaches 68% by 2020 (from 65% in 2015), in which the processing rate of grain, fruit, vegetables, meats, aquatic products reach 88% (85% in 2015), 23% (20% in 2015), 13% (10% in 2015), 17% (16% in 2015) and 38% (35% in 2015) respectively;
- the ratio between output value of agricultural product processing industry and agricultural overall output value reaches 2.4:1 by 2020 (from 2.2:1 in 2015);
- 80% of enterprises sale online, and the online trade value of agricultural products reaches 800 billion yuan by 2020;
- The revenue of leisure agriculture reaches 700 billion yuan by 2020 (from 440 billion yuan in 2015).

### **The key tasks**

1. Strengthening the primary industry, consolidate the foundation of industry integration
  - Developing green circular agriculture
  - Boosting the production of high-quality agricultural products
  - Upgrading the facilities for agricultural development
2. Strengthening agricultural products processing industry,
  - Supporting the local primary processing
  - Boosting the overall level of fine and deep processing of agricultural products
  - Promoting the comprehensive utilization of by-products from agricultural products processing
3. Making rural service more active
  - Developing all kinds of marketing services
  - Actively promoting e-commerce and other new operation models
  - Speeding up the development of leisure agriculture and rural tourism

## **The priority projects**

### **1. Development of production base for specialised raw materials**

- Cultivating specialised varieties, developing raw material production bases
- Promoting standard production of agricultural products

### **2. Transferring and upgrading agricultural product processing industry**

- Developing local facilities for primary processing of agricultural products
- Building the capacity for main-food processing
- Upgrading the quality brand
- Developing the technology integration bases for agricultural products processing
- Building demonstration pilots for the comprehensive utilization of by-products

### **3. Promoting leisure agriculture and rural tourism**

- Supporting the upgrading of basic infrastructure and service facilities of leisure agriculture
- Cultivating the brands of leisure agriculture and rural tourism
- Strengthening the protection of agricultural heritage

### **4. Piloting and demonstration of industries integration**

(The full text (in Chinese) of the “National Development Plan for Agricultural Product Processing and Integration of Primary, Secondary and Tertiary Industry in Rural Areas (2016-2020)” is available at: [http://www.moa.gov.cn/zwl/m/tzgg/tz/201611/t20161117\\_5366803.htm](http://www.moa.gov.cn/zwl/m/tzgg/tz/201611/t20161117_5366803.htm))

## **13<sup>th</sup> FYP for National Feed Industry Development 全国饲料工业“十三五”发展规划**

On 14<sup>th</sup> October 2016, Chinese Ministry of Agriculture released the 13<sup>th</sup> Five-Year Plan for National Feed Industry Development (2016-2020).

In the next five years, the increase in feed demand will slow down. It is expected the annual increase in feed consumption is 4 million ton. The raw material of protein feed will remain reliant on imports to a large extent.

### **Objectives and targets**

The overall objective of the feed industry development in the 13<sup>th</sup> FYP period is to stabilize and increase feed output, improve quality, raise feed conversion ratio, speed up the dissemination of safety, high efficiency and environmental friendly feed products; increase the international competitiveness and to transform China's feed industry from large to strong.

The total output of feed will reach 220 million tons. Of which 200 million tons formula feed, 12 million tons concentrated feed, 8 million tons of additive premixed feed; of those feed, 94 million tons for pig, 60 million tons for meat and poultry, 31 millions for layer hen, 20 million tons for aquaculture, 20 million tons ruminant feed, 1.2 million feed for pet.

The feed conversion ratio for pig fattening herd to reaches 2.7:1; for commercial white feather chicken reaches 1.6:1; layer hen reaches 2.0:1;

### **Key tasks**

1. Improve feed raw material supply capability
  - Stabilize raw materials supply for protein feed
  - Stabilize raw materials supply for basal feed
  - Establish modern forage production system
  - Push on utilization of crop straw as feed
  - Promote utilization of agricultural by products as feed
2. Enhance the feed safety
  - Improve the regulation and standard
  - Improve the supervision system and mechanism
3. Develop high efficient, safe and environment friendly feed products
  - Speed up the development of new feed additives
  - Research, development and dissemination of safe and environment friendly feed
  - Establish the precision formula technology system
4. Enhance feed processing
  - Upgrade the feed processing facilities
  - Promote precision processing
  - Enhance the capability ensuring safe production
5. Transform feed production mode
  - Promote feed industry informatization

- Promote innovation-driving development

The Plan supports feed enterprise become the key play in international cooperation, and calls on active cooperation with major countries on feed legislation and regulation, quality and safety, and trade rules.

(The full text (in Chinese) of the “13<sup>th</sup> FYP for Livestock Feed Industry Development” is available at: <http://www.moa.gov.cn/zwillm/ghjh/201610/P020161025404280483926.ccb>)

## **Science and Technology Innovation Policies 科技创新政策**

### **13<sup>th</sup> FYP on Science and Technology Innovation “十三五”国家科技创新规划**

China's 13<sup>th</sup> Five-Year Plan was released by the State Council on 28 July 2016.

#### **Objectives**

The Plan aims to accelerate the pace of agricultural modernisation, ensure food security and increase rural income, through development of high efficiency, safe and eco-friendly modern agricultural technologies.

#### **National Major programmes**

Among the national major programmes will be implemented in the next five years, cultivation of GMO new varieties and enhancing independent innovation in seed industry are the major agricultural programmes. These programmes will enhance the research on genetic technologies for crop tolerance to insect, diseases, drought, and cold; enhance research on GM cotton, maize and soy; promote the industrialization of new pest-resistant cotton, pest-tolerant maize, herbicide tolerant soy; enhance the research and development of new technologies for biosecurity, and gene cloning. Provide new varieties and technology reserves to ensure China's food security. Establish biosecurity assessment technology system, ensure the safety of GMO products.

#### **Development of new agricultural technologies**

China will develop cutting-edge technologies to boost the efficiency, quality and competitiveness of agriculture. The Plan identified the following 14 specific technologies as priority.

1. R&D of biological breeding

Cultivate a bunch of new varieties which are featured with high yield, high efficiency, and high quality, more tolerant and wide adaptability; cultivate competitive modern seed enterprises.

2. High yield, high efficiency technologies for grains

Research on new technologies and integrative demonstration to increase yield and efficiency for rice, wheat and maize, yield increases by 5%, waste reduces by 5%, fertilizer and water efficiency increase by 10%, heat and sunlight resource efficiency increase by 15%, production efficiency increases by 20%.

3. High yield and high efficiency technologies for major cash crops

Make breakthroughs in the theory and methods in increasing yield and efficiency for major cash crops, cultivate new varieties.

4. Innovation in marine agriculture and fresh water fishery sciences and technologies

Germplasm resources. Development of, select and breed new varieties, marine and freshwater healthy aquaculture, deep and fine processing, fishery environment protection.

5. High efficiency and safe livestock and poultry farming

Research and development on the technologies in detection, prevention and control of major epidemics and diseases; process and environment control in livestock and

poultry farming; livestock and poultry farming equipment and facilities; better waste treatment and recycling; protection of grassland ecosystem.

6. Forestry resource cultivation and high efficiency utilisation

7. Prevention, control and rehabilitation of agricultural non-point pollution and heavy metal pollution

Making breakthroughs in prevention, control and rehabilitation of nitrogen, phosphorus, toxic chemicals and organisms, heavy metal, and organic pollutants in agricultural and forest ecosystems.

8. Sustainable development and utilization of agricultural and forestry resources

Research on the key technologies for fertilizer and pesticides use reduction, high efficient use of soil and water resources, ecosystems rehabilitation and disaster prevention and reduction.

9. Reclamation of saline-alkali soil and low yield land

10. Agricultural biological manufacturing

Research on the mechanism of action, target design, synthetic biology, pathogenic mechanism, nutrient control and release mechanism; develop genetic engineered vaccine and molecular diagnostics technologies, biological pesticides, bio-fertilizers, bio-feed, plant growth conditioners, bio-energy.

11. Agricultural machinery and facilities

12. High efficient utilization of biomass

New technologies and business models on the clean collection, storage, processing of agricultural and forest wastes (straw, manure) and new biological resources (energy crops, microalgae).

13. Smart agriculture

Key technologies and products, establish the technology system for precision production in fields and orchards, smart production of facility agriculture, informatized livestock and poultry production.

14. Smart high efficiency facility agriculture

Make breakthroughs on the key technologies of fertigation, smart environment control, whole process mechanization; make innovations on the equipment and facilities for greenhouse energy saving, PV utilization, and smart vertical farm

(The full text (in Chinese) of the “13<sup>th</sup> FYP on Science and Technology Innovation” is available at: [http://www.gov.cn/zhengce/content/2016-08/08/content\\_5098072.htm](http://www.gov.cn/zhengce/content/2016-08/08/content_5098072.htm))

## **13<sup>th</sup> FYP for National Natural Science Foundation 国家自然科学基金“十三五”发展规划**

The 13<sup>th</sup> FYP for National Natural Science Foundation was released on 14<sup>th</sup> June 2016. The Foundation identified 118 research areas as priority to be supported in the next five years. Of these, the following are relevant to agricultural development.

### **Biodiversity and function**

Main research direction: mechanism of biodiversity formation; mechanism of biodiversity maintenance; mechanism of biodiversity loss; relationship between biodiversity and ecosystem function.

### **The molecular basis for agricultural genetic improvement**

Main research direction: genetic basis of important traits of agricultural organisms; interaction mechanism between agricultural biological gene and the environment; the relationship between phenotype and genotype; new concepts and new models of agricultural biological breeding.

### **Mechanism of pests and diseases resistance of agricultural organism**

Main research directions: molecular and physiological mechanism of resistance of agricultural organism to pests and diseases; molecular mechanism of immune response of agricultural organism; regularity of pests and diseases prevalence and the basis of control and prevention.

### **Adaptation mechanism of agricultural and forestry plants to abiotic stress**

Main research directions: molecular and physiological basis of agricultural and forestry plant adaptation to abiotic stress; response mechanism of agricultural and forestry plants to multiple abiotic stress; regulation mechanism for agricultural and forestry plants adaptation to abiotic stress.

### **Basis for health farming of agricultural animals**

Main research directions: biological and physiological basis for the formation of important traits of agricultural animals; adaptation and spared of pathogens in agricultural animals and environment; prevalence and control of major zoonotic diseases; changes in environmental factors and pollutants transfer in the animal farms; impact mechanism of feed nutrition and metabolites on animal immunity; forage varieties selection and breeding and maintenance of pasture productivity.

### **Variation and sustainable utilization of soil and water resources**

Main research directions: soil process and variation; soil quality and resource impacts; catchment hydrological process and ecological impacts; ecological function and environmental impact of soil biota.

### **Process and function of earth critical zones**

Main research directions: structure, formation and evolvement of critical zones; critical zones' service function and sustainable development; modelling on the critical zone process.

(The full text (in Chinese) of the “13<sup>th</sup> FYP for National Natural Science Foundation” is available at: [http://www.nsf.gov.cn/nsfc/cen/bzgh\\_135/index.html](http://www.nsf.gov.cn/nsfc/cen/bzgh_135/index.html))

## **Opinion on Agricultural and Rural Big Data Development 农业部关于推进农业农村大数据发展的实施意见**

On 31 December 2015, the Chinese Ministry of Agriculture (MOA) released the “Opinion on Agricultural and Rural Big Data Development”. This document outlines the objectives, tasks and roadmap for the Chinese agricultural and rural big data development.

### **Objectives**

In the next 5-10 years, to realise agricultural data opening and sharing, and to complete the agricultural data transformation.

### **Main tasks**

#### **Consolidate the foundation for agricultural and rural big data development and application**

- Establishing national agricultural data centre
- Advance data opening and sharing
- Bring the full play of various data function
- Perfecting agricultural data standard system
- Enhance data security management

#### **The priority areas for agricultural and rural data development and application**

- Support smart agricultural production
- Carry out precision monitoring on agricultural resource and environment
- Carry out agricultural natural disaster prediction and forecasting
- Enhance monitoring and early warning on animal epidemics and plant diseases
- Whole course tracing on safety and quality of agricultural products
- Information inquiry and traceable for whole seed industry chain of crops
- Enhance data support for marketing information monitoring and early warning
- Support innovation in agricultural operation system
- Push on data resource sharing in agricultural science and technology innovation
- Meet the need of personalised services in farm management
- Promote the transparency in agricultural management

### **Roadmap**

**2016-2018** – basically realise data sharing

**2019-2020** – gradually realise government data opening to the public

**2021-2025** – Complete the construction of global agricultural data collection and analyses system

(The full text (in Chinese) of the “Opinion on Agricultural and Rural Big Data Development” is available at: [http://www.moa.gov.cn/zwllm/tzgg/tz/201512/t20151231\\_4972005.htm](http://www.moa.gov.cn/zwllm/tzgg/tz/201512/t20151231_4972005.htm))

## **Three-Year Action Plan on “Internet Plus” Modern Agriculture “互联网+” 现代农业三年行动实施方案**

The “Three-Year Action Plan on “Internet Plus” Modern Agriculture” was jointly released by Ministry of Agriculture, National Development and Reform Committee, the Central Leading Group for Internet Security and Informatization, Ministry of Science and Technology, Ministry of Commerce, General Administration of Quality Supervision, Inspection and Quarantine, State Food and Drug Administration, State Administration of Forestry, on 22 April 2016.

### **Objective**

Achieve significant progress in the integration of internet into agriculture production, marketing, management, services, as well as various aspects of agricultural and rural economy, push on online agriculture and digital agriculture.

### **Key tasks**

The Action Plan proposed 11 priority areas for “Internet Plus” development.

1. “Internet Plus” for new type of agricultural business entities

Encourage family farms, cooperatives and leading enterprises to use internet technologies to improve the business and management.

2. “Internet Plus” for modern crop farming

Develop precision farming, IoT agriculture, agricultural information monitoring and early warning, remote sensing for cropping system, monitoring and early warning on pests and diseases, fustigation and smart water-saving irrigation.

3. “Internet Plus” for forestry
4. “Internet Plus” modern livestock

Establish comprehensive information data platform on production, processing, marketing and monitoring, promote internet of thing (IoT) based farm environment monitoring and individual animal monitoring system; demonstration and promoting robotic milking, feeding and cleaning; establish veterinary drugs inquire and tracing system, livestock and poultry life cycle safety monitoring system.

5. “Internet Plus” for fishery

Establish integrated fishery management system which covers fish production, marketing prices, eco-environment, fleet, fish harbour and seafarers.

6. “Internet Plus” for quality and safety of agricultural products
7. “Internet Plus” for agricultural e-commerce
8. “Internet Plus” for beautiful countryside
9. “Internet Plus” for agricultural and rural big data
10. “Internet Plus” for agricultural information service
11. “Internet Plus” for basic infrastructure

### **Major projects**

1. Agricultural IoT experiments

2. Agricultural e-commerce demonstration
3. Household access to information service
4. Demonstration of precision agricultural machines
5. Mobile phone based soil test and fertilization information service
6. Agricultural information economy demonstration zones.

(The full text (in Chinese) of the “Internet Plus” Modern Agriculture Action Plan” is available at:  
[http://www.moa.gov.cn/ztzl/scdh/tzgg/201607/t20160721\\_5213458.htm](http://www.moa.gov.cn/ztzl/scdh/tzgg/201607/t20160721_5213458.htm))

## **Action Plan for Enhancing Agricultural E-Commerce Development 推进农业电子商务发展行动计划**

The “Action Plan for Enhancing Agricultural E-Commerce Development” was jointly released by Ministry of Agriculture, Ministry of Commerce and National Development and Reform Committee on 6 September 2016.

### **Objectives**

By 2018, the basic infrastructure for agricultural e-commerce will be improved significantly, institutional system and policy environment completed, a bunch of influential e-commerce business and created, the business proportion of e-commerce in the market of agricultural products increased.

### **The key tasks**

The Plan outlined 5 key tasks and 20 specific activities.

1. Cultivating market entity of agricultural commerce  
Actions: capacity building, platforms coaction and e-commerce expanding
2. Constructing agricultural e-commerce public service platform  
Actions: freight gathering, products promotion, information sharing, quality inspecting, operation safeguarding
3. Unclogging agricultural e-commercial channels  
Actions: extending e-commerce channels, market transformation, innovation in operation model, basic support
4. Enhancing agricultural e-commerce technology innovation and application  
Actions: technology innovation, demonstration and dissemination, promoting standardization, policy research, and application of think-tank
5. Improving agricultural e-commerce policy system  
Actions: policy support, hardware support and operation support

The full text (in Chinese) of the “Action Plan for Enhancing Agricultural E-Commerce Development” is available at: <http://www.moa.gov.cn/zwl/m/ghjh/201509/P020150922631596113494.doc>

## **Resource and Environment Protection Policies 资源环境保护政策**

### **13<sup>th</sup> Five-Year Plan for Ecological & Environmental Protection “十三五”生态环境保护规划**

On 5<sup>th</sup> December, 2016 the Chinese State Council released the “13th Five-Year Plan for Ecological & Environmental Protection”. The Plan is the leading document for China’s environmental protection during the 13th Five-year Plan period.

#### **Objectives**

Achieving overall improvement of environmental quality by 2020. Green and low-carbon production and way of life will become the main trend, with substantial reduction in pollutants. Meanwhile, environmental risks will be effectively curbed by controlling decline of biological diversity. The ecological system will become more stable, and ecological security barriers will be in place, with material progress in the national environmental governance system and ability.

#### **Key Tasks**

- Strengthening control of pollution sources,
- Enhancing quality management,
- Launching special projects for emission reduction,
- Carrying out overall supervision for risks reduction,
- Enhancing ecological restoration,
- Speeding up institutional innovation
- Conducting a batch of major projects for eco-environment protection.

#### **Measures to support the implementation**

- Making clear responsibilities,
- Increasing investment,
- Enhancing international cooperation,
- Promoting pilot projects
- Conducting strict evaluation.

“The full text (in Chinese) of the “13<sup>th</sup> Five-Year Plan for Ecological & Environmental Protection” is available at: [http://www.gov.cn/zhengce/content/2016-12/05/content\\_5143290.htm](http://www.gov.cn/zhengce/content/2016-12/05/content_5143290.htm))

# **Action Plan for Prevention and Control of Soil Pollution 土壤污染防治行动计划**

## **Objectives**

By 2020, curb the nation's increasing soil pollution, achieve a sound and stable soil environment quality, ensure a safe soil environment for agricultural land and land used for construction purposes, and basically control the soil environmental risks.

## **The ten actions**

### **1. Conduct survey on soil pollution, and get a better understanding of the baseline of soil environment quality**

- (1) Intensify survey on soil environment quality
- (2) Construct soil environmental quality monitoring network
- (3) Enhance the level of soil environmental information management

### **2. Promote Legislation of Soil Pollution Control, Establish Sound Regulation and Standard System**

- (4) Accelerate legislation process
- (5) Systematically establish standard system
- (6) Comprehensively strengthen supervision and enforcement

### **3. Manage agricultural land by categories to ensure a safe environment for agricultural production**

- (7) Categorize agricultural land based on soil environment quality
- (8) Strengthen land protection
- (9) Focus on promoting safe utilization
- (10) Implementation comprehensively and control strictly
- (11) Strengthen soil management for forestland, grassland and garden land

### **4. Implement the access management for construction land, guard against the risk of livelihood environment**

- (12) Specify requirements for the management
- (13) Implement supervision responsibilities
- (14) Tighten land use access

### **5. Strengthen the protection of soil that are not polluted, strictly control the pollution of new soil**

- (15) Strengthen the Environmental management on unutilized land
- (16) Prevent new pollution on construction land
- (17) Enhance the spatial planning and management

### **6. Strengthen the regulation on pollution sources and emphasize the soil pollution prevention and control**

- (18) Strictly control the industrial and mining pollutions and enhance the daily environmental supervision.
- (19) Contain agricultural pollution
- (20) Reduce municipal pollution.

**7. Conduct pollution treatment and remediation, improve regional soil environment quality**

- (21) Clarify main subject for treatment and remediation
- (22) Formulate treatment and remediation plans
- (23) Carry out treatment and remediation in an orderly manner
- (24) Supervise achievement of objectives and implementation of tasks

**8. Increase efforts on technological research and development, advance the progress of environmental protection industries**

- (25) Enhance research on soil pollution prevention and control
- (26) Increase efforts to promote applicable technologies
- (27) Advance the development of the treatment and remediation industry

**9. Give full play to the dominant role of government and develop a soil environmental governance system.**

- (28) Strengthening the dominant role of government
- (29) Give fully play to the role of market
- (30) Strengthen social supervision
- (31) Awareness-raising and education

**10. Strengthen objective assessment and accountability**

- (32) Clarify the responsibility of local governments
- (33) Strengthen inter-departmental coordination and cooperation
- (34) Fulfill corporate responsibilities
- (35) Enforcing Stricter Performance Evaluation and Assessment

(The full text (in Chinese) of the “Action Plan for Prevention and Control of Soil Pollution” is available at: [http://www.gov.cn/zhengce/content/2016-05/31/content\\_5078377.htm](http://www.gov.cn/zhengce/content/2016-05/31/content_5078377.htm))

## **Action Plan for Prevention and Control of Water Pollution 水污染防治行动计划**

The “Action Plan for Prevention and Control of Water Pollution” was released by the State Council in April 2015.

### **Objectives**

By 2020, the water quality in the country will be improved significantly, with a sharp decline in heavily polluted water areas; drinking water safety guarantee level will rise continuously; groundwater extraction will be strictly controlled; groundwater pollution trend will be contained; environment quality of offshore areas will remain stable with an improving trend; the water ecological environment in Beijing-Tianjin-Hebei region, the Yangtze River Delta and the Pearl River Delta will be improved.

### **The ten actions**

#### **1. Comprehensive controlling pollutants discharge**

- (1) Strengthening industrial pollution prevention and control and total banning ten categories of small manufacturers (paper mills, tanneries, textile printing, colorant, coking, sulfur smelting, arsenic smelting, petroleum refining, electroplating and pesticides) which are not in accordance with the national industrial policy.
- (2) Strengthening municipal wastewater treatment.
- (3) Carrying forward agricultural and rural pollution prevention and control. This includes prevention and control the pollution from livestock and poultry farming, as well as non-point pollution from crop production.
- (4) Strengthening shipping port pollution control.

#### **2. Carrying forward economic restructuring and upgrading**

- (5) Adjusting the industrial structure and phasing out backward production facilities according to the law.
- (6) Optimizing spatial planning take account of the carrying capacity of water resources and water environment.
- (7) Promoting the development of recycling

#### **3. Making major efforts on water saving and protection**

- (8) Controlling total quantity of water use.
- (9) Improving water efficiency.
- (10) Protecting water resources in a scientific manner.

#### **4. Strengthening scientific and technological support**

- (11) Disseminating and demonstrating appropriate technology.
- (12) Researching and developing frontier technologies.
- (13) Making utmost effort to develop environmental protection industry.

#### **5. Giving full play to the role of market mechanism**

- (14) Getting prices and taxes in order, accelerate reform on water price.
- (15) Promoting multiple financing and guiding private capital investment.
- (16) Establishing incentive mechanisms, carry out transboundary water environment compensation.

#### **6. Intensifying environmental law enforcement and regulation**

- (17) Improving regulations and standards.
- (18) Reinforcing law enforcement.
- (19) Improving supervision and regulation.

#### **7. Strengthening water environment management**

- (20) Strengthening environment quality target management.
- (21) Tightening control over the total volume of pollutant emission.
- (22) Strictly controlling environmental risks.
- (23) Comprehensively implementing pollution permission system.

#### **8. Ensuring the safety of aquatic ecological environment**

- (24) Ensuring the safety of drinking water sources.
- (25) Focusing on the treatment and prevention of pollution in major watersheds.
- (26) Strengthening protection of offshore environment.
- (27) Treating urban black and odours water.
- (28) Protecting river and wetland ecological system.

#### **9. Clarifying the responsibility of different parties**

- (29) Strengthening local government's responsibility to protect aquatic environment.
- (30) Strengthening coordination between different authorities.
- (31) All emitting units should shoulder their responsibility.
- (32) Improving target task assessment.

#### **10. Strengthening public participation and social supervision**

- (33) Revealing environmental information according to laws.
- (34) Strengthening public supervision.
- (35) Create an environment for public participation.

(The full text (in Chinese) of the “Action Plan for Prevention and Control of Water Pollution” is available at: [http://zfs.mep.gov.cn/fg/gwyw/201504/t20150416\\_299146.shtml](http://zfs.mep.gov.cn/fg/gwyw/201504/t20150416_299146.shtml))

## **The Action Plan for Zero Growth in Fertilizer Use by 2020 到 2020 年化肥使用量零增长行动方案**

In February 2015, Chinese Ministry of Agriculture released the “The action plan for zero growth in fertilizer use by 2020”. This document was a response the government’s No 1 Central Document in 2015, which requested to change agricultural production from high productivity, high input and high pollution mode to a high productivity, high efficient and environmentally friendly mode. The fertilizer zero growth action plan forms part of China’s agricultural modernization strategy.

### **Objectives**

The overall objective is by 2020 to establish a management and technology system for scientific fertilizer application established, and achieve zero growth in fertilizer use. This includes:

- Fertilizer structure further optimized, with more reasonable composition of NPK and micro-nutrients
- Fertilizer application methods further improved, over 40% of crop land with mechanized fertilization; fertigation area reaches 150 million mu.
- Fertilizer use efficiency increased, fertilizer use efficiency for major crops reaches 40% and over.

### **Technical approaches**

- Promoting precision fertilization
- Adjusting fertilizer use structure
- Improving fertilizer application methods
- Replacing chemical fertilizers with organic fertilizers

### **Key tasks**

#### **1. Carrying forward soil test and fertilizer recommendation**

- Expanding the soil test programme to cover vegetable, fruit trees, tea and other cash crops
- Encouraging and facilitating business sector participation in the soil test and fertilization service programme
- Innovating service mechanism to support professional service organizations providing unified soil testing, fertilizer formulation, fertilizer supplying and fertilizer application.

#### **2. Transforming fertilizer application methods**

- Promoting mechanized fertilizer application
- Promoting fertigation technologies
- Disseminating timed fertilization technologies

#### **3. Promoting the application of new fertilizers and new technologies**

- Enhancing technologies research and development with focus on high yield and high efficiency fertilization technologies, new fertilizers and new equipment

- Speeding up the dissemination of new products, including slow releasing fertilizers, water soluble fertilizers, liquid fertilizers, foliar fertilizers, bio-fertilizers and soil conditioners.
  - Demonstrating and disseminating high efficient fertilization technology package
4. Promoting organic fertilizers utilization
  5. Improve arable land quality

(The full text of “The action plan for zero growth in fertilizer use by 2020“is available at:  
[http://www.moa.gov.cn/zwillm/tzgg/tz/201503/t20150318\\_4444765.htm](http://www.moa.gov.cn/zwillm/tzgg/tz/201503/t20150318_4444765.htm))

## **The Action Plan for Zero Growth in Pesticides Use by 2020 到 2020 年农药使用量零增长行动方案**

In February 2015, Chinese Ministry of Agriculture released the “The action plan for zero growth in pesticides use by 2020”. This document was a response the government’s No 1 Central Document in 2015, which requested to change agricultural production from high productivity, high input and high pollution mode to a high productivity, high efficient and environmentally friendly mode. The pesticides zero growth action plan forms part of China’s agricultural modernization strategy.

### **Objectives**

By 2020, to establish a resource-saving, environmentally friendly pest and disease prevention and control technology system, and to strive to realize zero growth in pesticides use.

### **Key tasks**

1. Constructing monitoring and early warning system. Establish automated and smart field monitoring network, improve the timeliness and accuracy of the monitoring and early warning.
2. Pushing forward the scientific application of pesticides
  - Disseminating high efficient, low toxicity, low residues pesticides
  - Disseminating high efficient plant protection machines
  - Spreading the knowledge of scientific utilization of pesticides
3. Push forward green prevention and control
  - Establish demonstrating zones of green prevention ad control technologies
  - Training farmer technicians who will lead other farmers on scientific use of pesticides
4. Promoting unified prevention and control
  - Upgrade the equipment and facilities
  - Raising the technology level
  - Improve the services, providing timely forecasting information and responding recommendations

In order to ensure the implementation of the action plan, the Ministry of Agriculture will set up a coordinating group led by a ministerial official, set up an expert advisory group to provide technical support and advises; increase the subsidies to low toxic pesticides.

(The full text (in Chinese) of “The action plan for zero growth in pesticides use by 2020”is available at: [http://www.moa.gov.cn/zwllm/tzgg/tz/201503/t20150318\\_4444765.htm](http://www.moa.gov.cn/zwllm/tzgg/tz/201503/t20150318_4444765.htm))

## **Regulation on the Prevention and Control of Pollution from Large-scale Breeding of Livestock and Poultry 畜禽规模养殖污染防治条例**

The Regulation on the Prevention and Control of Pollution from Large-scale Breeding of Livestock and Poultry, was released by the State Council on 11 November 2013; it came into force on January 1, 2014. This is the first environment-related regulation tackling pollution in agriculture at the national level.

### **Objectives**

The Regulation was formulated to prevent and control pollution from livestock and poultry breeding, boost the comprehensive utilization and harmless treatment of livestock and poultry wastes, protect and improve environment, guarantee the physical health of the general public, and promote the sustainable and healthy development of the livestock husbandry.

### **The role of governments and entities**

- Governments above county level are required to prepare plans for development of animal husbandry and plans on prevention and control of pollutions from livestock and poultry breeding
- Governments at municipal and national level are required to formulate schemes on comprehensive pollution control in main areas of animal husbandry
- The agriculture and animal husbandry departments of the people's governments at or above the county level shall be responsible for guiding and serving the comprehensive utilization of livestock and poultry wastes.
- The state shall encourage and support the research and development for the prevention and control of pollution from livestock and poultry breeding and the comprehensive utilization and harmless treatment of livestock and poultry wastes
- The environmental protection departments at or above the county level shall be responsible for the unified supervision and administration of the prevention and control of pollution from livestock and poultry breeding.
- Those engaging in the livestock and poultry breeding as well as the comprehensive utilization and harmless treatment of livestock and poultry wastes shall comply with the requirements of the state, and be subject to the supervision and inspection by the competent authorities according to law.

### **Prevention and control**

- Livestock husbandry development plans shall take an overall consideration of the environmental carrying capacity and the requirements of the prevention and control of pollution from livestock and poultry breeding, make rational layout, and scientifically determine the varieties, scale and total quantity of livestock and poultry breeding.
- The plans for the prevention and control of pollution from livestock and poultry breeding shall be integrated with livestock husbandry development plans. The large-scale livestock and poultry farms and breeding areas which may have a major impact on environment shall prepare environmental impact reports.

- It is forbidden to construct livestock and poultry farms and breeding areas within the following areas:
  - Conservation areas of drinking water sources and scenic spots.
  - Core areas and buffer areas of natural protection areas.
  - Areas of urban residents, areas of culture, education and scientific research, and other population intensive areas.
  - Other breeding-prohibited areas as prescribed by laws and regulations.
- The new construction, reconstruction and expansion of livestock and poultry farms and breeding areas shall comply with the livestock husbandry development plans and the plans for the prevention and control of pollution from livestock and poultry breeding, satisfy the conditions for animal epidemic prevention, and conduct environmental impact assessment.

### **Wastes treatment and utilization**

- Animal husbandries and areas should be equipped with the following facilities:
  - facilities for separating animal waste from rainwater
  - storage facilities for animal waste and sewage
  - facilities for methane production, separation of biogas residue from biogas liquid and their transmission facilities for treatment of sewage and animal bodies
  - environmentally sound disposal facilities according to the production scale and need of pollution control
- Encourage and support the comprehensive utilization of animal wastes
  - Returning manure to fields, preparation of biogas and manufacture of organic fertilizer
  - Consumption and utilization of animal wastes by integrating planting and breeding, and promote the utilization of on-spot and nearby livestock and poultry manure, sewage and other wastes
  - Constructing facilities for wastes comprehensive utilization
- Treated animal waste, to be discharged into the environment, should meet national and local standards on pollution discharge and the target for total pollution control (“total cap”). Untreated animal waste is not allowed to be discharged

### **Incentive, offences and penalties.**

- To encourage further waste reduction even after complying the discharge requirements and meeting the total cap limits, financial incentives and supports will be provided by governments at county level
- For animal husbandry farms using animal waste for biogas power generation, they are entitled to favourable on-grid power price according to related national policies
- Demonstration and reward to support large-scale and standardized livestock and poultry breeding

- Support the livestock and poultry farms and breeding areas in conducting standardized transformation and the construction and improvement of pollution prevent and control facilities
- Encourage the transformation from decentralized breeding to intensive breeding.
- Warnings will be issued and penalties (in a range of 0.03 to 0.5 million RMB, remove or shutdown the husbandry) will be charged for:
  - building animal husbandry in forbidden areas, farmers will firstly receive warning from county-level governments to remove construction or shutdown the husbandry;
  - building animal husbandry in drinking water source protection areas, farmers will receive warning from county-level governments
  - animal husbandry without environmental impact assessment if actually required,
  - animal husbandry without waste treatment either in own facilities or designated facilities
  - animal waste discharge without complying national or local standards or cap control indicator

(The full text (in Chinese) of the “Regulation on the Prevention and Control of Pollution from Large-scale Breeding of Livestock and Poultry” is available at: [http://www.gov.cn/zwggk/2013-11/26/content\\_2534836.htm](http://www.gov.cn/zwggk/2013-11/26/content_2534836.htm))

## **Campaign on Agricultural Non-Point Pollution Control and Prevention 农业部关于打好农业面源污染防治攻坚战的实施意见**

On 10<sup>th</sup> April, Chinese Ministry of Agricultural announced its plan of “Campaign on Agricultural Non-Point Pollution Control and Prevention”. Control and prevention of agricultural non-point pollution is regarded as an important part of China’s agricultural transition to a modern and sustainable agriculture.

### **Objectives**

By 2020, strive to effectively curb the worsening trend of non-point pollution from agriculture. The specific tasks include:

- Strictly control total agricultural water use, massively promote water-saving agriculture, and for irrigation water use efficiency to reach 0.55;
- Reduce fertilizers and pesticides use, and achieve zero growth in fertilizers and pesticides use in major crops;
- Livestock and poultry wastes, crop straws, and plastic mulching films recycled and reused.

### **Key tasks**

The document outlined seven key tasks which include:

- Massively promoting water-saving agriculture
- Implementing fertilizers and pesticides zero growth action plan
- Advancing pollution prevention and control in livestock and poultry farm
- Further push forward recycling of crop straws
- Carrying out farm land heavy metal pollution treatment

### **Approaches to non-point pollution control**

The document recommended the following technical approaches:

- Promoting agricultural clean production – disseminate clean production technologies in crop production and animal husbandry, establishing clean production standard and accreditation system
- Promoting standard production – strengthening inspection and monitoring, constructing information platform for quality tracing; developing green, organic and geographical indication products.
- Promote modern ecological and circular agriculture
- Promote scale farm operation
- Developing new entities for non-point pollution control – developing the professional service providers on farm machine, crop protection and information; encouraging professional service providers participating in non-point pollution control
- Establishing comprehensive non-point control demonstration zones

(The full text (in Chinese) of the “Campaign on Agriculture Non-source Pollution in China” is available at: [http://www.agri.cn/V20/ZX/tzgg\\_1/tz/201504/t20150414\\_4525628.htm](http://www.agri.cn/V20/ZX/tzgg_1/tz/201504/t20150414_4525628.htm))

## **Incentive Policies 激励政策**

### **Guiding Opinions for the Governmental and Social Capital Cooperation in Agricultural Sector 关于推进农业领域政府和社会资本合作的指导意见**

The Chinese National Development and Reform Committee (NDRC) and Ministry of Agriculture on 6<sup>th</sup> December 2016 jointly released the “Guiding Opinions for the governmental and social capital cooperation in agricultural sector” (the agricultural sector PPP).

#### **Priority areas**

The “Guiding Opinions” outline three broad priority areas to support social capital participate: (i) basic infrastructure and public services, such as high standard farm land, see projects, modern fish harbour, safety inspection and trace system for agricultural products; (ii) agricultural waste recycling and utilization, prevention and control of agricultural non-point pollution, large scale anaerobic digestion (biogas), protection of of agricultural resource and environment and sustainable development; (iii) modern agricultural demonstration zones, agricultural IoT and infomatization, wholesaling market, development of tourism and leisure agriculture.

The qualified state-owned enterprises, private-owned enterprises, foreign-owned enterprises, mixed ownership enterprises, and other investors and business organisations have equal opportunities and rights to participate.

The “Guiding Opinions” proposed six policies to support the agricultural PPP:

- Strengthening government’s advice in agricultural investment
- Speeding up the reform on rural collective property right reform
- Innovating financing services
- Establishing appropriate investment-return mechanism
- Improving the risk prevention and sharing mechanism
- Ensuring land supply to PPP projects

(The full text (in Chinese) of the “Guiding Opinions for the governmental and social capital cooperation in agricultural sector” is available at:

[http://www.sdpc.gov.cn/zcfb/zcfbtz/201612/t20161216\\_830306.html](http://www.sdpc.gov.cn/zcfb/zcfbtz/201612/t20161216_830306.html))

## **Plan for Establishing Green Oriented Agricultural Subsidies System 建立以绿色生态为导向的农业补贴制度改革方案**

On 19<sup>th</sup> December 2016, Chinese Ministry of Commerce and Ministry of Agriculture jointly announced the “Reform Plan for Establishing Green Oriented Agricultural Subsidies System”. The aim of the Plan is to shift the policy target from quantity growth as priority to equal importance of quantity and quality growth in agricultural production. This will encourage the flow of increased subsidies to resource-saving and environmentally friendly agriculture.

The Reform Plan will push forward the reform of existing subsidies to agricultural input materials, direct subsidies to grain-production farmers, and improved variety subsidies.

The Reform Plan will push forward the implementation of arable land protection, raise soil quality, pilot of fallow scheme, new round of grassland protection, expand the scale of conversion of farm land to grassland and forest land (grain for green programme), completely protection of natural forest; establish wetland protection system; promote water-saving agriculture and rain-fed agriculture, push forward water price reform.

(The full text (in Chinese) of the “Plan for Establishing Green Oriented Agricultural Subsidies System” is available at:

[http://nys.mof.gov.cn/zhengfuxinxi/bgtGongZuoDongTai\\_1\\_1\\_1\\_1\\_3/201612/t20161219\\_2484541.html](http://nys.mof.gov.cn/zhengfuxinxi/bgtGongZuoDongTai_1_1_1_1_3/201612/t20161219_2484541.html))

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