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April 2012

China's Agriculture and Food Policies[1]
中国农业与食品政策法规

1. National Development Plans 国家发展规划

1.1. Medium and Long-term Plan for National Food Security (2008-2020) 国家粮食安全中长期规划纲要(2008-2020)

This Plan was released on 13 November 2008, prepared by the National Development and Reform Committee, together with other more than 10 ministries. The Plan outlines the objectives, tasks, and specific programmes for food security and provides the strategic framework for all actions on food security.

Objectives

(i) Stabilize grain-sown areas. By 2020, maintain arable land area at not less than 1.2 billion hectares.
(ii) Ensure grain and other major food basically self-sufficient. Maintain grain self-sufficiency over 95%.
(iii) Maintain a reasonable level of grain storage and the proportion of wheat and rice not less than 70% of the storage.
(iv) Establish a modern grain logistic system; reduce grain distribution costs.

The key tasks

(i) Increase food production capability.
(ii) Utilize non-grain food resources.
(iii) Strengthen international cooperation on grain and edible oil.
(iv) Perfect grain distribution system.
(v) Perfect grain storage system.
(vi) Further improve grain processing system.

Policies and measures to safeguard food security

(i) Strengthen government's food security responsibility; provincial government is responsible for the region's arable and water resource protection, grain production, distribution, storage and marketing regulation.
(ii) Strongly protect production resources, including arable land and grassland.
(iii) Strengthen scientific and technological support to agriculture, establish the government-led multiple founding system and encourage business sectors and farmer associations to disseminate agricultural technologies.
(iv) Increase agriculture input for infrastructure, finance service and production subsidies.

[1] The content of this issue of *Information Sheet* is largely based on the annexes of the report "*The Future of Food and Farming - Foresight Report's Implications for China",* prepared by Yuelai Lu, commissioned by UK Government Office for Science. For further inquiries, please contact Yuelai Lu at: y.lu@uea.ac.uk

(v) Perfect grain macro control mechanism, improve grain statistic system, emergency response system, grain distribution policies, and strengthen grain administration system.
(vi) Promote healthy food consumption and reduce food chain waste.
(vii) Push forward food legislation.
(viii) Implement specific programmes and plans regarding grain production, distribution, storage, process and consumption.

The 10 specific programme and plans proposed include

(i) The plan to increase grain production capability by 50 Mt (2009–2020).
(ii) Arable land protection and land reclaim development plan.
(iii) Water resource protection and development plan.
(iv) Agricultural and food science and technology development plan.
(v) Grain saving livestock development plan.
(vi) Edible vegetable oil development plan.
(vii) Modern grain logistic development plan.
(viii) Grain storage system development plan.
(ix) Grain processing industry development plan.
(x) Policies and measurements for healthy food consumption.

1.2 The 12th Five-Year Plan for National Economic and Social Development (2011-2015)

中华人民共和国国民经济和社会发展第十二个五年规划纲要**(2011-2015)**

This is China's most comprehensive development plan which covers all the important sectors of social and economic development. The Plan covers two important aspects of the food system – food production and resource/environmental protection. The section on agricultural development, with the title of 'Strengthen Agriculture and Benefit Farmers, Speed Up the Development of the Socialist New Countryside', outlines objectives of major aspects of agricultural development in the period of 2011–2015, including:

Chapter 5 Develop Modern Agriculture More Rapidly

- Become More Capable of Ensuring Food Security
- Carry Out Strategic Agricultural Restructuring
- Accelerate Scientific and Technological Innovation in Agriculture
- Improve the Agricultural Social Service System

Chapter 6 Expand the Ways in Which Farmers Can Increase Their Incomes

- Solidify and Raise Household Production Income
- Strive to Increase Wage Incomes
- Energetically Increase Transfer Income

Chapter 7 Improve Living and Working Conditions in the Countryside

- Improve Planning and Management of Towns, Townships and Villages
- Strengthen Rural Infrastructure
- Strengthen Public Services in Rural Areas
- Comprehensively Clean Up the Rural Environment

Chapter 8 Improve Systems and Mechanisms for Rural Development

- Uphold and Improve the Basic Rural Management System
- Develop a Sound System for Integrated Urban and Rural Development
- Enhance the Vitality of Economic Development in Counties

Chapter 21 Actively Respond to Global Climate Change

- Control Emissions of Greenhouse Gases
- Enhance the Ability to Adapt to Climate Change
- Extensively Develop International Cooperation

Chapter 22 Strengthen Resource Conservation and Management

- Save Energy and Resource Consumption
- Strengthen Water Resource Conservation
- Use Land Economically and Intensively
- Intensify the Surveying, Protection and Rational Exploitation of Mineral Resources

Chapter 23 Vigorously Develop a Circular Economy

- Promote Cyclic Production
- Improve the Resource Recycling System
- Spread Green Consumption
- Enhance Policy and Technological Support

Chapter 24 Intensify Environmental Protection

- Reduce and Control Emissions
- Guard Against Environmental Risks
- Strengthen Environmental Monitoring

Chapter 25 Promote Ecological Protection and Remediation

- Construct Ecological Safety Barriers
- Strengthen Ecological Protection and Governance
- Establish an Ecological Compensation Mechanism

Chapter 26 Intensify the Development of Systems for Water Conservancy and Disaster Prevention and Mitigation

- Improve Capabilities to Guarantee Supply of Water
- Enhance Flood Control Capabilities
- Strengthen the Prevention and Control of Mountain Torrents, Geological Disasters, Meteorological Disasters and Earthquakes

Chapter 27 Increase Scientific and Technological Innovation Capabilities

- Promote Major Scientific and Technological Breakthroughs
- Accelerate the Establishment of a Technological Innovation System Led by Enterprises
- Accelerate the Construction of Science and Technology Infrastructure
- Strengthen Support Policies for Scientific and Technological Innovation

Chapter 49 Deepen Reform of the Prices for Resource Products and Environmental Protection Charges

- Improve the Price Formation Mechanism for Resource Products
- Reform of the System of Environmental Protection Charges
- Establish a Sound Mechanism for Trading in Resources and Environmental Property Rights

The main targets for economic and social development in the 12th Five-Year Plan period

Item		2010	2015	Average annual increase (%)	Nature
Economic development					
Gross domestic product (GDP) (trillion RMB yuan)		39.8	55.8	7	Anticipated
Share of services in GDP (%)		43	47	[4]*	Anticipated
Urbanization level (%)		47.5	51.5	[4]	Anticipated
Science, technology and education					
Nine-year compulsory education retention rate (%)		89.7	93	[3.3]	Obligatory
Senior secondary school gross enrolment rate (%)		82.5	87	[4.5]	Anticipated
Ratio of R&D expenditure to GDP (%)		1.75	2.2	[0.45]	Anticipated
Number of patents granted per 10,000 people		1.7	3.3	[1.6]	Anticipated
Resources and environment					
Total cultivated land (billion hectares)		1.818	1.818	[0]	Obligatory
Reduction of water use per unit of industry VA (%)				[30]	Obligatory
Efficiency coefficient of irrigation water		0.5	0.53	[0.03]	Anticipated
Percentage of non-fossil fuels in primary energy resource consumption		8.3	11.4	[3.1]	Obligatory
Reduction of energy per unit of GDP (%)				[16]	Obligatory
Reduction in carbon dioxide (CO_2) emissions per unit of GDP (%)				[17]	Obligatory
Reduction of major pollutant emission (%)	Chemical oxygen demand (COD)			[8]	Obligatory
	Sulphur dioxide (SO_2)			[8]	
	Ammonia-N			[10]	
	Nitrogen oxide/dioxide (NO_x)			[10]	
Forest growth	Forest coverage (%)	20.36	21.66	[1.3]	Obligatory
	Forest volume (billion cubic metres)	13.7	14.3	[6]	
People's life					
Urban per capita disposable income (RMB yuan)		19,109	>26810	>7	Anticipated
Rural per capita net income (RMB yuan)		5,919	>8310	>7	Anticipated
Registered urban unemployment rate (%)		4.1	<5		Anticipated
Increase in urban employment (million)				[45]	Anticipated
Urban residents covered by basic pension insurance (million)		257	357	[1]	Obligatory
Urban and rural residents covered by one				[3]	Obligatory

of the three basic medical insurance systems (%)**				
Low-income housing units built (million)			[36]	Obligatory
Total population (billion)	1.341	<1.39	<7.2 ‰	Obligatory
Life expectancy	73.5	74.5	[1]	Anticipated
* '[…]' indicates 5-year cumulative amount ** The three basic medical insurance refers: basic medical insurance for urban workers; basic medical insurance for non-working urban residents; new rural cooperative medical insurance scheme.				

1.3. The 12th Five Year Plan for Agricultural and Rural Economy

全国农业和农村经济发展第十二个五年规划

The overall objective of agricultural and rural development in the 12th Five-Year Plan period are (i) steadily increase production capacity of grain and other agricultural products; (ii) significantly increase farmers' income; and (iii) make significant progress in new countryside development. To achieve the objectives, the Ministry of Agriculture will take actions on the following seven aspects:

Steadily Increase the Grain Production Capacity

- Stabilize grain planting area
- Optimize grain variety structure
- Strengthen the redevelopment of main grain production areas
- Increase per unit area yield

Substantially Improve the Level of Agricultural Material and Equipment

- Strengthen science and technology innovation and professional training
- Strengthen infrastructure development
- Accelerate agricultural mechanization and development of facility agriculture
- Build up the capacity for disaster prevention and reduction

Adjust and Optimize the Structure of Agricultural and Rural Economy

- Deepen agricultural structure adjustment
- Accelerate the development of the agricultural product processing industry
- Enhance township enterprise development
- Promote agricultural services
- Foster emerging rural industries

Increase Farmer Income

- Steadily increase incomes from household business operations
- Strive to increase wage incomes
- Effectively increase transfer income

Enhance Agricultural and Rural Public Services

- Strengthen the development of the agricultural public service system
- Enhance rural infrastructure construction
- Strengthen rural social services

Perfect and Innovate Rural and Agricultural Development Mechanism

- Perfect rural land administration system
- Develop multiple types of operations
- Further develop farmer technical associations

- Raise the quality of agricultural industry development
- Strengthen the establishment of modern agricultural demonstration zones

Protect Rural Ecological Environment

- Strictly protect arable land
- Strengthen grassland protection
- Strengthen water resource and agricultural biological resource protection
- Push forward agricultural energy saving and emission reduction and rural environmental management (see Annex 4.2)

The main targets for agriculture and rural economic development in the 12th Five-Year Plan period

Item	2010	2015	Average annual increase (%)
Agricultural products supply capacity			
Grain crop sown area (100 million ha)	1.099	>1.067	
Grain production capacity (100 Mt)	>5.0	>5.4	
Cotton, total production (10,000 t)	596	>700	>3.27
Yield of oil-bearing crops (10,000 t)	3230	3500	1.62
Yield of sugar crop (10,000 t)	12008	>14000	>3.12
Total meat (10,000 t)	7925	8500	1.41
Eggs (10,000 t)	2765	2900	0.96
Milk (10,000 t)	3780	5000	5.75
Total output of aquatic products (10,000 t)	5373	>6000	>2.23
Pass rate for regular quality test of agricultural products (%)	94.8	>96	>[1.2]
Agricultural production structure			
Proportion of livestock production value to total agricultural production value (%)	30	36	[6]
Proportion of fishery output value to total agricultural output value (%)	9.3	10	[0.7]
Ratio of the value of agricultural products processing industry to the total value of agricultural output	1.7	2.2	[0.5]
Average annual growth rate of added value of township enterprises (%)			10
Agricultural technology and equipment			
Contribution rate of technical progress (%)	52	>55	> [3]
Total mechanical power (100 million kW)	9.2	10	1.68
Level of mechanization in ploughing, sowing and harvesting (%)	52	60	[8]
Increase in irrigated area (100 million ha)			[0.027]
Irrigation water use efficiency	0.5	0.53	[0.03]
Number of rural skilled population (10,000)	820	1300	6.8
Agricultural production operation and management			
Number of households associated to production association (100 million)	1.07	1.3	3.97

Proportion of large-scale dairy cattle farms (%) (annual in stock number over 100 heads)	28	>38	> [10]
Proportion of large-scale pig farms (%) (annual slaughter number over 500 heads)	35	50	[15]
Agricultural benefits and farmer income			
Annual growth rate in added value of agricultural, forestry and livestock output			5
Rural labour transfer (10,000 people)			[4000]
Rural per person income (RMB yuan)	5919	>8310	>7
Resource utilization and environmental protection			
Utilization rate of crop residues (%)	69	>80	>[11]
Percentage of biogas pits installed in suitable households (%)	33	>50	>[17]
Release various aquatic species for stock enhancement (100 million heads)	289		[1500]
[….] 5-year cumulative number			

The Ministry of Agriculture has also prepared five-year plans for specific sectors including:

12th Five-Year Plan of Crop Production (2011–2015)

12th Five-Year Plan of Livestock Development (2011–2015)

12th Five-Year Plan of Fishery Development (2011–2015)

12th Five-Year Plan of Feed Industry (2011–2015)

2. Laws on Agriculture and Grain Production 农业与粮食生产有关法律

2.1. Agricultural Law (revised in 2002) 农业法（2002 修订）

First edition was approved by National People's Congress on 2nd July 1993, revised edition was approved on 28th December 2002.

The Law is aimed to consolidating and strengthening the position of agriculture as the foundation of the national economy, deepening the reform in rural areas, developing the productive forces of agriculture, pushing forward the modernization of agriculture, safeguarding the legitimate rights and interests of farmers and agricultural production and operation organizations, increasing the income of farmers, enhancing their scientific and cultural qualification, promoting the sustained, steady and sound growth of agriculture and the rural economy, and attaining the objectives of building a well-off society in an all-round way.

The Law contains 13 chapters and 99 articles. The titles of chapters are listed as below:

Chapter 1 General Provisions

Chapter 2 System of Agricultural Production and Operation

Chapter 3 Agricultural Production

Chapter 4 Circulation and Processing of Agricultural Products

Chapter 5 Grain Safety

Chapter 6 Input to and Support and Protection of Agriculture

Chapter 7 Agricultural Science and Technology and Education in Agriculture
Chapter 8 Agricultural Resources and Protection of Agricultural Environment
Chapter 9 Protection of the Rights and Interests of Farmers
Chapter 10 Development of the Rural Economy
Chapter 11 Law Enforcement and Supervision
Chapter 12 Legal Responsibility
Chapter 13 Supplementary Provisions

2.2. Grain Law (Draft for consultation) 粮食法（征求意见稿）

On 21 February 2012, the Legislative Affairs Office of the State Council released a draft of a new Grain Law to solicit public opinion. The draft law was jointly prepared by the National Development and Reform Commission and the State Administration of Grain. According to the explanatory notice, safeguarding national grain security is the fundamental purpose of the Grain Law. It aims to ensure grain security by stabilizing grain output and intensifying control and supervision over the market.

The draft law applies to grains, edible vegetable oil, and oilseeds, as well as the production, distribution, and consumption of these commodities. It also defines the roles and responsibilities for different administrative departments in managing grain production, processing, trade, reserves, and market information dissemination.

The draft law contains 10 chapters and 97 articles. The 10 chapters are listed as below:

Chapter 1 General Provisions
Chapter 2 Grain Production
Chapter 3 Grain Distribution and Processing
Chapter 4 Grain Consumption and Conservation
Chapter 5 Grain Quality Safety
Chapter 6 Grain Macro Regulation and Reserve
Chapter 7 Support to and Development of the Grain Industry
Chapter 8 Supervision and Inspection
Chapter 9 Legal Liability
Chapter 10 Supplementary Provisions

3. Food safety and food consumption 食品安全与消费

3.1. Food Safety Law (2009) 食品安全法（2009）

Food Safety Law (FSL) was approved by China's National People's Congress (NPC) Standing Committee on 28 February 2009. The FSL went into effect on 1 June 2009. The FSL aims to enhance monitoring and supervision, toughen safety standards, recall substandard products and severely punish offenders. To reinforce the implementation of FSL, the State Council issued the implementing regulation on 20 July 2009, and set up the Food Safety Committee on 6 February 2010. The Committee is responsible for the coordination of food safety work, making major policies and measurements on food safety, and supervising the fulfilment of food safety responsibilities.

The FSL covers the following 10 chapters:

Chapter 1 General Provisions

Chapter 2 Surveillance and Assessment of Food Safety Risks

Chapter 3 Food Safety Standards

Chapter 4 Food Production and Trade

Chapter 5 Food Inspection and Testing

Chapter 6 Food Import and Export

Chapter 7 Response to Food Safety Incidents

Chapter 8 Supervision and Administration

Chapter 9 Legal Liabilities

Chapter 10 Supplementary Provisions

3.2. Law on Agricultural Product Quality Safety (2006) 农产品质量安全法(2006)

Adopted by the National People's Congress on April 29, 2006 and effective as of November 1, 2006, the Law was formulated to guarantee the quality safety of agricultural products, maintain the health of the general public, and promote the development of agriculture and rural economy.

The term "agricultural products" as mentioned in the Law refers to primary products sourced from agriculture, that is to say, the plants, animals, microorganisms and their products, which are obtained from agricultural activities.

The term "agricultural product quality safety" as mentioned in the Law refers quality of an agricultural product meets the requirements for ensuring human health and safety.

The Law contains 8 Chapters and 56 Articles. The titles of the 8 Chapters are as following:

Chapter 1 General Provisions

Chapter 2 Agricultural Product Quality Safety Criteria

Chapter 3 Places of Origin of Agricultural Products

Chapter4 Production of Agricultural Products

Chapter 5 Packages and Marks of Agricultural Products

Chapter 6 Supervision and Inspection

Chapter 7 Legal Liabilities

Chapter 8 Supplementary Provisions

3.3. Food and Nutrition Development Guideline (2011-2020) 中国食物与营养发展纲要(2011-2020)

Led by MoA and MoH, the State Food and Nutrition Consultant Committee (SFNCC) is preparing the Food and Nutrition Development Guideline (2010-2020). The Guideline will cover the aspects of food supply, food consumption, nutrients intake, balanced diet, and diseases control. The Guideline will also set out the goal of food and nutrition development in 2015 and 2020, as well as enabling policies, technology and investment to achieve the goal.

3.4. State Grain Administration's Suggestion to Combat Food Waste 国家粮食局关于切实加强节约粮食反对浪费工作的实施意见

On 12th April 2010, the State Grain Administration issued Suggestion to Combat Food Waste. The Suggestion outlined the following actions to combat food waste in China:

- Through broad publicity campaign to raise awareness on food saving
- Enhance grain purchase and storage, reduce grain waste in storage
- Accelerate grain logistic infrastructure development, reduce grain waste in transportation
- Improve the standard of grain and oil products, enhance the efficiency of grain and oil process
- Develop and disseminate new technologies for grain waste reduction
- Push forward the trusted grain and oil programme, encourage grain and oil business to combat grain waste, provide services to facilitate public combat food waste.

4. Environmental and Resource Protection 环境与资源保护

4.1. MoA's Suggestions on Agricultural and Rural Energy Saving and Emission Reduction (ESER) 农业部关于进一步加强农业和农村节能减排工作的意见

Released on 14th December 2011 by Ministry of Agriculture, as a sectoral response to the national action plan on ESER.

Targets

By 2015, compare with 2010, total agricultural COD emission reduced by 8%, ammonia nitrogen emission reduced by 10%; coverage of soil test programme reaches to 60%, fertilizers use efficiency increase 3%; promote unified pest and diseases prevention and control programme, unified pest and diseases prevention and control covers 30% of major crops by 2015; promote green pest and diseases prevention and control, abolish a patch of high poison, high residue pesticides; promote ESER planting system, reduce the high energy consumption procedures; over 50% of intensive livestock farm or livestock raising community equipped with waste treatment facilities; households with biogas reaches 55 million, annual biogas consumption reaches 21.6 billion M^3; phase out high energy consumption and high pollution machines and fishing boats, update township enterprises for energy saving, increase rural production energy efficiency.

Actions

<u>Energy Saving in Agricultural production</u>

- Enhance energy saving in agricultural machinery and fish boat
- Promote energy saving in crop planting system
- Promote energy saving in township enterprises
- Promote energy saving in rural domestic life

<u>Actively Prevent and Control Agricultural Non-point Pollution</u>

- Dissemination of technologies for fertilisers, pesticides and water saving
- Dissemination of technologies for ecological livestock raising
- Dissemination of technologies for health aquaculture

<u>Step Up the Efforts to Promote Reuse of Rural Waste</u>

- Development of rural biogas

- Implement rural cleanup programme
- Comprehensive use of crop residues
- Collection and reuse of mulching plastic film

Provide Effective Enabling Measures to Rural and Agricultural ESER

- Strengthen the leadership and consensus
- Design and improve relevant policies and regulations
- Increase financial input
- Strengthen technical support
- Initiate extensive training and dissemination

4.2. Circular Economy Promotion Law 循环经济促进法

The Circular Economy Promotion Law was passed at the 4th meeting of the Standing Committee of the 11th National People's Congress of the People's Republic of China on 29 August 2008. It entered into force on 1 January 2009.

The Law was formulated for the purpose of facilitating a circular economy, raising the resource utilization rate, protecting and improving the environment and realizing sustained development.

The term *Circular Economy* in the Law refers the general term for the activities of decrement, recycling and resource recovery in production, circulation and consumption.

The Law contains 7 chapters and 58 articles. The titles of the 7 chapters are as follows:

Chapter 1 General Provisions

Chapter 2 Basic Administrative System

Chapter 3 Decrement

Chapter 4 Recycling and Resource Recovery

Chapter 5 Incentive Measures

Chapter 6 Legal Responsibilities

Chapter 7 Supplementary Provision

There are two Articles particularly relevant to agricultural sector:

Article 24 The people's governments above county level as well as their agricultural departments shall promote the intensive use of land, encourage and support agricultural producers to adopt advanced planting, breeding and irrigating technologies that reduce the use of water, fertilizer and pesticide, promote the energy saving of agricultural machinery, and give priority to developing ecological agriculture.

In areas where water is insufficient, efforts shall be made to adjust planting structure, give priority to develop water-saving agriculture, promote the collection and utilization of rain water and build and manage water-efficient irritating facilities to raise water use efficiency and reduce the vaporization and loss of water.

Article 34 The State encourages and supports agricultural producers and relevant enterprises to employ advanced or applicable technologies to make comprehensive utilization of the straw of crops, the excrement of poultry and livestock, by-products from the processing of agricultural products, and waste agricultural films, and develop and use marsh gas and other biomass energies.

5. Research and Extension 研究与推广

5.1. National 12th Five-Year Plan on Science and Technology Development 国家"十二五"科学和技术发展规划

The objectives

On 13 July 2011, the National 12th Five-Year Plan on Science and Technology Development was released by MOST. The Plan aims to push China forward towards becoming an innovative nation by significantly boosting the nation's innovation capacity and international competitiveness in high-tech sectors and achieving breakthroughs in priority and key technical fields.

Some other targets under the 12th Five-Year Plan on scientific and technological development are included in the table below:

Targets	2010	2015
R&D expenditure as percentage of gross domestic product	1.75%	2.20%
R&D personnel per 10,000 workers	33/man-year	43/man-year
Ranking of citations in international science papers	8th	5th
Invention patent ownership per 10,000 persons	1.7 pieces	3.3 pieces
R&D personnel's invention patent applications	10 pieces/100 man-years	12 pieces/100 man-years
Total contract deals in domestic technology market	RMB 390.6 billion yuan	RMB 800 billion yuan
High-tech value added as percentage of manufacturing sector value added	13%	18%
Percentage of civic scientific literacy in the population	3.27%	5%

The contents

1. Situations and demands
2. Overall ideas, targets and strategies
3. Accelerate the implementation of major projects of national science and technology
4. Make great efforts to nurture and develop emerging industries of strategic importance
5. Forge ahead with breakthroughs in key technologies in major areas
6. Forward deploy basic research and frontier technology research
7. Strengthen the construction of scientific and technological innovation bases and platforms
8. Vigorously cultivate innovative technology talents
9. Enhance the level of opportunity and cooperation in science and technology

10. Deepen the reform of the science and technology system, and comprehensively promote the establishment of a national innovation system
11. Strengthen the implementation and development of science and technology policies, and optimize the environment for whole social innovation
12. Effectively guarantee the implementation of the plan

Relevant elements on agriculture and food system

1. Raise the capability of transferring science and technology into practice
   - Strengthen the agricultural science and technology transfer system.
   - Continue to implement various dissemination programmes.
   - Make full play of the leading and demonstration role of leading enterprises, cooperatives, and large-scale livestock and crop farms.
   - Actively nurture small and medium-scale technically intensive agricultural enterprises and cooperatives.
   - Develop technical service platform and support farmers' entrepreneurship.
2. Carry out rural technical entrepreneurship initiatives and establish a new type of rural technology service system
   - Boost the initiative of specially appointed technical agents (*Keji Tepaiyuan*).
   - Support the development of national agricultural technical parks and zones.
   - Strengthen the integration and demonstration of rural information technology.
   - Establish a nationwide rural public service system which integrates extension services, entrepreneurship services and diversified technical services.
   - Establish a novel rural science and technology service system which is centred on leading agricultural enterprises, affiliated to farmers' professional organizations.
   - Continue to perfect various forms of rural technical services, which include extension services provided by universities and research institutes, Court of Agricultural Experts, rural technology cooperation organizations, Spark programme, etc.
   - Continue to push forward science popularization in rural areas.
3. Create new crop varieties using gene transfer technology
   - Achieve breakthroughs in key techniques on gene cloning and functional verification and large-scale gene transfer and bio-safety on major crops and livestock production.
   - Improve gene transfer biological cultivation and security assessment system, gain an array of functional genes with high application values and self-owned intellectual property rights.
   - Create a number of important gene transfer varieties with high disease and pest resistance, high stress tolerance, high quality, high yield and high efficiency.
   - Commercialize genetically modified cotton and maize and raise the overall level of biobreeding.
   - Strengthen the capacity for agricultural innovation and enhance agricultural efficiency and farmers' income.
4. Foster emerging industries of strategic importance
   - Bio-seed industry – priority will be on modern bio-breeding techniques and commercialization of varieties and accelerating wide uptake of new plant and livestock varieties.

- Agricultural biomedicine – focuses on leading-edge technologies of target discovery and drug molecular design, high throughput screening and nano-scale agricultural biomedicine.
- Bioenergy – emphasis on production of vehicle fuel from biogas, cellulosic liquid fuel, liquid fuel using agricultural waste through gasification and pyrolysis, biodiesel and non-grain bioethanol.

5. Strengthen agricultural technology innovation
   - Capture key technologies for agriculture and rural development.
   - Increase technology transformation.
   - Carry out rural technical entrepreneurship initiatives and establish new types of rural technology service system.

6. The priorities of agricultural technical innovation
   - Technologies for high grain yield .
   - Multi-functional agricultural equipment.
   - Green and safe food processes.
   - Marine agriculture.
   - Water-saving agriculture.
   - Rural information.
   - Rural community and residence.

7. Future basic and cutting-edge research in agriculture
   - Research on high-yielding, high-stress tolerance, high-quality and high-efficiency crops.
   - Research on high productivity, high quality and high disease resistance in agricultural animals.
   - Efficient utilization of farm land
   - Sustainable farming systems.
   - Bio-safety of agricultural produces.

8. Water pollution control and management.

9. Promote circular economy and recycle agricultural and urban wastes.

5.2. Natural Science Foundation of China (NSFC) 12th FYP 国家自然基金委十二五规划

The Natural Science Foundation of China (NSFC) is an organization directly affiliated to the State Council for the management of the National Natural Science Fund. It is equivalent to the UK Research Council. The funds of NSFC mainly come from the State financial allocations. NSFC supports basic research and some applied research, identifies and fosters talented researchers in the realm of science and technology, accelerates the progress of science and technology, and promotes the socioeconomic development in China. The budget for the NSFC was RMB 10.4 billion yuan in 2010.

The following are the agricultural- and food-related areas NSFC aims to support in the 12th Five-Year Plan period.

Biodiversity and conservation mechanism

Research themes: relationship between biological evolution and diversity; formation and distribution of biodiversity patterns and conservation mechanism at different scales;

relationship between biodiversity and ecosystem function; restoration of biodiversity to degraded ecosystems.

Assessment and explore biological germplasm resources
Research theme: theory and strategy for biological genetic resource protection; genetic diversity and differentiation of agricultural biological wild relatives and wild populations; variation and evolution of biological resources; identification and assessment of good gene resources; new methods of bio-resource preservation.

Water and nutrient demand and pathways for efficient use of major crops
Research theme: water and nutrient demand by high-yielding and high-quality crops; mechanism and regulation of water and nutrient efficient use; moisture movement in the field and crop response; ecological interactions in the rhizome; mechanism of nutrient and moisture synergies.

Disease and pest epidemiological characteristics and control mechanisms for major crops
Research theme: mechanism of major crop disease and pest occurrence; interaction among pathogens, insects and crops and co-evolution; regional occurrence of agricultural diseases and pests and control.

Epidemiology and control of major agricultural animal diseases
Research theme: pathology and pathogen ecology of major animal diseases; interaction between pathogen and host; molecular mechanism of interspecies pathogen transmission.

Biochemical mechanism of food storage and process
Research theme: mechanism of food quality change and maintenance; change in bioactive substances and nutritional elements in food processing and storage; formation and transmission of toxic substances; methods for toxic substance and harmful microbe inspection and risk assessment.