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National Plan for Development of the Crop Seed Industry (2012-2020)

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Planting Seeds

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Report Highlights:

On December 31, 2012, the State Council released the National Plan for Development of the Modern Crop Seed Industry (2012-2020). The Plan provides government recommendations/guidelines for China's seed industry development for the next 8 years. This document is an UNOFFICIAL translation.

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On December 31, 2012, the State Council released the National Plan for Development of the Modern Crop Seed Industry (2012-2020). The Plan provides government recommendations/guidelines for China's seed industry development for the next 8 years. This document is an UNOFFICIAL translation. Key points of the document are as follows:

1. The Plan notes that research institutes are key participants of fundamental research, but stresses that private enterprises are the main players in further developing the Chinese seed industry. It prescribes creating a new mechanism to promote enterprise-based commercial breeding, and provides two deadlines (2015 and 2020) for the eventual establishment of national champions, or top private enterprises that are developing and commercializing seed.
2. The Plan emphasizes the development of large, vertically integrated seed enterprises. Mergers and acquisitions are encouraged to improve competitiveness. New policies will support qualified large seed private companies. For example, vertically integrated enterprises that conduct breeding, production, and marketing will be exempt from corporate income taxes. Qualified high-tech seed enterprises will also enjoy preferential tax policies.
3. The Plan lists 5 grain crops and 15 cash crops as priorities for scientific research. The 5 grain crops are: rice, corn, wheat, soybeans, and potatoes. The 15 cash crops are vegetables, cotton, rape seed, peanuts, sugar cane, apples, citrus, pears, tea trees, hemp, silkworm and mulberry trees, flowers, bananas, tobacco, and natural rubber.
4. The Plan notes that future work should focus on amending and/or modifying seeds laws and regulations, including plant variety protection, seed labeling, and the examination/approval of seed varieties. This includes establishing a seed variety registration system for non-major crops, such as fruits and vegetables. However, the document does not specify when these amendments or changes will be finalized.
5. The Coordination Group for the Development of the Modern Crop Seed Industry, which is comprised of many several Chinese Ministries such as (but not limited to) the Ministry of Agriculture, National Development and Reform Commission, and the General Administration of Quality Supervision, Inspection, and Quarantine, is tasked to have a larger role in addressing development issues with the domestic seed industry. It is unclear how often this group will meet, and what level of authority it may have in providing guidance.

BEGIN TRANSLATION

National Plan for Development of Modern Crop Seed Industry
(2012-2020)

Agriculture is the foundation of a country while seeds are the roots of the agriculture. China is the largest agricultural producer and seed user. The crop seed industry is a strategic and basic core industry, and the foundation of ensuring long-term stable agricultural development and food security of the State. In order to promote the implementation of Opinions of the State Council on Accelerating the Development of Modern Crop Seed Industry (G.F. [2011] No.8), Plan of Increasing the National Grain Production Capacity by 100 Billion Kilograms (2009-2020) and National Plan of Development of Modern Agriculture (2011-2015), the Plan is hereby formulated.

I. Background

1. Major achievements: The crop seed industry in China has obtained significant achievements. Ever since the reform and opening up, especially after enter the new century, it has realized the substantial shift from planned seed supply to market-oriented management, which has been playing a significant role in improving the agricultural comprehensive production capacity, ensuring effective supply of agricultural products and increasing farmers' income, especially for China's grain yield to increase for nine consecutive years. First, the capacity of selective breeding of varieties has been greatly enhanced, a large batch of groundbreaking quality varieties such as super-hybrid rice, compact-type corn, quality special wheat, transgenic pest-resistant cotton, and double-low (low erucic acid and low thioglycoside) cole have been successfully cultivated and promoted; the coverage of major improved crop seeds has risen to 96% and the contribution rate of improved seed varieties to agricultural production reached more than 43%; Second, the supply capacity of improved varieties is on a steady rise. A batch of breeding bases for improved varieties have been established and the rate of commercial supply of major crops' seeds has increased to 60%, among which the hybrid corn and hybrid rice have realized commercial seed supply in full. Third, the business strength of the seed enterprises has been obviously enhanced. With further integration of seed breeding, production and marketing, the market share of the Top 50 enterprises of the crop seed industry has been increased to more than 30%. Fourth, laws, regulations and management systems have been gradually perfected. Seed Law and Regulations on Protection of New Varieties of Plants have been issued and implemented and seed management organizations have been set up in most agriculture-based counties (municipalities and districts).

2. Development Trends: At a new stage featuring synchronous development of industrialization, informationization, urbanization and agricultural modernization, China calls obviously higher requirements for the development of the crop seed industry so as to ensure the food security and realize the agricultural modernization. With the acceleration of the global economic integration and the rapid development of bio-technology, the international competition of modern crop seed industry becomes very fierce. Acceleration of the development of the modern crop seed industry, enhancement of its technological innovation and cultivation and promotion of the improved seed varieties have become urgent needs for us to break through the restrictions of arable land and water resource, etc., speed up the development of modern agriculture and boost the international competitiveness of agriculture.

3. Existing Problems. The crop seed industry of our country is still in its initial development stage, and in harmony with the requirements for development of the modern agriculture. First, the innovation capacity of seed breeding lags behind, with analyses on seed breeding materials lacking insights, scattered breeding forces, outdated breeding methods, technologies and modes, unsound mechanism for evaluation and transfer of research achievements and insufficient breeding resources and talents. Second, seed enterprises lack competitiveness, featuring a large number but small scale, weak R&D capability and yet-to-built commercial breeding system. Third, seed production capacity falls behind, with poor infrastructure for advanced seed breeding, a lack of disaster resistance capability; and backward mechanization and processing technologies. Fourth, market supervision is far from satisfying, with weak seed management, laggard supervision technologies and measures and insufficient funds. Fifth, there is still a long way to go before a sound supporting system for seed development can be achieved, as seed laws and regulations cannot fully meet new trends and demands of development of the crop seed industry and more policy supports in such areas as finance, taxation and credit are needed.

II. Overall Requirements

4. Guiding Ideology. Guided by Deng Xiaoping Theory, the important thought of Three Representatives and Scientific

Outlook on Development, we should advance the institutional reform and mechanism innovation, enhance policy supports, increase investments in the crop seed industry, integrate crop seed industry resources, intensify fundamental researches for public welfare, promote commercial breeding, improve and perfect laws and regulations, strengthen market supervision, and speedily improve technical innovation, corporate competitiveness, seed supply capability, and market supervision of our crop seed industry, so as to develop modern agriculture, ensure the food security of the State, increase farmers' income, construct a world-class modern crop seed industry system accommodating to China's role as the largest agricultural producer, and raise the development level of China's crop seed industry comprehensively as well.

5. Basic Principles.

-- Adherence to the mechanism innovation. We should make clear that research institutions, colleges and universities are key participants of fundamental researches on the crop seed industry for public welfare, establish a new enterprise-based commercial breeding mechanism, encourage scientific and technological resources to flow into enterprises, so as to promote close integration of production and academic researches and enhance independent innovation and international cooperation of the seed industry.

-- Taking enterprises as principals. We should fully bring out the enterprises' leading role in commercial breeding, technology transfer and application, motivate seed enterprises of "integrated breeding, production, and marketing" to integrate resources of the crop seed industry and direct corporate and social funding by means of policy guidance to contribute to bigger and stronger enterprises.

-- Adherence to the overall planning and all-round consideration. We should give top priority to the seed industry development of major grain crops while taking into consideration that of important cash crops. We will focus on the construction of seed production bases at national level without sacrificing the development of seed production bases at regional and county (field) levels, so as to ensure the balance between total seed production and industrial structure.

-- Supporting superior and strong enterprises. While making efforts to perfect laws and regulations to create a uniformed, open and fair environment for development of the crop seed industry, we should concentrate our attention on supporting those large-scale seed enterprises with breeding capability, taking up a large market share and integrating breeding, production and marketing, and encourage merge and restructure of enterprises and enabling them to attract more social capital and talents as well.

6. Development Goals.

By 2015, a new breeding mechanism will be established, featuring a rational division of labor in scientific researches and integration of production, study and research; seed enterprises created by research institutions, colleges and universities will become independent corporation entities; production bases of seeds of major grain crops at national level will be initially established in northwest and southwest and Hainan Province, more than 96% of which will be covered by improved varieties of major crops; a group of seed enterprises integrating breeding, production and marketing will be developed, with a market share of more than 40% held by the Top 50 enterprises; Seed laws and regulations will be further improved, and supervision measures and conditions substantially ameliorated; the annual sample testing ability of qualified seed inspection services will reach 400,000 and 30% of seed enterprises will go through regular seed testing.

By 2020, a new breeding mechanism will be formed, featuring a rational division of labor in scientific researches, integration of production, study and research, concentration of resources and effective operations; a batch of genetic resources with outstanding target traits and sound comprehensive trait and new varieties of high yield, good quality, multi-resistance, euryvalent and adaptable to mechanized operation and facility-based cultivation will be developed; a batch of standard, intensive, merchandized and large-scale superior seed production bases will be established, with improved varieties of major crops covering more than 97% of the bases; percentage of contribution of improved varieties will reach more than 50% and the rate of commercial supply seeds more than 80%; a batch of modern crop seed industry groups with outstanding ability in breeding, advanced production and processing technologies, sound marketing network and comprehensive technical services and pursuing integration of breeding, production and marketing will be fostered, and the percentage of market share held by the Top 50 enterprises will reach more than 60%; Seed management system at the national, provincial, municipal and county level will be well-defined in responsibilities and supported with advanced measures and effective oversights; the annual sample testing ability of qualified seed inspection agencies will reach more than 600,000 and more than 50% of seed enterprises will implement regular seed testing.

III. Key Tasks

7. To establish new technical innovation system of the crop seed industry. We should aid research institutions, colleges and universities in doing fundamental researches on crop seed industry for public welfare and guide and actively promote withdraw of these public institutions from commercial breeding, so as to gradually turn seed enterprises into main force of commercial seed breeding; encourage seed enterprises and research institutions, colleges and universities to jointly create R&D platforms and form strategic alliance for innovation of industrial technologies.
8. To strengthen fundamental researches on the seed industry for public welfare. We should do general survey, collection, protection, identification as well as in-depth evaluation of germplasm resources of crops, and discovery of important functional genes, and create a germplasm resources sharing platform, which will be legally accessible to the society. More efforts will be directed to the researches on breeding theories and key technologies in such areas as molecule breeding, inspection and quarantine, resistance identification, production and processing and information management and to specify and improve technical standards for detection and testing of variety authenticity and seed quality. More attention will be paid to researches on the breeding of conventional crops and selective breeding and application of asexual reproduction materials.
9. To establish a commercial breeding system with enterprises as main force. We should encourage competitive seed companies to set up its own research institutions and teams, develop a commercial breeding system, cultivate groundbreaking good varieties with independent intellectual property rights and strive for major breakthrough in hybrid corn and hybrid rice; support enterprises featuring “integrated breeding, production and marketing” to integrate existing breeding resources and forces, increase investments on R&D, bring in high-level personnel home and abroad, advanced technologies, breeding materials and key equipment, innovate breeding theory and R&D models, so as to enhance core competitiveness of enterprises at a greater speed.
10. To make seed enterprises bigger and stronger. We should promote the merger and restructuring among seed enterprises for alliance of giants, realize complementation of each other’s advantages and concentration of resources, and encourage capable seed enterprises to go public for raising funds. Large-scale enterprises should be supported to engage in the crop seed industry by means of merger or equity participation and to lead or take part in the organization and implementation of application researches, industrialization and other projects in the seed industry. Seed enterprises featuring “integrated breeding, production and marketing” should be encouraged to do tests for self-fertile varieties and adopt advanced seed processing technologies and equipment to improve the quality of seeds. Enterprises should be instructed in establishing demonstration networks for new varieties, improving seed marketing, promotion of technologies and information service system, setting up village-based supermarket chains, distribution centers, retail stores and other sales network for seeds, enhancing after-sales technical services and extending the industry chain; Impetus should be given to seed enterprises to establish a modern enterprise system, strengthen corporate culture and brand construction, attach more importance to self-discipline and initiatively assume social responsibilities.
11. To speed up the development of seed production bases. We should build production bases for superior seeds by regions and crops, identify arable land within production bases as basic farmland for permanent protection and long-term stability of seed production in accordance with the Overall Land Use Planning; support seed enterprises to establish stable seed production bases, and set up long term agreement-based cooperation between seed enterprises and large seed producers, professional cooperative organizations and farmers by means of tenancy and other land transfer modes on a voluntary, compensatory and lawful basis without changes to use of land; form a commercial risk spreading mechanism for seed production with supports from governments and participation of enterprises; put more efforts to construct infrastructure of the seed production bases, improve production conditions and establish modern seed processing centers and distribution systems for better seed production, processing and services.
12. To impose strict requirements on variety registration and protection. We should make plan for the testing of new plant variety and regional variety testing and intensify the identification of specificity, disease-resistance and stress resistance of varieties. A variety registration coordination mechanism at national and provincial levels should be established and scientific variety registration standards should be formulated to standardize variety registration behaviors, improve variety withdraw mechanism, and speed up withdraw of unsuitable plant variety. We should improve the protection system for new plant varieties, enlarge the protection range, and earnestly protect groundbreaking parents and varieties of originality; create a public platform for variety right transfer transaction and draw up transaction management measures to standardize the transaction behaviors; establish demonstration fields for bringing in new varieties in major production counties of cotton,

grains and edible oil, organize demonstrations for new varieties and step up promotion of groundbreaking good varieties. For new varieties with a significant role in production, the State should reward the breeders in accordance with relative regulations.

13. To consolidate market supervision. We should enhance the whole process management of administrative licensing, adopt strict accessing conditions and standards, approve and issue business licenses for seed production and operation in accordance with laws, intensify supervision and management after issuing the business license and establish an open platform for inquiry of license information and reporting of production and operation information; reinforce supervision over seed markets, improve regular seed monitoring mechanism, and crack down on such illegal activities as dissemination without approval, production without business license, shopping rush, fraudulent purchase, fake brands and production and sales of fake or inferior seeds; intensify inspection and quarantine for imported and exported seeds and conduct epidemic monitoring and supervisions by spot check; put more efforts to protect intellectual property rights and improve the service system for intellectual property rights with new variety rights at the center.

14. To perfect the regulation and control system for the seed market. We should establish information service platform for crop seed industry, promote the application of the internet of things, instruct enterprises in adopting a quality tracing system covering production, processing, distribution and other links; establish and improve seed reserve systems at both national and provincial levels, under which the national system will mainly reserve seeds and parents of hybrid corn and hybrid rice while the provincial system will mainly reserve seeds with short growth period and seeds of staple crops. By applying open bidding and tendering to seed storage, the State will give priority to those seed enterprises of “integrated breeding, production and marketing” and initiatively bear seed storage task, and the central and local finances will also give supports to seed reserves.

15. To improve the quality of talents of the crop seed industry. We should support enterprises in establishing academician workstations, post-doctoral scientific research workstations and bases for study and practice. Priority should be given to enterprises to introduce high-level talents and leaders from home and abroad and select and assign personnel for further education and training in institutions of higher learning on the basis of major scientific and technological projects, important innovation platforms and key entrepreneurial bases or by such means as the Program for Introduction of Two Thousand Foreign Talents. Regular training should be given to the personnel involved with scientific research, production, inspection, marketing and management of the seed enterprises and more efforts should be taken for the technical training of peasants engaged in seed production and cultivation of skilled personnel and major seed producers. Qualifications for personnel engaged in administrative enforcement of seed laws should be strictly evaluated to improve their professional skills and administrative capability by law.

16. To enhance international cooperation and communication of the seed industry. We should take active part in activities initiated by International Union for the Protection of New Varieties of Plants (UPOV), International Seed Federation (ISF) and other international organizations and participate in international communication and cooperation under the framework of International Plant Protection Convention, to promote bilateral and multilateral cooperation of crop seed industries among different countries and regions. Measures should be worked out and ameliorated to manage foreign investments involving in resources researches in the crop seed industry as well as R&D, production and operation of seeds, so as to standardize the technical cooperation between domestic seed enterprises and research institutions and foreign seed enterprises, and to ensure that security reviews are properly done when foreign-funded enterprises are merging China’s seed companies; Superior seed enterprises at home should be encouraged to exploit overseas market, combine breeding researches, seed production and operation and bring in high quality germplasm resources, advanced breeding and seed processing technologies.

IV. Development Layout

17. Objectives and priorities of scientific researches. Collection, storage, evaluation and application will be made about the germplasm resources of five major food crops: rice, corn, wheat, soybeans and potatoes as well as fifteen important cash crops: vegetables, cotton, cole, peanuts, sugar canes, apples, oranges, pears, tea trees, hems, silkworm mulberry, flowers, bananas, tobacco and natural rubber, so as to develop the functional genes of such great application values as high yield, high quality, resistance to diseases and pests, nourishment and high efficiency. The conventional breeding methods will be combined with the biotechnologies to cultivate the new crop varieties suitable to different eco-regions and market demands.

Production of the seeds (seedlings) will be simplified, mechanized and factorized. Technical research should be made

about processing, storage, quality inspection, high-yield high-efficiency cultivation, prevention and control of crop diseases and pests and quality testing, to achieve the good methods supporting improved seeds.

Column 1 Targets and Focuses of Scientific Research on Seed Industry of Major Food Crops

Crops	Targets for Scientific Researches 2010	Focuses of Scientific Research
Rice	3-5 new crop varieties with an annual promotion area exceeding 10 million mu (1mu= 666 ² / ₃ m ²) will be cultivated; the mechanized production of hybrid rice seeds is expected to account for 50% of the total production area, and; the rate of commercial supply of conventional rice will reach 70%.	Develop a batch of eurytopic, high-resistant, high-quality and high combining capacity backbone rice parents and the three-line new sterile line, and the two-line sterile line insensitive to low temperature; enhance researches on and application of technologies used in safe multiplication and production of hybrid rice seeds, merchandized seed production, seed inspection, processing and storage.
Corn	Cultivate 5-10 new crop varieties with an annual promotion area exceeding 10 million mu.	Establish a large-scale high-efficiency haploid breeding technical system and technical platform for auxiliary breeding of molecule markers, and create backbone breeding colonies; conduct researches on and application of technologies used in mechanized corn seed production, sterilized seed production, productive isolation, seed processing, and quality inspection, and formulate standards for such quality technologies as seed vigor and monoseeding
Wheat	Cultivate 4-8 new crop varieties with an annual promotion area exceeding 10 million mu, with commercial supply of seeds exceeding 70%	Develop the high-yield high-quality high-gluten wheat varieties, and eurytopic, water-saving and high-yield middle-gluten wheat varieties in the wheat regions of Yellow River, Huaihe River and Haihe River basins, and develop high-yield, high-quality and high stress resistance low-gluten and middle-gluten wheat varieties in the wheat regions of middle and the lower reaches of the Yangtze River. In the southwest wheat regions, however, it is proper to develop the middle-gluten wheat varieties with high yield, high quality and strong resistance to crop diseases and pests, while in the northwest wheat region, the middle-gluten wheat varieties with high yield, high quality and high resistance to draught, diseases and stresses. In the northeast wheat region, it is good to develop the high- and middle-gluten wheat varieties with high yield, high quality, early maturing and high resistance to stress
Soybeans	Cultivate 3-5 new crop varieties with an annual promotion area exceeding 5 million mu, with commercial supply of seeds exceeding 60%	Carry out technical researches on and application of technologies used in stress-resistance identification and adaptability evaluation; select and cultivate a batch of high oil-bearing and high protein varieties in the northeast regions, and a batch of high-protein and multi-resistance varieties in the Yellow River, Huaihe River and Haihe River basins.
Potatoes	The coverage rate of detoxicated seed potatoes is expected to reach 40%	Strengthen the storage, identification and genetic improvement of the seed variety resources, select and breed the high-yield and high-quality special new varieties, and enhance technical researches on and application of technologies used in breeding of detoxicated seed potatoes and quality control

Column 2 Targets and Focuses of Scientific Researches on Seed Industry of Major Cash Crops

Crops	Targets for Scientific Researches of 2020	Focuses of Scientific Researches
Vegetables	Independently developed varieties account for over 80%; staple vegetable crop varieties realize one or two circles of updating; the coverage rate of improved vegetable variety exceeds 90%	Strengthen researches on the genetic laws of agronomic traits of staple vegetable crops, utilization of hybrid advantages, seed production and fine processing techniques, healthy and environmental factors of edible mushroom species, and cultivate special new varieties adaptable to facility-based cultivation, open-land cultivation, processing and production
Cotton	Cultivate 20-30 new varieties adaptable to mechanized operation, simplified cultivation and with resistance to crop diseases and pests	Discover such excellent resources as high ginning outturn and stress resistance, start researches on and application of technologies used in multiplication, production, processing, storage and inspection of seeds; cultivate simplified high-efficiency new varieties of cotton adaptable to inter-planting in the Yellow River and the Yangtze River basins; and cultivate high-quality and high-yield new varieties of cotton adaptable to mechanized operations in the northwest inland cotton-planting regions
Cole	Cultivate over 10 new varieties adaptable to mechanized operation with an annual promotion area exceeding 1 million mu	Develop a batch of backbone parents and superior trait materials with high oil content and resistance to pod dehiscence and suitable to close planting; cultivate a batch of double-low new canola varieties with high yield, high oil content and resistance to crop diseases and suitable to mechanized harvesting; start researches on and application of technologies used for seed pelletization coating and chemical regulation of seed germination, etc.
Peanut	Cultivate 5 to 10 new varieties with an annual promotion area exceeding 3 million mu; the oil content of oil-bearing peanuts reaches over 56% and the oleic acid content of high oleic-acid varieties over 70%	Conduct researches on and application of technologies applied in seed non-destructive testing, husking, coating and processing
Sugar cane	Cultivate more than 5 new varieties with an annual promotion area exceeding 2 million mu	Conduct eco-adaptive evaluation researches of the multiple-cropping sugar cane varieties; select and breed new varieties featuring genetic diversification, different cropping periods, high yield and high sugar content
Apples	Prepare over 2000 germplasm resources for long-term storage; the percentage of cultivation area of improved varieties with independent intellectual property rights to the newly-developed apple orchard area reaches about 30%	Conduct researches on apple biotechnology, engineering breeding technology and rootstock breeding techniques, and speed up the cultivation of new varieties suitable for different regions
Oranges	Prepare over 1800 germplasm resources for long-term storage; cultivate over 10 new varieties; the proportion of non-toxic improved varieties of oranges exceeds 60%	Conduct researches on and application of technologies used in selection of optimal stock-scion combination, cultivate the rootstock-based varieties of shorter trunks, higher resistance to plant diseases and stronger adaptability; cultivate a batch of new varieties of different maturing periods, high resistance and high quality
Pears	Prepare over 2500 germplasm resources for long-term storage; cultivate over 10 new varieties adaptable to different eco-conditions;	Conduct researches on the identification technology of stock-scion combination affinity and select excellent rootstock seedlings through grafting-induced dwarfing experiments, adopt distant hybridization, backcrossing and other conventional breeding methods and molecule breeding technologies to selectively breed new varieties of early,

		middle and late-maturing periods
Tea trees	Cultivate over 20 new tea-tree varieties of different tea types adaptable to different eco-regions; the coverage rate of improved clonal tea-tree varieties reaches over 75%	Conduct researches on the genetic mechanism and transformation of the cold-resistance, disease-resistance, pest-resistance and draught-resistance of tea trees and plant regeneration technologies; screen out the parental combinations with high seed-setting rate based on intraspecific hybridization and distant hybridization, selectively breed a batch of new varieties featuring high quality, strong disease resistance, low fluorin and adaptable to mechanized harvesting
Hemps	Store over 10000 germplasm resources; cultivate over 8 new varieties; the coverage rate of improved varieties exceeds 60%	Improve the fiber counts, gel contents and spinnability parameters as well as the parameters of protein content and biological yields used as feed and energy and selectively breed the new varieties of high stress resistance, high yield, stable yield and high quality
Silkworm and Mulberry Trees	Cultivate 20 new silkworm species, 10 new mulberry tree varieties and 5 new oak varieties	Selectively breed new mulberry (oak) tree varieties of high resistance to diseases and pests, high quality and high yield and new silkworm (oak silkworm) varieties as well
Flowers	The rate of self-sufficiency of flower seeds across the country reaches 30%	Develop a batch of eurytopic, high-resistant, high-quality and high combining-capacity important parental flowers as well as the breeding materials insensitive to low temperature and sunlight; selectively breed a batch of new varieties of unique features and adaptable to different regions and target markets
Bananas	Store over 700 germplasm resources; cultivate over 10 new varieties; the annual breeding proportion of improved banana seedlings exceeds 60% of needed banana germchits	Cultivate new varieties of good comprehensive traits and adaptable to different eco-regions
Flue-cured tobacco	Cultivate over 50 new varieties	Create backbone parents giving away different smells and scents with strong resistance to major diseases; study the regulatory mechanism of genetic expression of tobacco by germplasms, developing stages, tissues and organs and adverse conditions; selectively breed a batch of new varieties of strong scent, low tar, strong resistance to diseases and stress and high yield
Natural Rubber	Cultivate 2-3 new varieties; the coverage rate of improved varieties for the new rubber plantation reaches 100% and 70% for the whole rubber plantation	Strengthen researches on rootstock clonal cultivation theories and conduct researches on stock-scion combination clonal selective breeding technologies; selectively breed new varieties with high resistance to cold climate and wind and high yield and adaptable to different rubber-planting regions

18. Production Layout. In accordance with the principles of “Advantageous Regions, Enterprise as Principals, Scale Construction and Promotion of Capacity”, production bases for main food crops and cash crops will be constructed in a scientific way, so as to form advantageous seed-production areas, enhance construction of these bases in an all-round manner and form stable seed production capacity. A joint coordination mechanism should be established to enhance the base management and optimize the environment of the base.

Column 3 Production Layout of Crop Seeds

Types		Regions	Contents of Construction
Seed Production	National Level	Northwest China Production Base of Hybrid Corn Seeds; Southwest	Enhance the construction of field infrastructure and seed inspection capacity, direct capable

Bases for Major Grain Crops		China Production Base of Hybrid Rice Seeds and South Hainan Breeding Base	enterprises to participate in the transformation of scale production and reconstruction, equip with the special facilities and equipment for seed production, establish seed processing centers and improve the mechanization level of seed production
	Regional Level	Build up 100 region-level seed production bases in the core grain production areas according to different regional ecological characteristics	Enhance the construction of field infrastructure, equip with the seed processing and inspection equipment and improve the ability in stable seed supply
	County (Field) Level	Build seed production bases in major counties (fields) with the planting area of grain crop seeds exceeding 10000 mu.	
Seed Production Bases for Important Cash Crops	County (Field) Level	Build seed production bases in advantageous seed-production counties (fields) of larger scale and better capabilities according to China's plan for advantageous regions with special agricultural products	Improve the field conditions for seed production, build greenhouses for seedling cultivation and workshops for seedling detoxication so as to realize facility-based, scale and standard seed production

V. Major Projects

19. Fundamental researches on the seed industry for public welfare. The Crop Germplasm Resource Library, the National Key Laboratories in the Field of Biological Breeding, the National Research Center of Engineering Technology and the Scientific Breeding Base in Haihan will be built up, and the infrastructure conditions for scientific researches will be improved. Supports will be given to researches on such common key subjects as breeding theories, methods and genetic mechanism as well as such key generic technologies of modern breeding, mechanized seed production, seed processing and quality inspection. In-depth evaluation of the crop germplasm resource and the scale development and application of the breeding materials will be carried forward. Supports will be directed to selection and breeding of such conventional varieties as rice, wheat and soybeans and such clonal crop varieties as potatoes, sugar cane, fruit trees and tea trees. The scientific and technological innovation capacity of the crop seed industry will be comprehensively improved.

20. Commercial Breeding Projects. Supports and guidance will be directed to the capable seed enterprises of integrated breeding, production and marketing to improve their breeding infrastructure and technical equipment and build up breeding R&D centers, seed processing and treatment centers, seed variety testing systems and demonstration bases. Seed enterprises will be supported to screen out the breeding materials of hybrid crops, conduct selection and testing of the combinations, do experiments and demonstration for new varieties, and cultivate a batch of groundbreaking improved varieties. Enterprises and advantageous research institutions will be aided in establishing a cooperation platform with the aim to improve innovative breeding capabilities of enterprises at a faster speed by making the most of manpower, technologies, resources and scientific research achievements of the research institutions.

21. Project of construction of seed production bases. We will strengthen the construction of seed production bases at national and regional levels, support the construction of major seed production counties of major grain crop seeds and counties superior in production of cash crop seeds. Meanwhile, a batch of large modern seed processing centers will be set up, so as to form standardized, intensive and merchandized large-scale seed production bases that are scattered in higher density and stable. Financial subsidies to seed storage will be increased to motivate enterprises to engage in seed storage. Of the existing agricultural insurance, seed production insurance for hybrid corn and hybrid rice will be increased as well because their seed production is at higher risks.

22. Project for improvement of regulatory capacity of seed industry. We will build and improve an array of crop variety test stations, resistance identification stations, pilot fields for bringing in of new varieties, test (sub-) centers for new varieties of plants, storehouse (nursery) of reproduction materials for plant varieties, identification center of variety authenticity, so as to

form a crop variety testing network covering several different ecotopes. Seed quality inspection and control centers at provincial, municipal and county levels will be established and improved and equipped with necessary testing facilities to improve the testing ability. Management of bases, markets and varieties will be intensified and higher importance will be attached to seed quality, authenticity, GMO testing and quarantine inspection.

Column 4 Major Projects and Key Items of Crop Seed Industry

Major Projects	Key Items	Supports
Fundamental research projects for public welfare of seed industry	Development Plan for Key National Fundamental Researches (973 Plan)	Supporting researches on major scientific problem as basic theory of breeding, genetic mechanism, integrating breeding technologies and omics including crop germplasm resources science and functional genomics and guiding innovations in breeding technologies.
	Development Plan for National High Technology Researches (863 Plan)	Supporting discovery of cutting edge high and new breeding techniques, generic resources and generic locus of major agronomic traits, and innovative production of new breeding materials and varieties, establishing a system made up of original breeding and producing high-tech, and intensifying the production of new varieties with great application potential.
	National Key Technology R&D Program (Fundamental Researches)	Supporting innovation of breeding resources, researches on conventional breeding techniques and cultivation of new varieties and studying key generic technologies and their integrated application for such links as high efficiency seed breeding, seed reproduction, seed production, seed processing and storage complying with China's practical conditions.
	Construction Project of Infrastructure of Science and Technology, National Key Laboratories and National Research Center of Engineering Technology	Supporting construction of national key laboratories, national research center of engineering technology in biological seed breeding field and a platform to sharing germplasm resources of crops and scientific data of the crop seed industry.
	Project of Basic Innovation Capacity Building of Regional Industries	Supporting construction of the innovation support system such as engineering research centers, engineering laboratories, enterprise technology centers, and public technology service platform in biological breeding field.
	Major National Project of Science and Technology about Cultivation of New Varieties of GMOs (Fundamental Researches)	Conducting researches on cloning validation of functional genes, scale transgenic operations and GMO safety technologies.
	Industrial Technology System of Modern Agriculture (Fundamental Researches)	Screening valuable germplasm resources and supporting researches on and application of the theory and methods for genetic breeding and key techniques concerned.
	Special Fund for Scientific Research on Public Welfare Sectors (Agriculture)	Conducting researches on and application of key common technologies, standard specifications and supporting equipment for such links as modern seed breeding, variety testing, mechanized seed production, seed processing, quality inspection, epidemic surveillance, pest removal, monitoring and control, and seed industry management.
	Project of Seed Engineering (Fundamental Researches)	Supporting introduction, storage and utilization of germplasm resources and construction of infrastructures for centers and sub-centers for crop improvement, bases for innovation in breeding and key technologies as well as Nanfan scientific breeding base.

	Program of Bringing in International Advanced Agricultural Science and Technologies (948 Program)	Supporting introduction, storage and utilization of superior germplasm resources abroad and quarantine inspection and preventative control of foreign harmful organisms.
	Special Fund for Protection of Germplasm Resources of Crops	Supporting storage, innovation and utilization of germplasm resources, vigorously conducting in-depth evaluation, innovation, distribution and application of germplasm resources as well as innovation in breeding materials, and inspecting and protecting exported germplasm resources.
	Project of Key Laboratories of the Ministry of Agriculture	Supporting fundamental researches on the theory and methods of generic breeding as well as key technologies concerned.
Commercial Breeding Projects	National Key Technology R&D Program (Industrialized Application)	Supporting enterprises and scientific institutions in enhancing cooperation in production, study and researches, constructing strategic alliance for technological innovations in the crop seed industry, and speeding up industrialized application of scientific achievements.
	Major Project for Innovative Development of Biological Breeding Industry	Supporting and nurturing large seed enterprises featuring “integrated breeding, production and marketing” and core competitiveness, to form important platforms and pilot demonstration bases for research and development and industrialization of biological breeding of crops in China.
	Development Fund for Modern Seed Industry	Supporting mergers and restructuring by means of investment shareholding to nurture a group of large seed enterprises featuring “integrated breeding, production and marketing”.
	Major National Project of Science and Technology about Cultivation of New Varieties of GMOs (Cultivation of Varieties)	Supporting competitive seed enterprises to create a batch of new groundbreaking GMO varieties with outstanding target traits and sound comprehensive traits.
	Industrial Technology System of Modern Agriculture (Cultivation of Varieties)	Supporting enterprises featuring “integrated breeding, production and marketing” to undertake seed breeding task.
	Project of Seed Engineering (Innovative Capability Building)	Supporting capable seed enterprises featuring “integrated breeding, production and marketing” to build up breeding innovation bases.
Project of Construction of Seed Production Bases	Project of Increasing the National Grain Production Capacity by 100 Billion Kilograms	Giving top priority to supporting the construction of seed production bases at the national level and developing regional and large-scale seed production bases as planned.
	Special Fund for Integrated Agricultural Development of Ministry of Agriculture	Supporting the construction of breeding and processing bases for breeder’s seeds, original seeds and improved varieties of crops.
	Project of Seed Engineering (Production Capability Building)	Concentrating efforts on the construction of crop seeds production base in areas superior in seed production.
	Subsidies to Seed Production Insurance	Granting subsidies to insurance premium in seed production insurance pilot areas.
	Financial Subsidies to Seed Storage	Granting discount loans to seeds storage for disaster relief and granting subsidies for seed keeping, inspection, natural loss and normal commercialization.
Project for Improvement of	Project of Seed Engineering (Regulatory Capability)	Supporting capacity building of seed quality inspection and testing services and constructing demonstration fields for

Regulatory Capacity of Seed Industry	Building)	bringing in of new varieties in major production counties of cotton, grains and edible oil.
	Project of Pilot Demonstration of Agricultural Technologies (Variety Testing)	Supporting examination and approval tests for major crop varieties of China.
	Project of Supervision over Quality and Safety of Agricultural Products (Seed Management)	Supporting bases management, market supervision, protection of new varieties, supervision and inspection of GMOs and quarantine inspection.

VI. Safeguards

23. Improvement of laws and regulations. We should speed up researches on and amendments to seed laws and provisions for protection of new varieties of plants, revision to relative regulations on examination and approval of varieties of crop seeds, seed label management, stipulations on treatment of violations against new variety rights of agricultural plants, etc; work out measures to manage the transfer of variety rights, construction of seed (seedling) production bases, recognition and protection of bases and formulate guidelines for testing of new varieties of plants, list of protected new varieties, variety testing procedures, approval standards and other regulatory documents; seek to establish a registration system for varieties of non-major crops; improve the seed standards system which covers the whole process comprising production, processing and distribution.

24. Establishment of diversified investment channels. More financial inputs will be directed to the crop seed industry to support the development of germplasm resources, cultivation of conventional varieties and research and development of key technologies and standards. Modern seed industry development fund will be set up to support development of commercial breeding in the seed enterprises featuring “integrated breeding, production and marketing”. Seed enterprises will be aided in participating major national projects of science and technology related with cultivation of new varieties of genetically modified organisms (GMOs) and accumulating capitals by means of mergers, restructuring, joint operation and shareholding. The seed enterprises with strong development potential will be guided to go public and raise funds. Capacity building in such area as innovative breeding, production and processing of seeds will be backed up and conditions for testing and experiment of seed varieties as well as seed inspection will be improved.

25. More policy supports. For the qualified seed enterprises featuring “integrated breeding, production and marketing”, the amount of income generated by seed production and operation will be exempted from corporate income tax; confirmed high-tech seed enterprises will enjoy relative preferential tax policies; certain preferential tax policies will also be given in accordance with relevant national regulations to revaluation increments, gains on restructuring of debts, transfer of ownership of land and house, etc., arising from mergers and acquisitions of seed enterprises. Seed production machinery for seed selection and processing, drying, packaging, sowing and harvesting will be included into purchase subsidies for agricultural implements. More supports will be directed to major seed production counties to motivate local governments to develop seed production industry and farmers to produce quality seeds. Financial institutions, especially policy banks, should give more credit supports to the purchase and storage of seeds. Fast transportation channels of seeds will be built and railways should take the transportation of seeds as top priority. Local governments should help to deal with problems concerning household register of the scientific talents brought in by enterprises in accordance with relative policies.

26. Improvement of management system. We should strengthen construction of seed management systems at national, provincial, municipal and county levels, identify an organization responsible for seed management, highlight the function of seed management, improve the management team, step up personnel training to improve their quality, meliorate their capabilities in providing public services and performing administration in accordance with laws, attach greater importance to capacity building, and ensure sufficient funds to make sure that all the work are accomplished effectively. A performance appraisal system should be established to perform comprehensive assessments for the seed management agencies and position performance appraisal for the managerial personnel. In order to form an evaluation system favorable to intensification of fundamental researches for public welfare and solution of practical production problems, we should strengthen variety management, reform existing evaluation methods for research achievements in the crop seed industry, improve breeding achievements rewarding mechanism. We should give full play to the role of seed industry associations in coordinating and serving enterprises, protecting their rights and raising their awareness of self-discipline, so as to standardize

their behaviors and improve professional services, with top priority given to credit ratings among seed enterprises to promote cooperation and communication among enterprises and industries home and abroad.

27. Strengthening of organization and leadership. We should give full play to the role of the Coordination Group for Promoting Development of Modern Crop Seed Industry to enhance coordination and cooperation among departments and solve major problems arising in the development of crop seed industry. Provinces (regions and municipalities) should draw up development plan for the crop seed industry based on local conditions and work out various measures in details. Departments of agriculture, development and reform, science, finance, human resources and social security, quality inspection and forestry shall implement requirements of the plan to the earnest.

END TRANSLATION