

Action Plan for Prevention and Control of Soil Pollution

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Soil is material basis of economic and social sustainable development, concerning both human health and the process of building of a beautiful China. Protecting soil environment is a major component to promote ecological progress and safeguard national ecological security. Degrading soil environment is a great concern in China today, and part of the country is even suffering from heavy soil pollution, which stands out as one of the major weaknesses in building a moderately prosperous society in all respects. The Action Plan is hereby formulated to effectively strengthen soil pollution prevention and control, and to gradually improve soil environmental quality.

◆ Overall Requirements

It is crucial to fully implement the guiding principles from the 18th National Congress of the Communist Party of China (CPC) and the 3rd, 4th, and 5th plenary sessions of the 18th CPC Central Committee; act in accordance with China's overall plan for promoting economic, political, cultural, social and ecological progress, and the Four Comprehensiveness Strategy; firmly establish the new development concept featuring innovative, coordinated, green, open and shared development; thoroughly put into practice the decisions and plans of the CPC Central Committee and the State Council. Based on China's realities and its stage of development, and by taking a holistic view of economic and social development, with overall improvement of soil environment quality at the heart, the plan focuses on soil pollution prevention, calls for protection first, and highlights the needs of risk control and management and

regulation over key areas, sectors and major pollutants, ultimately to ensure quality agricultural products and safe living environment. It also follows a differentiated approach based on different categories, uses, and stages, to stringently control new pollution, gradually reduce soil contamination and to establish a soil pollution prevention and control system in which the government plays a guiding role, enterprises assume the main responsibility, the general public participate and play a supervising role, so as to promote sustainable use of soil resources and to build a beautiful China with a blue sky, clear waters and green mountains.

◆ **Goals**

By 2020, it's expected to 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. By 2030, it's expected that the nations' soil environment quality will be steadily improved, the soil environment safety of farmland and land used for construction purposes effectively guaranteed, and the environmental risks of soil thoroughly controlled. By the middle of this century, the soil environment quality will be improved comprehensively, and a virtuous cycle of the ecological system will be achieved.

◆ **Major Indicators**

By 2020, the proportion of contaminated farmland that can be used safely is expected to be 90% around, and that of contaminated sites expected to be above 90%. By 2030, the proportion of contaminated farmland that can be used safely will increase to 95%, and that of contaminated sites to above 95%.

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

Based on existing surveys relevant to soil contamination, detailed surveys on soil pollution will be conducted with a focus on farmland and business premises of enterprises in major sectors. Specifically, by 2018, the total areas, distribution, and the impact of contaminated agricultural land on agricultural products will be identified, and by 2020, distribution of contaminated sites for business premises of enterprises in major sectors and their environmental risks will be ascertained. Overall plan and technical requirements for the survey shall be formulated, with technical guidance, supervision and inspection, results evaluation in place. A system of surveying soil environmental quality on a regular basis will be established, and the survey will be conducted every 10 years. *(led by Ministry of Environmental Protection, participated by Ministry of Land and Resources, Ministry of Finance, Ministry of Agriculture, National Health and Family Planning Commission, etc, and implemented by People's governments at all levels. All of the following needs to be implemented by people's governments at all levels, and won't be listed hereinafter.)*

(2) Construct soil environmental quality monitoring network

Soil environmental quality monitoring points will be planned uniformly, integrated and optimized. By the end of 2017, the set-up of state-controlled soil environmental quality control monitoring points will be completed and national soil environmental quality monitoring network will be established. Industrial monitoring network will be given full play and basic capacity of soil environmental monitoring will be built. Technical personnel training about soil environmental monitoring should be held in provinces (autonomous regions and municipalities) at least once a year. Each region can add monitoring points, increase typical pollutant monitoring activity and improve monitoring frequency according to work requirements. Before the end of 2020, full coverage of

soil environmental quality monitoring points in all counties (cities, districts) will be realized. *(led by Ministry of Environmental Protection, participated by National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Land and Resources and Ministry of Agriculture etc.)*

(3) Enhance the level of soil environmental information management

Data from departments such as Ministry of Environmental Protection, Ministry of Land and Resources and Ministry of Agriculture will be used to set up basic database of soil environment. The establishment of national soil environmental information management platform will be strived to complete before the end of 2018. By means of mobile internet and Internet of Things, etc., channels for data acquisition will be broadened and dynamic data update will be realized. It is necessary to strengthen data sharing, compile resource sharing inventory, clarify permission and pattern of sharing, and give full play to the role of soil environmental big data in pollution control, urban and rural planning, land use and agricultural production. *(led by Ministry of Environmental Protection and participated by National Development and Reform Commission, Ministry of Education, Ministry of Science and Technology, Ministry of Industry and Information Technology, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, National Health and Family Planning Commission and State Forestry Administration etc.)*

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

(4) Accelerate legislation process

Concerted efforts will be needed to finish drafting the law on soil pollution prevention and control. Relevant laws and regulations of pollution control, urban and rural planning, land management, and the quality and safety of agricultural products shall be revised timely to

include content of soil pollution prevention and control. By the end of 2016, the revision of the regulation on pesticide management will be finished, environmental management measures of contaminated sites and environmental management measures of farmland soil will be released. By the end of 2017, department rules of pesticide packaging waste recycling, soil environmental management of industrial and mining land and waste agricultural plastic films recycling will be issued. By 2020, the system of soil pollution control law and regulations will be basically established. Each region can research and formulate local rules and regulations of soil pollution prevention and control according to actual situation. *(led by Legal Affairs Office of the State Council and Ministry of Environmental Protection, participated by Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture and State Forestry Administration etc.)*

(5) Systematically establish standard system

It is critical to improve soil pollution control standards and technical specifications. Before the end of 2017, soil environmental quality standards of farmland and land used for construction purposes will be released; revision of technical specifications of soil environmental monitoring, investigation & evaluation, risk control, treatment and remediation, as well as technical guideline of environmental impact assessment will be finished; standards such as toxic and hazardous substances limit in fertilizer, fodder and irrigation water, as well as standard of pollutant control in agricultural sludge will be revised, the pollution control requirements will be more stringent; agricultural plastic film standards will be revised to enhance requirement of thickness, and standards of biodegradable agricultural plastic film will be studied and developed; pesticide packaging standard will be revised to add

requirement of preventing pesticide packaging waste from contaminating soil. Pollutant emission standards should be timely revised, pollutant special emission limits should be further clarified. Analysis and test method of pollutants in soil will be improved and soil environmental standard sample will be developed. Each region can formulate local soil environmental quality standards stricter than national standards. *(led by Ministry of Environmental Protection, participated by Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Water Resources, Ministry of Agriculture, General Administration of Quality Supervision, Inspection and Quarantine and State Forestry Administration etc.)*

(6) Comprehensively strengthen supervision and enforcement

Identify regulation priorities. Key areas of monitoring include heavy metals contained in soil like cadmium, mercury, arsenic, lead and chromium, and organic pollutants like PAH and TPHs. The regulation will focus on such industries as non-ferrous metal mining and smelting, petroleum exploration and refining, coking, electroplating and tanning, and on major counties of grain production and build-up areas in cities at and above prefecture level. *(led by Ministry of Environmental Protection, participated by Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, and Ministry of Agriculture, etc.)*

Enhance Law Enforcement. Soil pollution prevention and control shall be a major focus of environmental law enforcement, which calls for efforts to fully utilize environmental monitoring network and strengthen oversight on soil environmental law enforcement on a regular basis. Meanwhile, major steps will be taken to crack down on violations involving illegally discharging toxic and hazardous pollutants, unlawfully

storing dangerous and hazardous chemicals, illegal disposal of hazardous waste, incorrect use of pollution management facilities, as well as fabricating and falsifying monitoring data. Targeting enterprises in key sectors, special campaigns will be launched on environmental law enforcement to disclose and regulate those enterprises that heavily contaminate the soil environment and cause public discontent. In addition, it's also critically important to improve the conditions of grass-roots level enforcement of environmental law, including ensuring the necessary enforcement equipment like the one for fast detection of soil contamination; to conduct nationwide training every three years to equip the environmental law enforcement personnel with necessary expertise and skills related to soil pollution prevention and control; and to enhance emergency response and preparedness on environmental accidents, including efforts to refine contingency plans at various levels and strengthen environmental emergency management, technical support and capacity on emergency handling and relief. *(led by Ministry of Environmental Protection, participated by Ministry of Industry and Information Technology, Ministry of Public Security, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, State Administration of Work Safety, and State Forestry Administration)*

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

(7) Categorize agricultural land based on soil environment quality

Agricultural land falls into three categories by degree of contamination, with uncontaminated and slightly contaminated soil categorized as priority land of protection, mildly contaminated and moderately contaminated soil as land of safe utilization, and heavily contaminated as land under strict control and management.

Corresponding measures targeting different categories of agricultural land will be adopted to ensure safe agricultural products, with a focus on arable land. Specifically, by the end of 2017, the technical guidelines for categorization on environmental quality of arable land will be released. By the end of 2020, arable land and agricultural products shall be concurrently monitored and evaluated based on detailed survey of soil contamination, and such categorization will be promoted nationwide by starting with the pilot projects. With these efforts, a category list of arable land is expected to be established in a gradual manner. Results of categorization shall be reviewed and determined by provincial governments with data uploading to national soil environment information platform. Given the changes of land use and changing soil environmental quality, there should be regular updates on total areas and distribution of arable land of various types. If conditions permitted, some localities may also start with the categorization of other types of agricultural land such as forest land, grass land and garden plot, etc. *(led by Ministry of Environmental Protection and Ministry of Agriculture, participated by Ministry of Land and Resources and State Forestry Administration)*

(8) Strengthen land protection

For the arable land qualified to be priority land of protection, localities should categorize it as permanent capital farmland, and implement strict protection measures to ensure there is no decline either in area or in quality of arable land. No construction projects or land development activities is allowed on such land unless it's specified in law and there's no other site options. Major counties of grain production are required to formulate soil environment protection plan. In developing high-standard farmland, priority will be given to regions where priority land of protection is most concentrated. In addition, it's also necessary to

continue with the practice of utilizing straw resources to fertilize farmland, using more organic fertilizers, applying minimum tillage and no-tillage technologies, rotation tillage of rice and soybeans, as well as less usage and recycling of agricultural films, and to continue to conduct pilot projects on black soil protection. In case of rural land transfer, the purchaser is required to fulfill the duty of soil protection to prevent soil environment quality degradation from any predatory or irrational agricultural activities like over-fertilization and misuse of pesticides. If any decrease in either areas or quality of priority land is detected in counties or cities within their respective jurisdiction, provincial governments should issue warnings and impose restrictive measures such as restrictions on issuing EIA permit in accordance with law. *(led by Ministry of Land and Resources and Ministry of Agriculture, participated by National Development and Reform Commission, Ministry of Environmental Protection and Ministry of Water Resources)*

Prevent and control pollution from enterprises. Strictly control the new construction of non-ferrous metallurgy, petroleum processing, chemicals, coking, electroplating, tanning and other relevant industries and enterprises in the area with high percentage of farm land where priority is given for protection, the existing relevant industries and enterprises are required to adopt new techniques, new processes and to accelerate their pace for standard improvement and industry upgrade. *(Led by Ministry of Environmental Protection and National Reform and Development Commission, participated by Ministry of Industry and Information Technology)*

(9) Focus on promoting safe utilization

Based on the status of soil pollution and pollution level of farm produce, for the county (city, district) with a high concentration of safe use type farm land, considering major local produce varieties and planting traditions, efforts should be made to formulate and implement the plan for the safe use of polluted farm land, to adopt agriculture adjustment and control, alternative plantation and other related measures, to reduce the risks of exceeding the required level of farm produce. Intensify quality check of farm produce. Strengthen technical guidance and training to farmers and rural cooperatives. By the end of 2017, technical guideline for the safe use of polluted farmland will be issued. Efforts should be made to achieve 40 million mu of land which originally is slightly and medium polluted farm land but can be safely used after remedial measures by 2020. *(Led by Ministry of Agriculture, participated by Ministry of Land and Resources)*

(10) Implementation comprehensively and control strictly

Strengthen the management of the purpose of the use of farm land which is under strict control type, mark the area where the production of special farm produce is prohibited in accordance with the law, growth of edible farm produce are strictly prohibited; for the case of threatening the safety of underground water and drinking water sources, relevant county (city, district) shall develop plan to manage and control environmental risks and implement these measures. Study should be made with regard to

the inclusion of farm land of strict control type into the implementation scope for the new round of deforestation and returning to forest and grassland of the country, formulate and implement the adjustment of planting structure of severely polluted farm land or the plan of deforestation and returning to forest and grassland. Continue the pilot project for the remediation of farm land which is polluted by non-ferrous metals and the adjustment of planting structure of farm produce in Changsha-Zhuzhou-Xiangtan region in Hunan province. Implement pilot for the mechanism of farm land rotation and re-planting. By 2020, the objective of 20 million mu of severely polluted farm land realizing the adjustment of planting structure or achieving returning of forest and grassland, can be met. *(Led by Ministry of Agriculture, National Development and Reform Commission, Ministry of Finance, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Water Resources and State Forestry Administration)*

(11) Strengthen soil management for forestland, grassland and garden land

Strictly control the pesticide use for forestland, grassland and garden land, the use of highly toxic, highly persistent pesticides is prohibited. Improve the system for the management of biological pesticides and attractant, extend and promote their use. Priority should be given to put the area with high percentage of severely polluted grassland under the

scope for the implementation of prohibiting and recessing grazing. For the quality test of edible agricultural (forest) product from severely polluted forestland and garden land, if pollution level exceeds the required one, measures should be taken to adjust the planting structure. *(In the charge of the Ministry of Agriculture and the State Forestry Administration)*

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

(12) Specify requirements for the management

Establish investigation and evaluation system. By the end of 2016, issue technical provisions for soil environment investigation and evaluation for construction land. From 2017, for the land used by industries such as non-ferrous metal metallurgy, petroleum processing, chemicals, coking, electroplating and tanning and their enterprises whose land use right is expected to be taken back, as well as those mentioned above whose land use is expected to change to residential and infrastructure use such as commercial building, school, hospital and nursing house, the person with the ownership of the land use shall conduct soil environment investigation and evaluation; for the land that has already been taken back, the city and county level people's government which manage the aforementioned land shall be responsible for organizing such investigation and evaluation. Since 2018, severely

polluted farm land which is converted to urban construction land, the city and county level people's government which manage the aforementioned land shall be responsible for organizing such investigation and evaluation. The result of the investigation and evaluation shall be reported and registered at the responsible departments for environmental protection, urban and rural planning and land resources. *(Led by Ministry of Environmental Protection, participated by Ministry of Land and Resources and Ministry of Housing and Urban-Rural Development)*

Specify management measures by purpose of use. Since 2017, efforts should be made to conduct thorough investigation to the status of soil pollution, based on the said soil environment investigation and evaluation result, gradually develop the catalogue for polluted land block and the negative list for the development of this kind of land, and properly define the purpose of land use. For the land block which conforms to the soil environment quality requirement of the land to be used, land use procedure may be followed. For the polluted land block which is put to temporary suspension of development and utilization and the land block whose remediation condition is lacking at present stage, the responsible region level and county level people's government shall mark the management and control area, set up sign, issue bulletin, carry out environmental monitoring for soil, surface water, underground water and air; if pollution and spread of the pollution are found, the responsible

party should initiate in a timely manner measures to manage and control environmental risks such as segregation and blocking of pollutants. *(Led by Ministry of Land and Resources, participated by Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development and Ministry of Water Resources)*

(13) Implement supervision responsibilities

Urban and rural planning departments at various levels should consider the status of soil environment quality and strengthen the management of related verification and approval regarding urban and rural planning. Land and resources departments at various levels should strengthen the supervision of land collection, take-back, buying and transfer, and change of land use, etc in accordance with the overall planning of land use, urban and rural planning as well as the status of land block and soil environment quality. Environmental protection departments at various levels should strengthen the investigation to the status of soil environment of construction land, risk assessment and activities relating to treatment and remediation of polluted land block. Establish information exchange mechanism among departments of urban and rural planning, of land and resources and of environmental protection. *(In the charge of Ministry of Land and Resources, Ministry of Environmental Protection and Ministry of Housing and Urban-Rural Development)*

(14) Tighten land use access

Incorporate the requirements for the management of soil environment of construction land into municipal planning and land supply management. Land development and utilization should be consistent with the quality requirements of soil environment. Land and resources departments, urban and rural planning departments and other departments at various levels should take full consideration of environmental risks brought by polluted land block and properly define land use while preparing land use overall plan, municipal overall plan, detailed control-type plan and other related plans. *(Led by Ministry of Land and Resources and Ministry of Housing and Urban-Rural Development, participated by Ministry of Environmental Protection)*

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

The development of unutilized land should be systematic and in an orderly manner to guard against pollution. Relevant local governments at county level or above should conduct environmental assessment on soil conditions to determine whether it is suitable for farmland. Those that fail to meet relevant standards are not allowed to grow edible agricultural products. Different places over China should enhance efforts to protect these unutilized land reserved for farmland and conduct inspections at

regular intervals. Those who dump poisonous or harmful substances to the sand, mudflat, salt marshes and swampland, or discharge pollutants illegally should be held accountable. Environmental supervision on unutilized land under influence by exploration of mines and oil fields should be strengthened and relevant enterprises should be urged to take prevention and pollution control measures to deal with polluted soil. Strive to improve the soil quality of salt marshes, and from 2017, Xinjiang Production and Construction Corps will initiate a pilot program to improve the salt marshes with desulphurization gypsum from coal fired power plants. *(Led by Ministry of Environmental Protection and Ministry of Land and Resources, and participated by National Development and Reform Commission, Ministry of Public Security, Ministry of Water Resources, Ministry of Agriculture, and State Forestry Administration)*

(16) Prevent new pollution on construction land

For construction projects that discharge key pollutants, take into account the impact on soil when conducting environmental impact assessment and come up with concrete measures for soil pollution prevention. The facilities for soil pollution prevention and control should be designed, developed and put into operation in line with the main projects. Relevant environmental protection departments should conduct supervisions to see how these measures are implemented. From 2017, relevant local governments will sign Letters of Responsibility for soil

pollution prevention and control with enterprises in key industries, so as to make these measures and responsibilities clearly defined by releasing it to the public. *(In the charge of Ministry of Environmental Protection)*

(17) Enhance the spatial planning and management

Enhance planning and conduct research on the layout of construction projects, determine the regional function zoning and spatial layout according to the capacity of soil and environment, encourage industries or enterprises to develop in the form of clusters to make intensive use of land and reduce soil pollution, strictly meet the requirements of site selection for relevant industries or enterprises, and prohibit the development of non-ferrous metal metallurgy and coking industries near residential areas, schools, hospitals and nursing facilities. Under the development of new urbanization, industry restructuring and overcapacity reduction, remove or shut down enterprises that heavily pollute the soil. Taking into account the regional functional zoning and needs for soil pollution prevention and control, make scientific planning for household and hazardous waste treatment, and waste resource recycling facilities or locations. Determine the distribution and scale of livestock and poultry breeding. *(Led by National Development and Reform Commission, participated by Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development, Ministry of Water*

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.

According to the layout and pollution discharge of mining enterprises, different places should make a list of the key enterprises under close supervision on soil environment, update the information and release to the public. The companies in the list should conduct environmental monitoring on the soil of their land annually, and release the data to the public. Relevant environmental departments should carry out monitoring on the key enterprises and around industrial parks on a regular basis, and upload the data at the National Soil Environment Information Platform as an important reference for environmental law enforcement and risk warning. Modify at a proper time the alternative inventory for poisonous and harmful substances, and enhance control on harmful substances from electronics and auto industries. Industries or enterprises concerning non-ferrous metal metallurgy, petroleum processing, chemical engineering, coking, plating and leather should make disposal plan for the remains of pollutants prior to the removal of production facilities, buildings and pollution control facilities, report to local environmental and industrial departments at county level, and

strictly follow relevant regulations to conduct secure disposal and guard against soil pollution in this process. *(In the charge of Ministry of Environmental Protection and Ministry of Industry and Information Technology)*

Strictly prevent the soil pollution caused by mineral resources exploitation. From 2017, regions with centralized mineral resources exploitation activities, including Inner Mongolia Autonomous Region, Jiangxi Province, Henan Province, Hubei Province, Hunan Province, Guangdong Province, Guangxi Province, Sichuan Province, Guizhou Province, Yunnan Province, Shaanxi Province, Gansu Province, Xinjiang Autonomous Region etc., will be subject to specific emission limit value of key pollutants. Comprehensively manage tailing ponds left over by history by promoting the risk management of film mulching, soil compressing, flood drainage, dam reinforcement and the measures on closing tailings. Enterprises with key supervised tailing ponds should carry out environmental risk assessment, improve their pollution treatment facilities, and reserve emergency supplies. Intensify the supervision on the radiation safety during mineral resources exploitation and utilization, and relevant enterprises should carry out radiation environmental monitoring for their diggings' soil annually. *(Led by Ministry of Environmental Protection and State Administration of Work*

Safety, participated by Ministry of Industry and Information Technology and Ministry of Land Resources should participate.)

Strengthen the pollution prevention and control in heavy metal industries. Strictly implement the heavy metal pollutant emission standard and relevant index of total quantity control, take stronger measures to the supervision and inspection of enterprises; to those enterprises that still do not meet standards after emission rectification, stop their production or put them out of business according to the law and publish a list of the enterprises. Continue to phase out backward production facilities, improve the requirements of entry of heavy metal related industries, and prohibit the new construction project with backward production facilities or in industries of severe overcapacity. Gradually phase out filament lamp as planned, raise standard of phasing out backward production facilities in industries such as lead acid battery, and finally eliminate the backward production facilities. Develop a promotional plan of cleaner production technology engaging in key heavy metal industries and sectors, and encourage enterprises to adopt advanced and applicable production processes and technologies. By 2020, the emission of key heavy metals in key industries will reduce by 10% compared with that of 2013. *(Led by Ministry of Environmental Protection and Ministry of Industry and Information Technology, participated by National Development and Reform Commission)*

Tighten treatment of industrial wastes. Comprehensively renovate the storage places for tailings, coal gangue, industrial by-product gypsum, fly ash, red mud, smelting slag, electric slag, chromium slag, arsenic slag and solid wastes produced by desulfurization, denitrification and dust precipitation; improve facilities to prevent dispersion, loss, and leakage, develop and implement corresponding remediation programs. Strengthen the comprehensive utilization of industrial solid wastes. Clean up and rectify recycling activities of electronic waste, waste tires, and waste plastics, guide relevant enterprises to adopt advanced and applicable processing technologies and develop in concentrated regions, encourage centralized construction and operation of pollution control facilities, and prevent soil and groundwater pollution. Carry out co-control pilots of sewage and sludge, waste gas and waste residue in a number of cities in the regions of Beijing-Tianjin-Hebei, the Yangtze River Delta, and the Pearl River Delta from 2017. *(led by Ministry of Environmental Protection and National Development and Reform Commission, participated by Ministry of Industry and Information Technology and Ministry of Land and Resources Ministry of Water Resources)*

(19) Contain agricultural pollution

Rationally use chemical fertilizers and pesticides. Encourage farmers to increase the use of organic fertilizers, and cut the use of chemical fertilizers. Apply pesticides in a scientific manner, implement specialized and uniform green prevention and control of diseases and insect pests for crops, promote efficient, less toxic and less persistent pesticides and modern plant protection machinery.

Strengthen the recycling of fertilizer package waste. Carry out pilots in a number of major grain (oil) counties and key counties of the vegetable industry in provinces including Jiangsu, Shandong, Henan, and

Hainan from 2017; expand the coverage to 30% of major grain (oil) counties and key counties of the vegetable industry nationwide by 2020. Promote clean production of the agriculture industry, carry out pilots in resource reutilization of agricultural waste, and develop a number of replicable and promotable prevention and control technology models for agricultural non-point source pollution. Strictly prohibit the use of municipal solid waste, sewage sludge and industrial wastes directly as fertilizers. By 2020, achieve zero growth in the country's main agricultural fertilizer and pesticide use, increase the utilization rate to more than 40%, and increase the coverage of soil testing technology for fertilizer application to higher than 90%. (*led by Ministry of Agriculture, participated by National Development and Reform Commission, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development and China Federation of Supply and Marketing Cooperatives*)

Strengthen the recycle and reuse of waste agricultural films. Rigorously crack down on illegal production and sale of substandard agricultural films. Establish and improve the network for recycle, storage and comprehensive utilization of waste agricultural films, carry out pilots on recycle and reuse of waste agricultural films; strive to achieve full waste agricultural film recycle and reuse in Hebei, Liaoning, Shandong, Henan, Gansu, Xinjiang and other high agricultural film consumption provinces by 2020. (*Led by Ministry of Agriculture, participated by National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Public Security, State Administration for Industry and Commerce and China Federation of Supply and Marketing Cooperatives*)

Enhance prevention and control of pollution from livestock and poultry breeding. Strictly regulate the production and use of veterinary drugs and feed additives, prevent excessive use, and promote source reduction. Strengthen the comprehensive utilization of livestock and poultry manure, carry out pilots on the complementary combination of planting and breeding industry, and circular development in major hog breeding counties. Encourage development of facilities for treatment and use of livestock and poultry manure, and increase the coverage of matching waste treatment facilities for large-scale farms and breeding districts to higher than 75% by 2020. (*led by Ministry of Ministry of Agriculture, participated by National Development and Reform Commission, and Ministry of Environmental Protection*)

Tighten the management of water quality for irrigation. Monitor quality of irrigation water. Irrigation water should meet the standard for farmland irrigation water quality. Adjust the planting structure timely for areas with long-term use of sewage irrigation and subsequent severe soil pollution and threat to the safety and quality of agriculture products. (*led by Ministry of Water Resources, participated by Ministry of Agriculture*)

(20) Reduce municipal pollution.

Establish a coordination mechanism among government, communities, enterprises and citizens, promote reduced, reused and harmless waste by collection classification and comprehensive recycling. Establish the village cleaning system, promote rural household waste treatment and implement rural household sewage treatment projects. Regulate illegitimate landfills, promote the implementation of

“encouraging treatment through awards” policy to a higher level and broaden the scope of integrated management of rural environment. Carry forward demonstration projects on cement kiln co-processing for household waste treatment. Encourage the use of sludge meeting relevant standards after treatment in gardening and landscaping. Conduct demonstration projects of using construction waste to produce building materials. Strengthen safe treatment of waste containing heavy metals such as waste mercuric oxide cells, nickel-cadmium cells, lead-acid cells, mercury-containing fluorescent tubes and thermometers. Reduce excessive packaging and encourage the use of products with environmental labels. *(led by Ministry of Housing and Urban-Rural Development, participated by National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Finance and Environmental Protection)*

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

(21) Clarify main subject for treatment and remediation

Based on the principle of “hold those who pollute responsible for treatment and remediation”, the entity or individual who pollutes soil shall be the subject to the responsibility of soil treatment and remediation. In the case of change of the responsible subjects, the entity or individual who inherits the rights and debt shall take responsibility; in the case of transfer of land use rights according to laws and regulations, transferee of land use right or the responsible party agreed by both parties shall take responsibility. If the subject is lost or indefinite, local people’s

government at county level shall take relevant responsibility in accordance with the law. *(led by Ministry of Environmental Protection, participated by Ministry of Land and Resources and Ministry of Housing and Urban-Rural Development)*

(22) Formulate treatment and remediation plans

With emphasis on outstanding soil pollution issues which influence the quality of agricultural products and safety of residential environment, all provinces (autonomous regions and municipalities) shall develop soil pollution treatment and remediation plans, identify key tasks, responsible entities and annual implementation plans, and establish projects database by the end of 2017. The plans shall be submitted to the Ministry of Environmental Protection and registered. The regions of Beijing-Tianjin-Hebei, Yangtze River Delta and Pearl River Delta shall take the lead in completing their plans. *(led by Ministry of Environmental Protection, participated by Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of Agriculture)*

(23) Carry out treatment and remediation in an orderly manner

Define key areas for treatment and remediation. With focus on polluted land plots planned for residential buildings, commercial buildings, schools, medical care organizations, and retirement homes, local governments shall perform treatment and remediation by taking into consideration of urban environment quality improvement and development layout adjustment. Provinces including Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Sichuan, Guizhou, and Yunnan shall give priority to areas where polluted farming land concentrate and perform treatment and remediation activities; other provinces shall determine key regions for treatment and remediation based on the severity of soil pollution, environmental risks and range of influence. 10 million mu of polluted farming land shall be treated and remediated by 2020. *(led by*

Ministry of Land and Resources, Ministry of Agriculture and Ministry of Environmental Protection, participated by Ministry of Housing and Urban-Rural Development)

Strengthen supervision of treatment and remediation projects. In principle, treatment and restoration projects shall be constructed in former locations and adopt necessary measures to prevent secondary pollution caused by digging and accumulated storage of polluted soil. In the case of transport of polluted soil, responsible entities shall report the transport time, means, route, amount of polluted soil, destination and final treatment measures to the environmental protection authorities of the site and destination in advance. During construction, responsible entities shall set up bulletin board to disclose general information of the project, environmental impact and prevention measures; responsible environmental protection authorities of the construction site shall inspect implementation of all sorts of environmental protection measures. Responsible entity shall entrust a third party institution to assess the results of treatment and remediation upon project completion and disclose the results to the public. Lifelong accountability shall be held for soil pollution treatment and remediation. Rules and policies on liabilities investigation will be issued before the end of the end of 2017. *(led by Ministry of Environmental Protection, participated by Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of Agriculture)*

(24) Supervise achievement of objectives and implementation of tasks

Environmental Protection agencies at all levels shall report regularly to the Ministry of Environmental Protection on the progress of soil pollution treatment and remediation; Ministry of Environmental Protection shall perform supervision and inspections in collaboration with

relevant departments. All provinces (autonomous regions, municipalities) shall entrust a third party institution to comprehensively assess progress of soil pollution prevention and control and remediation of the counties (cities, districts) within their administrative jurisdiction, the result shall be made available to the public. Assessment approaches for effectiveness evaluation of soil pollution treatment and remediation shall be released by the end of 2017. *(led by Ministry of Environmental Protection, participated by Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of Agriculture)*

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

(25) Enhance research on soil pollution prevention and control

Integrate the resources for scientific research from universities, research institutes, and industries, carry out fundamental research on soil environment baseline, soil environmental capacity and carrying capacity, transportation and transformation rules of pollutants, ecological effects of contamination, low accumulation of heavy metals in crops and selection of plants for remediation, and the relations between soil pollution and farm product quality and human health. Promote the research of key and common technologies on soil pollution diagnosis, risk management and control, treatment and remediation, research and develop advanced applicable equipment and cost-effective function materials (agent), strengthen application of Satellite Remote Sensing Technology, and build a number of laboratories and scientific research bases for soil pollution. Optimize and integrate science and technology programmes (specific

programs, funds, etc.) to support research on soil pollution prevention and control. *(led by Ministry of Science and Technology, participated by National Development and Reform Commission, Ministry of Education, Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, National Health and Family Planning Commission, State Forestry Administration and Chinese Academy of Sciences)*

(26) Increase efforts to promote applicable technologies

Establish sound technology systems. Complete 200 phased pilot projects for application of soil pollution treatment and remediation technologies by the end of 2020, typical polluted farmland, polluted plots shall be selected based on the type, degree, and regional representativeness of pollution. A series of replicable, low-cost, effective applicable technologies shall be compared and selected according to the result of the pilot projects. *(led by Ministry of Environmental Protection and Ministry of Finance, participated by Ministry of Science and Technology, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of Agriculture)*

Speed up commercialization of findings. Improve the mechanism for commercialization of scientific and technological findings for soil pollution prevention and control, establish a number of platforms for commercialization of findings such as high-tech industrial development

zones with environmental protection as the leading industry. Release the catalogue of major technological equipment encouraged for soil pollution prevention and control by the end of 2017. Conduct international cooperation and research, and technological exchanges, introduce and localize the advanced technology and management experiences for soil pollution risk identification, fast testing of soil pollutants, and soil and groundwater pollution cut-off. *(led by Ministry of Science and Technology, participated by National Development and Reform Commission, Ministry of Education, Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture and Chinese Academy of Sciences)*

(27) Advance the development of the treatment and remediation industry

Open up the service-oriented monitoring market, encourage social organizations' participation into activities such as soil environment monitoring and evaluation. Speed up development of the mature industrial chain covering soil environment survey, analysis and testing, risk assessment, treatment and remediation work design and construction, develop several leading enterprises with strong overall qualifications, and nurture a number of small and medium-sized vibrant enterprises through favorable policies. Promote the development of industrial demonstration bases in regions with necessary conditions. Standardize management of organizations and staff in the sector of soil pollution treatment and remediation, set up sound supervision mechanisms, list of enterprises in the sector with poor technical services, weak operation and management, and low overall credit shall be made public through the information disclosure system for enterprise credit information. Invite "internet plus" into the play for whole cycle industrial chain of soil pollution treatment

and remediation, encourage startup businesses by the public, and innovation by the public. *(led by National Development and Reform Commission , participated by Ministry of Science and Technology, Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, Ministry of Commerce and State Administration for Industry and Commerce)*

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

(28) Strengthening the dominant role of government

Improve the management system. Following the principle that the central government carries out unified management, provincial governments shoulder major responsibilities and governments at municipal and county level implement specific policies, governments should improve the soil environment governance system, fully implement the policy that a region is responsible for pollution prevention and control of soil within its jurisdiction, and explore the possibility to establish a unified and coordinated mechanism for prevention and control of cross-region soil pollution. *(Led by Ministry of Environmental Protection, participated by National Development and Reform Commission, Ministry of Science and Technology, Ministry of Industry and Information Technology, Ministry of Finance, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of*

Agriculture)

Increase fiscal input. The central government and local governments will increase input in soil pollution prevention and control. The central government should integrate special funds for prevention and control of heavy metal pollution and set up a Special Fund on Prevention and Abatement of Soil Pollution to promote investigation, monitoring and assessment of soil environment, and management and remediation of polluted soil. Local governments should allocate more capital to soil pollution prevention and control. The funds for integrated agricultural development, high-standard farmland development, water conservancy, and protection and quality improvement of farmland should be more directed to counties (cities and districts) where the farmland with protection priority is located. Rewards to counties (cities and districts) that increase the areas of farmland with protection priority are encouraged. Special funds should be put in place to support enterprises in upgrading production technologies and facilities. *(Led by the Ministry of Finance, participated by National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Water Resources and Ministry of Agriculture)*

Improve incentive policies. Local governments should take effective measures to encourage enterprises to be engaged in soil

pollution prevention and control and remediation; put in place incentive policies to support organic fertilizer production, comprehensive utilization of already used agricultural films, and recycle and disposal of fertilizer package. *(Led by the Ministry of Finance, participated by National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, State Administration of Taxation and China Federation of Supply and Marketing Cooperatives)*

Establish demonstration zones for integrated prevention and control of soil pollution. By the end of 2016, Taizhou of Zhejiang Province, Huangshi of Hubei Province, Changde of Hunan Province, Shaoguan of Guangdong Province, Hechi of the Guangxi Zhuang Autonomous Region, Tongren of Guizhou Province will develop demonstration zones for integrated prevention and control of soil pollution, with a focus on source-oriented prevention and control of soil pollution, risk control and management, remediation, regulation and management capacity building, and strive to substantially improve the soil environment quality in demonstration zones. The relevant local governments are required to formulate the plan for developing demonstration zones and report to the Ministry of Environmental Protection and Ministry of Finance. *(Led by the Ministry of*

Environmental Protection and Ministry of Finance, participated by National Development and Reform Commission, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture and State Forestry Administration)

(29) Give fully play to the role of market

Fiscal capital will attract more social capital into soil pollution prevention and control through the model of PPP. Governments should increase service procurement and promote the treatment and remediation of polluted farmland and of the polluted soil for which the government takes major responsibilities; step up the development of green finance, fully leverage the role of the policy and development-oriented financial institutions in guiding market capital to support the major projects of soil pollution prevention and control; encourage the qualified enterprises that are engaged in soil pollution prevention and control to issue stocks; explore the approach to promote soil pollution prevention, control and remediation through issuing bonds and develop such pilots in demonstration zones for integrated prevention and control of soil pollution; initiate the pilots of obligatory liability insurance for environmental pollution in major sectors. *(Led by National Development and Reform Commission and Ministry of Environmental Protection, participated by Ministry of Finance, People's Bank of China, China*

Banking Regulatory Commission, China Securities Regulatory Commission and China Insurance Regulatory Commission)

(30) Strengthen social supervision

Promote information disclosure. Soil condition should be released publicly nationwide, based on the results of soil quality monitoring and survey. Governments at levels of provinces (autonomous regions and municipalities) should release information about soil regularly in prefecture-level cities (autonomous prefectures and leagues) within their area. Key industries and enterprises, as required by relevant regulations, should release information on the type of the pollutants, the ways, the density and the total amount of discharge, as well as the availability and operation condition of pollution prevention and treatment facilities. *(Led by Ministry of Environmental Protection, participated by Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of Agriculture)*

Guide public participation. Whistle-blowing should be rewarded. Public are encouraged to supervise over soil contaminating activities such as illegal waste water discharge, exhaust gas emission and the dumping of waste materials and sewage sludge by calling the hotline “12369”, writing letters and emails, and using platforms such as government website and WeChat. Local governments, if condition permits, can hire voluntary supervisors to participate in environmental law enforcement

operations and soil contamination investigations. Large grain-producing households, family farms, farmer cooperatives and environmental NGOs are also encouraged to participate in soil contamination prevention and control. *(Led by Ministry of Environmental Protection, participated by Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development and Ministry of Agriculture)*

Promote public interest litigation. Lawful public interest litigation against soil contamination is encouraged. In areas of trial reform, procuratorates are allowed to act as plaintiffs in environmental public interest litigation cases. They can also file public interest lawsuits against administrative organs for illegal exercises of power or damages of public and country interest caused by administrative organ's failure to do its job. Governments and relevant departments at different levels should actively work with judicial authorities and procuratorates on case-handling and supervision processes. *(Led by the Supreme People's Procuratorate and the Supreme People's Court, participated by Ministry of Land and Resources, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Development, Ministry of Water Resources, Ministry of Agriculture and State Forestry Administration)*

(31) Awareness-raising and education

Develop work plans for soil protection awareness-raising and education. Disseminate soil protection knowledge, help the public to

better understand environmental laws and policies, create an enabling environment for soil protection and promote green development and lifestyles through making posters and videos, publishing popular science books, using means such as internet and digital screening platforms, and celebrating World Earth Day, World Environment Day, World Soil Day, World Food Day and National Soil Day. Soil protection education should be incorporated into awareness-raising campaigns and training programs of Party and government organs, schools, factories, communities and rural areas. Institutions of higher education, if condition permits, should be encouraged to open specialized courses on soil. *(Led by Ministry of Environmental Protection, participated by the Propaganda Department of the CPC Central Committee, Ministry of Education, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, State Administration of Press, Publication, Radio, Film and Television, the Office of the Central Leading Group for Cyberspace Affairs, State Administration of Grain and China Association for Science and Technology)*

10. Strengthen objective assessment and accountability

(32) Clarify the responsibility of local governments

As the main implementation body of this action plan, local governments at different levels should develop and release work plans on soil contamination prevention and control. Key tasks and objectives

should be identified. Governments at all levels should strengthen management, improve policy measures and investment, innovate financing models and strengthen supervision. Work plans at provincial (autonomous region and municipality) level should be submitted to the State Council for filing. *(Led by Ministry of Environmental Protection, participated by National Development and Reform Commission, Ministry of Finance, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Agriculture, etc.)*

(33) Strengthen inter-departmental coordination and cooperation

A National Coordination Mechanism for Prevention and Control of Soil Pollution should be established to resolve significant problems regularly. In accordance with their assigned responsibilities, relevant departments should join forces to carry out prevention and control measures against soil pollution. Ministry of Environmental Protection should be responsible for overall planning, coordination and inspection, as well as submitting annual progress reports to the State Council by the end of each February. *(Led by Ministry of Environmental Protection, participated by National Development and Reform Commission, Ministry of Science and Technology, Ministry of Industry and Information Technology, Ministry of Finance, Ministry of Land and Resources, Ministry of Housing and Urban-Rural Development, Ministry of Water Resources, Ministry of Agriculture, State Forestry Administration, etc.)*

(34) Fulfill corporate responsibilities

Relevant enterprises should strengthen internal administration, incorporate prevention and control of soil pollution into their environmental risk prevention and control systems, construct and operate pollution treatment facilities pursuant to laws and regulations, and ensure that emission of key pollutants is consistently up to standard. In the event that soil pollution is caused, the enterprise should assume legal liability for the assessment, control and remediation of the damage. An Enterprise Self-regulation Mechanism for Control and Remediation of Soil Pollution should be established over time. State-owned enterprises (SOEs), especially central SOEs, should take the lead in the implementation process. *(Led by Ministry of Environmental Protection, participated by Ministry of Industry and Information Technology, State-owned Assets Supervision and Administration Commission of the State Council, etc.)*

(35) Enforcing Stricter Performance Evaluation and Assessment

A target-oriented accountability system should be adopted. By the end of year 2016, governments of provinces, autonomous regions and municipalities should sign Responsibility Statements on Prevention and Control of Soil Pollution with the State Council, with targets disassembled and specific tasks allocated. Evaluations should be conducted at provincial level to assess the progress in key areas on an annual basis, and overall assessments on the performance of the Action

Plan should be conducted in year 2020. The results of such evaluations and assessments will serve as an important basis for the performance appraisal of government officials, and for auditing outgoing officials' management of natural resource assets. *(Led by Ministry of Environmental Protection, participated by the Organization Department of CCCPC and National Audit Office)*

The results of such evaluations and assessments will also serve as an important reference for the allocation of Special Fund on Prevention and Control of Soil Pollution. *(Led by Ministry of Finance, participated by Ministry of Environmental Protection)*

If the annual evaluation result of a province (autonomous region, municipality) is unsatisfactory, or the province (autonomous region, municipality) fails in the assessments, it will be required to rectify within limited time. EIA of construction projects in the area concerned should be restricted, until rectification measures are fully in place. If rectification is ineffective, the heads of municipal government and relevant departments in the provincial government should be summoned. As for areas with prominent soil environmental problems, dramatic decline in regional soil environmental quality, ineffective prevention and control measures, or strong public concern, the heads of municipal government and relevant departments in the provincial government should also be summoned. The act of dereliction of duty or falsification should be subject to admonishing,

public apology, or punishment by party and government disciplines respectively, in accordance with the seriousness of the circumstances. Those who break criminal laws should be held accountable according to law. Lifelong accountability should apply in the event of the wrongdoer's job transfer, promotion and retirement. *(Led by Ministry of Environmental Protection, participated by the Organization Department of CCCPC and Ministry of Supervision)*

China is in the crucial period to build a moderately well-off society in an all-around way, and Chinese people have high expectations on the improvement of environmental quality. Prevention and control of soil pollution is an arduous task. Local governments and relevant departments should be fully aware of the situation, consolidate confidence, and take practical actions to strengthen pollution prevention and control and ecological protection, to achieve national goals for prevention and control of soil pollution by the scheduled time, to improve eco-environmental quality, to ensure security and stability of all kinds of ecosystems, and to contribute to building a beautiful China, realizing the Two Centenary Goals and the rejuvenation of the nation.