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Control of Environmental Pollution in Jiangsu Province

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Abstract This paper introduces the problems in rural environment of Jiangsu Province, and analyzes the causation of these problems. Finally, this paper discusses the related measures for controlling the rural environment of Jiangsu Province.

Key words Rural area; Ecology; Environmental pollution; Control; China

The continued growth of economic aggregate of Jiangsu Province does not make the "inflection point" of "environmental Kuznets curve" appear automatically. Environmental problem in rural areas of Jiangsu Province has already become an unharmonious factor in the whole socio-economic development system of Jiangsu Province. If we can not resolve this problem, it will directly affect the sustainable development of social economy in Jiangsu Province.

1 Existing problems in the rural environment of Jiangsu Province

Result of expert investigation by the United Front Work Department of Jiangsu Province shows that there are great differences between the overall environmental qualities in rural and urban areas; and environmental issues will become more serious with the passage of time. Compared with the urban environment, pollution in rural environment shows the characteristics of wide range, large number and complex sources. "Wide range" means that there are pollution in areas where people lives or have farming and aquaculture. "Large number" means that there are many scattered polluting enterprises in rural areas. "Complex sources of pollution" means rural areas have the same pollution sources in urban areas and many other pollution sources of their own, such as the domestic sewage and garbage pollution, the straw stalk, the livestock and poultry manure, the emissions from agricultural waste, the irrational use of pesticides, fertilizers and other agricultural chemicals, and the industrial pollution. They are mainly shown in the following four aspects: ① Water pollution. Areas around the towns and villages and the reservoirs in the villages are all seriously polluted. Water peanuts, water hyacinth and other harmful aquatic plants are widely spread and decayed. ② Solid waste pollution. Emissions of agricultural solid waste are far more than industrial waste. Harmless treatment rate of livestock and poultry manure is less than 5%, and its utilization rate is less than 60%. Crop straw produced each year is about 45 million tons, but its percent of returning to field is less than 1/3. ③ Agrochemical pollution. The loss of fertilizer and pesticides, as well as the appli-

cation of plastic sheeting and herbicides, is a great harm to the soil and crops, which also exacerbated the pollution of surface and ground water. ④ Industrial pollution. Pollution of industrial enterprises in rural areas, especially the chemical industry and the printing and dyeing enterprise, has great affected the agriculture and ecosystem.

2 Causations for the environmental problems in rural areas of Jiangsu Province

2.1 Insufficient attention to rural environmental protection Industrial economy has become the main driving force of local economic development, but agriculture is not the major cause. Thus, environmental problems in rural areas have been neglected. Staff in environmental protection departments of county level is inadequate with backward equipment, and the quality of personnel still need to be improved. Environmental management staff at the township level is mostly scarce. Therefore, environmental management is difficult to extend to the rural areas, and enforcement power of environmental laws is affected from all sides.

2.2 Serious shortage of the input of rural environmental protection In recent years, governments at all levels have begun to attach importance to the input of urban environmental protection, but they seriously lack the cognition of rural environmental protection. In addition to the few input of a variety of demonstration sites, environmental protection input of the vast majority of cities (counties) is almost empty. There are no fixed source of management funding or clear policy of input guidance for the rural domestic sewage and solid waste. Resource utilization and agricultural non-point source control are short of the general and specific encouragement policy or financial subsidies. After the reform of rural taxes and fees, financial resources of township and village levels have been reduced. Most of the financial resources are only from financial transfer. Therefore, they have no funds for the construction of environmental infrastructure.

2.3 No resultant force in the comprehensive improvement of rural environment At present, local governments and relevant departments have carried out the rural environment control project from all aspects, such as water and toilet improvement, the Three Clear Project, silt cleaning engineering, estab-

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lishing sanitary town (village), and the development work of environmental protection, which play a certain role in improving the quality of the environment in rural areas. However, forces have been dispersed due to the lack of unified planning and integration in general. Effective use of funds is affected, which causes the unobvious practical effect of the overall improvement of environmental quality in rural areas.

2.4 Changes in rural production and lifestyle Changes in rural production and lifestyle have destroyed the virtuous circle of agricultural and rural ecosystems. The widespread use of coal, chemical fertilizers, and petroleum liquefied gas has taken the place of straw stalk, human and animal feces, which were used as fertilizer and energy sources before and become the heavy pollution source now. Oil agriculture with high input and pollution has taken the place of original ecological agriculture with virtuous circle of material and energy. The extensive agricultural mechanization, chemical and intensive management, as well as the aquaculture model of high density, high investment bait, large area and single species, not only have destroyed the original agricultural circular economy, but also have damaged the biological diversity of agro-ecological environment, and increased the vulnerability of agro-ecosystem. Plastics products and household appliances are widely used in rural areas, but the recovery measures after use are lacked, which has caused the increase in the garbage toxicity in rural areas, and the decrease in the biodegradability.

2.5 Pollution of township enterprises in rural environment There are many township enterprises with obsolete technology, poor equipment, backward technique, and high energy consumption. Most of the companies do not have facilities to prevent and control pollution, and the excessive emissions of the Three Wastes in industrial enterprises (wastewater, waste gas, and waste residue) have become one of the main factors influencing the environmental quality in rural areas. In particular, pollution in some scattered and hidden small township enterprises are difficult to control, which has further aggravated the environmental pollution in rural areas^[1].

3 Countermeasures for the rural environmental control of Jiangsu Province

3.1 Improving the index system of achievement assessment of grass-roots government We should improve the index system of achievement assessment, and promote the function transformation of grass-roots government. Requirements in the safety of drinking water, the rural sanitation, and the quality of agro-ecological environment should all be in the index system of achievement assessment, so as to establish an index system which can attract the attention of the grass-roots leadership to effectively improve the living and production conditions for the masses, as well as the overall development of human being.

3.2 Establishing the diversified input mechanism of rural environmental protection Innovative thought should be used to reform the allocation policy of public finance, and to increase the financial transfer to rural areas. And a part of the financial transfer (including the special fund for environmental protec-

tion) should be used for the environmental protection in rural areas. We should break both the regional administrative segmentation and the urban and rural segmentation, and coordinate the construction of important environmental infrastructure, so that both the urban and rural areas can share the achievement of development. Land benefits distribution system should be reformed after the transformation from agricultural land to construction land, in order to provide the land-lost peasants and areas with long-term benefits. Some of the land benefits should be used in rural protection in the form of fund or other suitable forms after accumulation. The financial viability and autonomy of the grassroots should be enhanced as well as the input in rural environmental protection and agro-ecological environment. We should also encourage private capital, social funds and offshore funds to invest in the environmental infrastructure construction in rural areas, the ecological environment protection project, the ecological agricultural construction and so on. Meanwhile, preferential policies for taxation, pricing and credit for pollution-free food, green food and organic food should be made. Some of the release methods for agriculture supporting fund should be reformed by using the approach of substituting subsidies with rewards in order to improve the use efficiency of funds.

3.3 Strengthening the management team of rural environment Environmental protection departments at county level urgently need the qualified managers to allocate corresponding equipment, to strengthen the team construction, and to enhance the capacity of law enforcement and service. Township level should have adequate talents in environmental protection according to its need. Part-time or voluntary staff of environmental protection should be attracted to assist the work of the department of environmental protection. For example, retired cadres and party members in Taixing City, Zhejiang Province are organized together as the members of environmental protection.

3.4 Raising the environmental awareness of rural citizens Environmental awareness of rural citizens should be improved through various forms of education activities. Firstly, we should mobilize peasants to carry out publicity and education activities of regular environmental knowledge, policies and regulations, to further enhance the understanding of the significance of environmental protection and ecological construction by enterprise legal person, rural cadres and the masses, to guide them to understand, support and participate in the environmental protection, and to create good atmosphere involving everyone participating in environmental protection, and protecting environment. Secondly, government departments should change their functions to give rural citizens the rights to know, participate in, and supervise environment, as well as the power of democratic decision-making, and the right to compensation for pollution damage. Government should allow villagers to participate in environmental issues related to construction projects, and listen to the views of the villagers^[2]. Thirdly, we should support and attach importance to the activities of non-governmental environmental organizations, and allow non-governmen-

tal organizations to play the role of a bridge or link between the government and the public^[3].

3.5 Improving the laws and regulations about rural environmental protection Content of the *Regulations on the Agro-ecological Environmental Protection of Jiangsu Province* should be improved, in order to make the system more operational. Corresponding supporting management system should be established, such as the management system of rural environmental sanitation, rural domestic waste treatment, agricultural waste disposal system, greening management system in rural areas, riverbed sludge dredging system in rural areas, environmental management system for keeping livestock, and useful bio-protection system in rural areas. Village regulations can be established to standardize the environmental pollution in rural areas. We can gradually bring the rural environment and agro-ecological environmental management into institutionalization track through a series of measures.

3.6 Controlling the industrial pollution The fundamental method to prevent industrial pollution from damaging agricultural ecological environment is to develop circular economy, to implement cleaner production, and to take a new road of industrialization. Centralized control of pollution can be realized by establishing industrial parks. There are four specific measures for reducing the industrial pollution at present. Firstly, strictly control the discharge of industrial wastewater. Punishment on violation units should be more strictly in order to make the illegal cost higher than the control cost. Meanwhile, we should give the environmental protection department adequate rights for on-the-spot law execution, such as the closure of illegal sewage outfall and the order of stop production. Secondly, improve the treatment standards for sewage. Higher emission standards for local pollutant should be made according to the situation of small capacity of Jiangsu Province. Thirdly, implement the total control system of environmental capacity and the emission trading system. New sewage project shall not be granted in areas having no capacity, places already having sewage project should reduce the emissions. Emission rights should be carried out under compensable distribution and pricing trade according to the environmental, social and economic benefits. Fourthly, strictly control the air pollution caused by industry. Enterprises with serious pollution should be closed by the adjustment of industrial layout and the optimization of product structure. Desulfuration and dedusting of coal-fired boiler in enterprises should be strictly conducted. And their structure of fuel should be optimized, such as promoting gas, natural gas and liquefied petroleum gas.

3.7 Carrying out comprehensive management of water environment Relatively bigger water body (Taihu Lake in Southern Jiangsu, Gehu Lake, Yangcheng Lake, Shijiu Lake, Gucheng Lake, Tianmu Lake and Hengshan Reservoir) should be selected to establish strategic water resources. These water bodies should strictly carry out the guide line of primacy of protecting, and should control or prohibit the development activities. Riverbed dredging mainly includes the regularity of desilting work, the ecology of clearing mode, and the utilization of

sullage in field and afforestation. Inter-city or township pollution incidents of water body should be solved by legislation as soon as possible. Therefore, the specific and feasible compensation system for the upper reaches compensating the lower reaches, and the lower reaches protecting the upper reaches can be made.

3.8 Controlling the solid waste pollution In order to solve the problem of domestic waste in rural areas, we should, on the one hand, popularize the cleaning system, establish the cleaning team, and change the phenomenon of garbage misplacing. On the other hand, safe disposal of garbage after collection should be solved. Urban and rural arrangement, regional overall planning, and unified treatment can be conducted for the landfill and incineration of rural domestic waste. Promote the eco-toilet such as biogas digester. Livestock and poultry manure can be recycled and made for organic fertilizer.

3.9 Controlling the soil pollution Improving soil environment should start from the environment, such as reducing the pollution of air and water body, developing precision agriculture and organic agriculture, and strengthening the environmental remediation of contaminated soils. Crop varieties are planted according to the local conditions. And the unedible crops can be planted on contaminated soil.

3.10 Using the advanced technology to control pollution Advanced technologies or experiences in different regions should be summarized in time, and then be promoted. For instance, Taixing City has widely promoted the technology of total returning wheat-rice interplanting straw to field, which avoids the burning of the straw; Zhaiqiao Town uses plant extracts to control pests, the photosynthetic bacteria to cure fish diseases, the rice bran to make high-efficient fertilizer and other technologies to avoid the pollution of chemical inputs. Biogas technology is used in Lianshui County and other areas of Jiangsu Province. "One Pool with Three Improvements" in these areas not only solves the energy, health and sanitation problems of peasant household, but also solves the pollution problems of human and animal fecal waste, and even the straw. Moreover, biogas residues and slurry can be used as pest control agent or fertilizer by returning to the field.

3.11 Constructing eco-agriculture system Construct a sustainable eco-agriculture system following the laws of nature. Under the guidance of informationization and ecologization, the mechanization, chemicalization and intensification of agriculture are reconstructed, by carrying out the measures of three-dimensional cultivation, the three-dimensional planting, and the integrated planting and culturing. Therefore, precision agriculture and organic agriculture are developed, and the ecological planting and culturing can be realized. Production of high value-added green, organic and pollution-free foods can finally achieve the reclamation of straw and livestock manure, the reduction of agrochemicals and artificial feedingstuff, and the benign development of agro-ecosystem.

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江苏省农村环境治理问题的思考

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摘要 介绍了中国江苏省农村环境存在的一些问题:①水环境污染;②固体废弃物污染;③农用化学品污染;④工业企业污染。分析了江苏省农村环境问题产生的原因:一是对农村环境保护重视不够,环保人员严重缺乏,人员素质有待提升;二是农村环保投入严重不足,没有固定的污染治理资金来源和明确的投入引导政策及相关的财政补贴;三是农村环境综合整治没有形成合力,力量分散,资金使用效益受到影响;四是农村生产和生活方式的改变,使农业和农村生态系统的良性循环遭到破坏;五是乡镇企业对农村环境的污染,乡镇企业绝大部分没有防治污染的设施,工业“三废”严重超标。提出了江苏省农村环境治理的相关措施:一是完善基层政府政绩考核指标体系;二是建立多元化农村环保投入机制;三是加强农村环境管理队伍建设;四是提高农村公民的环保意识;五是完善农村环境保护法规;六是治理工业污染,包括严格控制工业废水的排放、提高污水处理标准;普遍实行环境容量总量控制制度和排污权交易制度、严格控制工业造成的大气污染;七是进行水环境综合治理;八是治理固体废弃物污染;九是治理土壤污染;十是运用先进科技治理污染;十一是构建生态农业系统。

关键词 农村;生态;环境治理

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广东省主要农产品的空间集聚度及其影响因素分析

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摘要 简要回顾了基尼系数在衡量产业区域分布差异程度方面的国内外文献,介绍了基尼系数的修正计算公式及衡量农产品集聚程度时的标准,分为6个等级:绝对均衡、比较均衡、相对均衡、相对集聚、比较集聚、绝对集聚。根据中国广东省2005和2007年主要农产品(稻谷、糖蔗、蔬菜、茶叶、龙眼和荔枝)的播种面积和产量数据,分别计算了广东省6大主要农产品的基尼系数值。结果表明:以播种面积和产量两个指标分别计算的基尼系数值相近,反映的集聚度相同;除龙眼外,广东省主要农产品空间布局相对集中,集聚度逐年增加。分析了广东省主要农产品集聚的影响因素:①资源,是影响农产品集聚生产的基础因素,各资源组合的地区差异,决定了农产品类型、规模和质量的差异;②生产习惯,一定程度上决定了农户生产什么及如何进行生产;③市场,是促使广东主要农产品集聚的核心因素,市场需求的变化将改变农产品生产的空间布局;④科技,为广东主要农产品的空间集聚提供了强有力的技术支撑;⑤流通,科技的发展使农产品的远距离运输成为可能,由此改变了农产品的生产布局,农产品的顺畅流通解决了农产品集聚生产的销路问题。提出了提高广东省主要农产品空间集聚度、促进农业产业集聚发展的相关建议。

关键词 广东省;主要农产品;集聚度;影响因素