FRONTIERS OF LAW IN CHINA
VOL. 12 JUNE 2017 NO. 2
DOI 10.3868/s050-006-017-0013-3

FOCUS

FOOD SAFETY AND FREE TRADE

SOURCE CONTROL OR END CONTROL: WHAT CHINA SHOULD DO TO ENSURE EDIBLE AGRICULTURAL PRODUCT SAFETY FOR EXPORTS?

LI Yanfang[*], *WU Kaijie*[**]

Abstract The article intends to figure out how agricultural product laws in China could be improved to ensure edible agricultural product safety and reduce potential food trade conflicts. The article first presents the background and legal framework for addressing the safety issues of edible agricultural product in China, with the conclusion that market-entry regulation has failed to perform this task. The article moves on to discuss the disadvantages of market-entry regulation (end-control measures) and the necessity of agricultural producing area safety regulation (source-control measures) on the following six aspects: gap between Chinese and Foreign standards, gap between domestic and export markets, small farms and diffused peasants, historical pollution and extrinsic pollution, lack of government enforcement and lack of consumer supervision. To improve agricultural producing area regulation, this article analyzes the primary drawbacks of current laws, primarily including unreasonable prohibited agricultural producing area standards, unclear pollution prevention rules, and regulatory overlaps and gaps. Finally, this article come up with corresponding solutions which contribute to a growing field of scholarship that examines food safety governance issues in the context of developing countries.

Keywords source control, food safety, edible agricultural product safety, export

INTRODUCTION ····· 194
I. STATUS OF EDIBLE AGRICULTURAL PRODUCT SAFETY IN CHINA ····· 196
A. Pollution in APA Environment: The Main Cause ····· 196
B. China's Edible Agricultural Product Safety Laws ····· 197

[*] (李艳芳) Ph.D. in Law, School of Law, Renmin University of China, Beijing, China; Professor, School of Law, Renmin University of China, Beijing 100872, China. Contact: liyf@ruc.edu.cn

[**] (吴凯杰) Ph.D. Candidate in Law, School of Law, Renmin University of China, Beijing 100872, China. Contact: wukaijie0524@foxmail.com

This article is an interim work of research project *Development and Application of Circular Agricultural Management Econometric Model and Analytical Method* (Project No. 2016-X53) supported by Ministry of Agriculture. The authors express gratitude to Professor ZHU Xiao for instruction on topic selection and perspectives.

1. Regulations on Market Entry of Agricultural Products ····· 197
2. Regulations on APA Safety ····· 199
C. Failure of Agriculture Food Safety Regulation ····· 200
II. WHY REGULATIONS ON APA SAFETY IS NECESSARY? ····· 202
A. Flexibility: Gap between Chinese and Foreign Standards ····· 203
B. Equity: Gap between Domestic and Export Markets ····· 203
C. Administrative Feasibility: Small Farms and Diffused Peasants ····· 205
D. Fairness: Historical Pollution and Extrinsic Pollution ····· 206
E. Political Feasibility: Lack of Government Enforcement ····· 207
F. Accountability: Lack of Consumer Supervision ····· 208
III. PRIMARY DRAWBACKS OF CURRENT APA SAFETY REGULATION ····· 209
A. Unreasonable Prohibited APA Standards ····· 209
B. Unclear Pollution Prevention Rules ····· 210
C. Regulatory Overlaps and Gaps ····· 212
IV. RECOMMENDATIONS FOR IMPROVING APA SAFETY REGULATION ····· 213
A. To Demarcate Prohibited APAs Reasonably and Compensate Farmers' Losses ····· 213
B. To Tighten Exogenous Pollution Regulation and Encourage Endogenous Pollution Reduction ····· 214
C. To Rearrange Agency Responsibilities to Eliminate Regulatory Overlaps and Gaps ····· 215
D. To Disclose Information regarding Pollution in APA Standards to Spur Public Supervision ····· 215
CONCLUSION ····· 216

INTRODUCTION

Though China's edible agricultural product exports have been increasing, safety issues have not been properly addressed yet. The amount of China's annual food exports has grown from US$ 26.7 billion in 2006 to US$ 71.34 billion in 2014.[1] This rapid growth should not cover up the fact that numerous food exports have been banned by importing countries, primarily developed countries. Since China's entry to the WTO in 2001, the WTO Agreement on the Application of Sanitary and Phytosanitary Measures (hereinafter "SPS") and Technical Barriers to Trade (hereinafter "TBT") have resulted in huge direct losses of China's agricultural exports. In 2001, about US$ 7 billion worth of Chinese exports were affected by SPS and TBT.[2] In 2007, about US$ 9 billion worth of

[1] See China Chamber of Commerce of Foodstuffs and Native Produce, 2014 年我国农产品进出口贸易情况及 2015 年展望 (*2014 China Agricultural Product Import and Export Trade Situation and 2015 Outlook*), available at http://www.cccfna.org.cn/article/电子杂志/16512.html (last visited Mar. 7, 2017).

[2] CHEN Chunlai, YANG Jun & Christopher Findlay, *Measuring the Effect of Food Safety Standards on China's Agricultural Exports*, 144(1) Review of World Economics, 83, 85–86 (2008).

Chinese exports were affected by SPS.[3] In 2013, US$ 4.36 billion worth of agricultural exports were still blocked, accounting for 6.6 percent of total agricultural exports.[4]

In response, Chinese government has relied on the stronger market-entry regulation of agricultural products. The primary approach is to impose strict standards on allowable residues in food. For instance, after the spinach exports to Japan were blocked for excessive pesticides residues, Chinese government responded with increasing food safety standards and strengthening inspection.[5] Presumably, the rationale is that end control could bring changes in agricultural producers' behaviors. This approach, however, as the following analysis showed, has been proved ineffective in practice.

As an alternative, source control of agricultural producing area (hereinafter "APA") safety has attracted more regulatory attentions in recent years. The government has gradually realized that without effective up-stream regulations, taking merely end-control measures at market-entry level is insufficient to address the problem. The 13th Five-Year Plan (2016–2020) promulgated by the National People's Congress (hereinafter "NPC") explicitly claimed that "[government should] prevent and control soil pollution based on classification, and give priority to agricultural land safe."[6] In line with this plan, the NPC Environment Protection and Resources Conservation Committee (hereinafter "EPRCC") has undertaken the task of drafting and proposing a new Soil Pollution Prevention and Control Law (hereinafter "SPPCL").[7] Currently, the first draft has been finished and would be proposed to the NPC Standing Committee for deliberation in late 2016.[8]

The article argued that source control of APA safety is necessary for ensuring edible agricultural product safety and reducing potential trade conflicts. To this end, current legal framework for APA safety regulation should be improved. Part I presented the background and legal framework for addressing edible agricultural product safety issue in China. Part II discussed the necessity of APA safety regulation for ensuring edible agricultural product safety. Part III analyzed the primary drawbacks of current APA safety

---

[3] DONG Fengxia & Helen H. Jensen, *Challenges for China's Agricultural Exports: Compliance with Sanitary and Phytosanitary Measures*, 22(1) Choices, 19 (2007), available at http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1222&context=econ_las_pubs (last visited Mar. 7, 2017).

[4] See China Chamber of Commerce of Foodstuffs and Native Produce, fn. 1.

[5] Details of this incident will be discussed in Part I. C.

[6] 中华人民共和国国民经济和社会发展第十三个五年规划纲要 (*The 13th Five-Year Plan for National Economic and Social Development of the People's Republic of China*), Central Compilation & Translation Press (Beijing), (2016).

[7] 十二届全国人大常委会立法规划 (*Legislation Plan of the 12th NPC Standing Committee*), issued on Oct. 30, 2013, adjusted on Aug. 3, 2015.

[8] NPC Environment Protection and Resources Conservation Committee, 关于第十二届全国人民代表大会第四次会议主席团交付审议的代表提出的议案审议结果的报告 (*Report of Deliberation Results of Proposals Submitted by Delegates of the 12th National People's Congress*), Dec. 21, 2016, available at http://www.npc.gov.cn/npc/xinwen/2016-12/26/content_2004955.htm (last visited Mar. 7, 2017).

regulation and the corresponding solutions were discussed in Part IV. Part V came to a brief conclusion.

I. STATUS OF EDIBLE AGRICULTURAL PRODUCT SAFETY IN CHINA

A. Pollution in APA Environment: The Main Cause

China's agricultural products have long suffered from the chemical contamination in APA environment.[9] If plants grow in a polluted environment, they will gradually absorb the pollutants from the surrounding air, water and soil into their body. These pollutants may do harm to humans.[10] Hence, well-protected APA environment is the first condition to ensure edible agricultural product safety.[11] In recent years, the APA environment in China has been deteriorating. In general, excessive heavy metals (such as cadmium and lead) have existed in the soil, organic pollutants have caused serious pollution in surface and ground water, and the compound pollution of fluoride and sulfur dioxide has aggravated in the atmosphere.[12] All the environmental pollution has contributed to the serious chemical contamination in edible agricultural products.

The pollution in APA environment primarily comes from two sources. Firstly, uncontrolled discharges of industrial and municipal wastes, as a result of rapid industrialization and urbanization, have brought excessive organic pollutants and heavy metals into the soil, agricultural water and atmosphere,[13] in view of the fact that China's most seriously polluted APAs are located around large and medium-sized industrial and mining sites as well as in the suburbs.[14] Statistical data showed that in 1980, China's arable land area polluted by industrial wastes was 2.667 million hm^2, which increased to 10 million hm^2 in 1992, and further increased to more than 20 million hm^2 in 2007,

---

[9] Chemical contamination includes pesticides residues, veterinary drug and hormone residues, heavy metals (such as lead), trace elements and toxins, and overuse of food additives. See Geoffrey S. Becker, *Food and Agricultural Imports from China*, CRS Report for Congress, Order Code RL34080, at 11 (2008).

[10] The harmful effects mainly include carcinogenic, teratogenic and mutagenic effects; allergic reactions; and increased resistance of bacteria to antibiotic treatments. See WANG Show, ZHU Huaping & GE Yu et al., *Status and Management of Chemical Residues in Food and Ingredients in China*, 20 Trends in Food Science & Technology, 425 (2009).

[11] In general, food safety risks that cause the foodborne-illness are classified to three main categories: microbiological contamination, chemical contamination, and physical contamination, which includes "anything from glass to rocks" that is not part of the food. See Robert Brackett, *Managing Food Safety Practices from Farm to Table*, National Academies Press (Washington, D.C.), at 46 (2009).

[12] DOU Yanfen, CHEN Tong & LIU Lin, 基于农业生产环节的农产品质量安全问题的思考 (*Study on Problems of Quality Safety of Agro-Products Based on Agricultural Production Processes*), 1 天津农学院学报 (Journal of Tianjin Agricultural University), 53 (2009).

[13] LÜ Kaiyu, XU Jianmin & LOU Bojie, 环境变化对农业产出的影响 (*Impact of Environmental Change on Agricultural Output*), 4 中国农村经济 (China Rural Economy), 63 (2008).

[14] SHI Rongguang, LIU Fengzhi & WANG Yuehua et al., 农产品产地禁产区划分中存在的问题与对策研究 (*Status and Related Countermeasures for the Division of Non-Producing Areas in Agricultural Producing Areas*), 2 农业环境科学学报 (Journal of Agro-Environment Science), 426 (2007).

accounting for about one fifth of all arable lands.[15]

Secondly, overuse of agricultural inputs, including chemical fertilizers, pesticides, plastic sheeting, has also caused serious pollution in agricultural soil and water environment. Growing in such environment, vegetables and fruits are unlikely to escape from safety problems. The total amount of fertilizer consumption has kept growing in the past years, from 12.69 million tons in 1980 to 55.61 million tons in 2010,[16] and the average application intensity reached 457 kg/ha in 2010, far exceeding the international safe level of 225kg/ha.[17] Some studies have shown that the proportion absorbed by crops in China is only about 35%, which means that a majority of applied fertilizers become the sources of pollution, resulting in eutrophication of surface water, nitrate enrichment of groundwater, acid rain and other environmental problems.[18] In addition, the large-scale use of pesticides also affects the water environment. The use of pesticide in China ranked first in the world in 2010 with the annual consumption of 1.758 million tons.[19] However, the effective absorption rate of pesticides is only 15 to 30 percent,[20] and the rest pesticides cause three-dimensional pollution in soil, water and air.

B. China's Edible Agricultural Product Safety Laws

To improve edible agricultural product safety, the NPC has promulgated the Agricultural Product Quality Safety Law (hereinafter "APQSL"),[21] which is the fundamental law regulating quality and safety of agricultural products; secondly, the Ministry of Agriculture (hereinafter "MOA") is authorized to enforce it. Altogether this regulatory framework is primarily comprised of two parts: the first part is the regulations on market entry of agricultural products; the second part is the regulations on APA safety. A chronological review of the development of this two-part framework will provide a useful background in understanding its legal reach and limitations.

1. Regulations on Market Entry of Agricultural Products. — The regulations on market entry of agricultural products consist of two main parts: first, the APQSL requires the MOA and relevant departments should enact agricultural product safety standards

---

[15] Id.

[16] JIN Shuqin & SHENG Guiyin, 中国农业面源污染的困境摆脱与绿色转型 (*To Get Rid of the Predicament and Green Transformation of Agricultural Non-Point Source Pollution*), 5 改革 (Reform), 80–82 (2013).

[17] Id.

[18] ZHU Zhaoliang, David Norse & SUN Bo eds. 中国农业面源污染控制对策 (*Policy for Reducing Non-Point Pollution from Crop Production in China*) (1st edition), China Environmental Science Press (Beijing), at 2 (2006).

[19] 中国农业年鉴 2011 (*China Agriculture Yearbook in 2011*), China Agriculture Press (Beijing), at 19 (2011).

[20] See ZHU, Norse & SUN, fn. 18.

[21] 中华人民共和国农产品质量安全法 (*Agricultural Product Quality Safety Law of the People's Republic of China*), promulgated by the Standing Committee of the NPC on Apr. 29, 2006, effective on Nov. 1, 2006.

(hereinafter "APSSs") as basis for enforcement;[22] second, the APQSL requires the state to establish a monitoring system of agricultural product safety to ensure that all agricultural products comply with APSSs.[23]

In recent years, the Chinese government has continued issuing APSSs. Take maximum residue limits (hereinafter "MRLs") of pesticides for example. In November 2012, the Ministry of Health and the MOA jointly issued the National Food Safety Standard — Maximum Residue Limits for Pesticides in Food, which contained 2,293 MRLs, about 1,400 more than the standard before, covering 322 kinds of pesticides in 10 categories of agricultural products.[24] In March 2014, this standard was expanded to include 3,650 MRLs covering 387 kinds of pesticides in 12 categories of agricultural products.[25] Among the 3,650 MRLs, 1,999 MRLs are made by the Codex, and 1,811 MRLs are stricter than or equal to the Codex Alimentarius Commission standards.[26] In July 2015, the standard was further extended to include 490 more MRLs covering 46 pesticides varieties than the 2014 standard.[27]

Compared to enacting the APSS, enforcing them is a more challenging job. To implement the APQSL monitoring provision, the MOA promulgated the Administrative Measures for Agricultural Product Quality Safety Monitoring in 2012.[28] It specifies that agricultural product safety monitoring should include risk monitoring and daily inspection;[29] monitoring data and information should be summarized and analyzed to reveal general agricultural product safety status and development trend;[30] inspection works should follow certain principles, methods and disciplines to ensure accuracy and

---

[22] Id. art. 11.

[23] See fn. 21 art. 34.

[24] See GB 2763—2012 食品安全国家标准食品中农药最大残留限量 (*GB 2763—2012 National Food Safety Standard — Maximum Residue Limits for Pesticides in Food*), jointly issued by the MOA and the Ministry of Health on Nov. 16, 2012, effective on Mar. 1, 2013).

[25] See GB 2763—2014 食品安全国家标准食品中农药最大残留限量 (*GB 2763—2014 National Food Safety Standard — Maximum Residue Limits for Pesticides in Food*), jointly issued by the National Health and Family Planning Commission and the MOA on Mar. 20, 2014, effective on Aug. 1, 2014, replacing *National Food Safety Standard — Maximum Residue Limits for Pesticides in Food GB2763–2012.*

[26] See FENG Hua, *China's New Standards on Pesticide Residue in Food Approach International Standards*, Mar. 29, 2014, available at http://paper.people.com.cn/rmrb/html/2014-03/30/nw.D110000renmrb_20140330_4-02.htm (last visited Mar. 7, 2017).

[27] See GB 2763—2016 食品安全国家标准食品中农药最大残留限量 (*GB 2763—2016 National Food Safety Standard — Maximum Residue Limits for Pesticides in Food*), jointly issued by the National Health and Family Planning Commission, the MOA and China Food and Drug Administration on Dec. 18, 2016, effective on Jun. 18, 2017, replacing *GB 2763—2014 National Food Safety Standard — Maximum Residue Limits for Pesticides in Food* .

[28] 农产品质量安全监测管理办法 (*Administrative Measures for Agricultural Product Quality Safety Monitoring*), issued by the MOA on Aug. 14, 2012, effective on Oct. 1, 2012.

[29] Id. art. 3.

[30] Id. art. 6.

fairness.[31] Among them, requirements on inspection by fast detection methods are particularly important. In practice, fast detection methods have been frequently applied because most inspections must be done in a limited period between the time when fresh agricultural products arrive markets and when they are put on sale.[32]

2. Regulations on APA Safety. — Regulations on APA safety are mainly comprised of these laws and rules: firstly, provisions regarding APAs in the APQSL; secondly, the Administrative Measures for the Safety of Agricultural Product Area (hereinafter "AMSAPA")[33], an administrative rule issued by MOA to implement the relevant provisions in the APQSL; thirdly, provisions regarding APA in local laws and rules implementing the APQSL.

While the APQSL does not explicitly use the concept of "safety" in its APA provisions, the AMSAPA comes up with this concept in interpreting these provisions. The AMSAPA chooses this concept, instead of "protection" or "environmental protection," because the ultimate objective of these provisions is to ensure agricultural product safety rather than protection of APA environment itself.[34] It indicates that environmental protection in APAs should be distinguished from environmental protection in general. On the basis of this principle, the regulations on safety of APAs establish the following systems:

(1) Monitoring and evaluation of agricultural production environment

Local departments of agriculture should establish a monitoring and management system, conduct investigation, monitoring and evaluation of APA safety, as well as issue annual reports of APA safety status and development trend.[35] To monitor the changes in the safety status of APAs, the MOA and provincial agricultural departments need to set up nation-control and province-control sites, primarily in the environmental vulnerable areas, important APAs, and other areas demanding monitoring.[36]

(2) Demarcation and adjustment of prohibited APAs

Prohibited APAs have three features: APAs themselves violate legal standards; their products violate legal standards; and the latter violation is caused by the former violation.[37] No unit or individual shall produce, fish or collect prohibited edible

---

[31] Id. chs. 3 & 4.

[32] HUANG Xianmin, 农产品质量安全监管的现状与思考 (*Status Quo and Thoughts of Agricultural Product Safety Regulation*), 3 农业环境与发展 (Agro-Environment & Development), 57 (2008).

[33] 农产品产地安全管理办法 (*Administrative Measures for the Safety of Agricultural Product Area*), issued by the MOA on Oct. 17, 2006, effective on Nov. 1, 2006.

[34] LI Yujin, 农产品产地安全管理办法主要内容及要点解释 (*Main Content and Interpretation of the Administrative Measures for the Safety of Agricultural Product Area*), 3 农业环境与发展 (Agro-Environment & Development), 1 (2007).

[35] See fn. 33 art. 4.

[36] Id. art. 5.

[37] Id. art. 8.

agricultural products in the prohibited APAs, or establish agricultural production bases.[38] Local agricultural departments shall take measures to recover prohibited APAs and other APAs polluted by toxic and harmful substances.[39] When prohibited APAs safety is improved so as to meet legal standards, their agricultural functions will be restored.[40]

(3) Prevention of pollution to APAs

Firstly, construction projects impacting agricultural production environmental should be reviewed by local agricultural departments.[41] By this way, local agricultural departments can take agricultural factors into account before environmental impact assessment of the constructions projects are submitted to environmental protection bureaus for general review.

Secondly, exogenous pollution should be prevented.[42] No unit or individual shall discharge or dump waste gas, waste water, solid waste or other toxic and harmful substances into APAs; or pile, store or dispose any industrial solid waste in APAs.[43] If industrial solid waste is piled, stored or disposed around APAs, effective measures shall be taken to prevent any damage to APA safety.[44]

Thirdly, endogenous pollution should be prevented.[45] If urban trash, sewage sludge or any other solid wastes are offered or used as agricultural water or fertilizer, these solid wastes shall receive innocuous treatment that conforms to relevant standards of the state.[46] An agricultural producer shall appropriately use agricultural inputs like fertilizer, pesticide, veterinary medicine, feed, feed additive and agricultural films, and shall not use any banned, obsolete or unlicensed agricultural inputs.[47] An agricultural producer shall timely eliminate, re-collect agricultural films and pack materials so as to prevent them from polluting the APA environment.[48]

C. Failure of Agriculture Food Safety Regulation

Though China has realized the significance of edible agricultural product safety, and established a legal framework for addressing this problem, the status has been far from satisfied. The reason is that though both source-control and end-control measures on edible agricultural product safety exist, in practice the government has primarily relied on

---

[38] See fn. 21 art. 16; id. art. 19.

[39] See fn. 33 art. 16.

[40] Id. art. 12.

[41] Id. art. 18.

[42] See fn. 21 art. 18.

[43] See fn. 33 art. 20.

[44] Id.

[45] See fn. 21 art. 19.

[46] See fn. 33 art. 21.

[47] Id. art. 22.

[48] Id.

end-control measures by strengthening and expanding market-entry regulations. On the contrary, the regulations on APA safety have outdated and rarely been enforced. The following review of the frozen spinach safety incident shows how Chinese government responds to the incident through end-control measures, and how the safety disputes have continued.

In December 2001, a media reported that excessive pesticide residues were found in over 47 percent of vegetables in China's domestic markets, arising significant concerns among Japanese consumers.[49] In March 2002, a Japanese civil organization initiated the private testing on frozen vegetables made in China and found high residues of pesticides chlorpyrifos in frozen spinach imported from China.[50] The Japanese government responded by incorporating frozen vegetables into import inspection and also found excessive residues of chlorpyrifos in frozen spinach from China in April 2002.[51]

In July 2002, the Japanese government issued a voluntary ban on the frozen spinach import from China as a means of food safety management.[52] By voluntary ban, the Japanese government requested Japanese importing companies to voluntarily refrain from the import of frozen spinach from China.[53] The voluntary ban was lifted after eight months in February 2003, but was imposed again three months later when new inspections found excessive chlorpyrifos residues in frozen spinach from China.[54] The voluntary import ban was not lifted until June 2004. In addition to the voluntary ban, Japan tightened the MRL of the pesticide chlorpyrifos in spinach from 0.1 ppm to 0.01 ppm in 2002,[55] and also increased the rate of inspection to 15–18 percent of all food products from China from 2004 to 2009.[56]

In response, the Chinese government proposed an improvement strategy to meet the demand of the Japanese government for handling the issue properly, mainly including the measures as follows: Firstly, the Chinese government banned the use of pesticide

---

[49] Akane Matsuda, *Food Safety Issues in the Vegetable Trade between China and Japan: What Is Required to Establish Effective Food Safety System in Their Bilateral Food Trade?*, MPP Essay, Oregon State University, 2010, at 13, available at http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/18638/matsuda.pdf (last visited Mar. 7, 2017).

[50] Id. at 14.

[51] Id.

[52] Ministry of Health, Labor and Welfare of Japan (MHLW), 平成 16 年輸入食品監視統計 (*Labor and Welfare Japan Statistics of Imported Foods Monitoring for FY 2004*), Jun. 2005, at 8, available at http://www.mhlw.go.jp/topics/yunyu/dl/tp0130-1b.pdf (last visited Mar. 7, 2017).

[53] Id.

[54] Id.

[55] See CHEN, YANG & Findlay, fn. 2 at 86.

[56] Ministry of Health, Labor and Welfare of Japan (MHLW), *Statistics of Imported Foods Monitoring for FY 2009*, Aug. 2010, at 4, available at http://www.mhlw.go.jp/topics/yunyu/dl/07toukei_en.pdf (last visited Mar. 7, 2017).

chlorpyrifos for spinach exported to Japan in August, 2002.[57] Secondly, Chinese government developed the "vertically integrated supply chain" to establish a traceability system of food products.[58] The farms allowed to produce spinach for exports were limited to the leased, company-owned, or contracted farms, which were required to establish their own inspection centers for pesticide residues, and perform inspections regularly. Thirdly, the General Administration of Quality Supervision, Inspection and Quarantine (hereinafter "AQSIQ") conducted inspections on each lot of spinach before exporting to Japan.[59] Fourthly, the difference of safety standards between China and Japan was solved. Japan's MRL of chlorpyrifos in spinach was 0.01 ppm, while the corresponding MRL in China was 1.00 ppm. To remove the gap, the AQSIQ agreed to apply Japan's level of MRLs though it was 100 times stricter than China's standard then.[60]

These measures showed that Chinese government relied primarily on end-control measures rather than source-control APA safety regulations to deal with food safety problems. Since the frozen spinach safety problem, trade disputes on edible agricultural product safety have continued. From 2004 to 2009, the number of China's food exports blocked by Japan showed an upward trend, and reached the peak in 2009 with 304 times.[61] Since 2010, the situation has improved but the number of blocks was still high. Statistics showed that from 2010 to 2012, China's food exports blocked by Japan due to disqualified agricultural and veterinary drug residues accounted for 38.87%, 34.27% and 29.08% of the total number, respectively.[62]

II. WHY REGULATIONS ON APA SAFETY IS NECESSARY?

Though the Chinese government has taken end-control measures to ensure safety of food exported to Japan and other countries, which may have temporary effects but are unlikely to solve the problem from the source. In view of the failure of end-control measures, this article argued that China should switch to stronger source control on APA safety.

---

[57] As for the frozen spinach in stock that were produced before Aug. 2002, the Chinese government ensured implementation of special inspections in pursuant to Japanese safety standards, and provided governmental-inspection stickers on the products that passed the inspection.

[58] See Matsuda, fn. 49 at 19.

[59] Id.

[60] Ministry of Agriculture, Forestry, and Fisheries of Japan (MAFF), 輸入野菜の安全管理 (*Safety Management of Imported Vegetables: China and Thailand*), Mar. 2005, at 8, available at http://www.maff.go.jp/j/syouan/seisaku/risk_analysis/priority/zanryu/pdf/16rmpr.pdf#search=%27 (last visited Mar. 7, 2017).

[61] ZHANG Yan, 中国对日本食品出口现状及对策研究 (*Study of Status Quo of Chinese Food Exports to Japan and Its Countermeasure*), 7 价格月刊 (Price Monthly), 36 (2015).

[62] Id.

A. Flexibility: Gap between Chinese and Foreign Standards

The first reason is that effective source control of APA safety can offer flexibility for exporters when importing countries lift their food safety standards. Effective regulations on APA safety can eliminate the source of safety problems, and therefore agricultural products from regulated APAs are subject to less concern of higher standards. On the contrary, if exporters only control their food safety downstream at the market-entry level, they are likely to face serious troubles when the standards change.

China has expanded and tightened the standards for pesticide residues in food, but a big gap still exists between Chinese and Japanese standards. Firstly, Japanese standards have a much wider coverage than Chinese standards. As introduced above, current Chinese standards have set 4,140 pesticides MRLs. But Japan's Positive List System for Agricultural Chemical Residues in Foods, which took effect on May 29, 2006, contains up to more than 50,000 pesticides MRLs,[63] almost covering all kinds of pesticides existing in the world.[64] In addition, Japan also sets a uniform standard of 0.01 ppm for all other unlisted pesticides, which further enlarges the risk of violation.[65]

Secondly, Japanese standards are stricter than Chinese standards. Among Japanese and Chinese correspondent standards, 25% of the Japanese standards are stricter than the corresponding Chinese standards. For instance, the MRL of malathion in vegetables is 8 ppm under Chinese standards, a hundred times higher than that in the Japanese standards. China sets the MRL of Fenpropathrin in lentils at 0.5 ppm, 50 times higher than Japan. Japan may also conduct more frequent inspections on Chinese edible agricultural product exports. In 2008, the inspection rate was 18.6 percent, which was two times of that for the food products from the US.[66] Thompson et al. described Japanese inspections as an "aggressive testing program" comparing to the one percent tested placed on Chinese food products by the U.S. authorities.[67]

B. Equity: Gap between Domestic and Export Markets

Even if Chinese standards could be consistent with foreign standards, a likely result is that edible agricultural products exported could meet these standards, while food sold in domestic markets are still subject to lower standards or insufficiently inspected. Such gap

---

[63] See CHEN, YANG & Findlay, fn. 2 at 87.

[64] GUO Yingyu, 日本实施新标近乎苛刻 蔬菜出口门槛陡增 (*Japan Adopts Strict New Standards and Chinese Vegetable Exports Become Harder*), 国际先驱导报 (International Herald Leader), May 26, 2006, available at http://news.xinhuanet.com/food/2006-05/26/content_4604066.htm (last visited Mar. 7, 2017).

[65] LI Qin & WANG Yutang, 应对"绿色壁垒"迎接新的挑战——释析日本食品中残留农药肯定列表制度 (*Respond to Green Barriers and Welcome New Challenges: Explanation of Japan's Food Pesticide Residue Positive List System*), 4 中国水产 (China Fisheries), 61 (2006).

[66] Drew Thompson & HU Ying, *Food Safety in China: New Strategies*, 1(2) Global Health Governance, 14 (2007).

[67] Id.

between domestic and export markets would not only cause equity issues among agricultural produces, but also ultimately affect export markets. In comparison, such problem will not appear if APA safety is well controlled.

Before 2009, regulations on market entry of agricultural products for export market were stricter than those for domestic market.[68] The domestic market, where more than 99 percent of production volume goes, requires lower level of quality and safety.[69] In a comparison, the production suppliers in the export market are limited due to the high-standard product quality and safety requirement.[70]

Such situation happened after the frozen spinach safety incident. Since then, the Details for Registration of Vegetable Planting Bases for Export, which was enacted in January 2003,[71] prescribed that the companies producing fresh or frozen vegetables for export markets were required to own farms larger than 20 hectares for direct management and control of all the production processes. To meet these government requirements, Chinese export companies started to lease small farms from the individual farmers to create sufficiently large farm bases for the export markets. As of 2007, only 380,000 hectares out of 121 million hectares of farmland in China were approved to produce food products for export market.[72] Obviously, the "20 hectares" standard could be criticized as arbitrary and unfair to the small farmers who have good controls of food safety issues.

In addition, the export markets are not completely independent from the domestic markets. In the frozen spinach safety incident, Japanese government's updated inspection was initially triggered by news about unsafe vegetables found in Chinese domestic markets, which shows that food safety problems in domestic markets of exporting countries are likely to cause suspicion among the consumers in importing countries. Consequently, the governments of importing countries may add inspections or even tighten the standards specially for the suspicious exporters. Even if the exported food could pass the inspections, the consumers of importing countries may be willing to buy other similar products from more reliable sources rather than them.

Such suspicion will not easily fade away. The percentage of people without an affinity for China has increased since 2003, after the frozen spinach safety incident happened. The annual survey conducted by Japanese cabinet office showed that friendly feelings of Japanese to China were at their lowest level in 2005 since the government started polling

---

[68] ZHANG Xiaoyong, QIU Huanguang & HUANG Zhurong, *Linking Small Scale Farmers in China with the International Markets: A Case of Apple Export Chains*, 12 International Food and Agribusiness Management Review, 105 (2009).

[69] The World Bank, *China's Compliance with Food Safety Requirements for Fruits and Vegetables Promoting Food Safety, Competitiveness, and Poverty Reduction*, at 12 (2005).

[70] Linda Calvin, Fred Gale & HU Dinghuan et al., *Food Safety Improvements Underway in China*, 4 Amber Waves, 17 (2006).

[71] See Matsuda, fn. 49 at 23.

[72] Fred Gale & Jean C. Buzby, *Imports from China and Food Safety Issues*, 52 Economic Information Bulletin, 20 (2009).

on the topic in 1978.[73] In addition, the survey conducted by Tokyo-Beijing Forum showed that Japanese consumers regarded Chinese food products "unsafe" or "dangerous" to eat, and safety of Chinese food products were recognized as a primary reason that hindered the development of bilateral relationship as mentioned above.[74] Another survey conducted by Frozen Food Association showed Japanese consumers' perception of the Chinese vegetables remained to be "untrustworthy" as of 2009.[75]

Without effective regulations on safety of APA, the gap between Chinese and Japanese standards will continue existing. Most Chinese farmers will be unable to get access to the Japanese market, and average Chinese consumers will be unable to have food of the same safety level as Japanese consumers. Therefore, to solve all these problems at the source, regulations on safety of APAs should be strengthened.

C. Administrative Feasibility: Small Farms and Diffused Peasants

China's agriculture has long been dominated by small peasants, which has caused serious difficulty in enforcing market-entry regulations. They tend to care production more than safety not only due to economic incentives, but also unawareness and irrationality. Altogether, end control of market-entry regulations is unlikely to be effective. If government takes direct actions to restore and protect APA safety, farmers are more likely to understand the objective of policy and take safer agricultural producing methods.

The domination of small peasants in Chinese agriculture will last for a long time. On the one hand, although the forms of agricultural producers are diversified, the time has not come to change the *status quo* of small peasants as basic production unit of Chinese agriculture.[76] Even in the future, small-scale family farms will continue for a long period, both for Chinese unique institutional environment and the multiple advantages of small-scale agriculture in planting and breeding.[77]

As the agricultural income is lower than other incomes, small farmers are more inclined to increase the use of pesticides, fertilizers and veterinary drugs for higher output than before.[78] The market economy and rapid urbanization process in China have offered farmers more job opportunities. In recent years, wage income has been a major part of farmers' income due to the rising labor prices. In 1990, the wage income of farmers was

---

[73] See Matsuda, fn. 49 at 37.

[74] Id. at 36.

[75] Id.

[76] CHEN Xiwen, 陈锡文谈农业经营主体问题 (*CHEN Xiwen Talks about Agricultural Operation Entity Problem*), 3 林业经济 (Forestry Economics), 47 (2011).

[77] HUANG Zongzhi, 龙头企业还是合作组织? (*Leading Company or Cooperative Organization?*), 4 中国老区建设 (China's Construction of Old Revolutionary Basic Area), 25–26 (2010).

[78] YU Liyan & WANG Dianhua, 环境壁垒对我国食品出口的影响——基于农产品食品安全的视角 (*Impact of Environmental Barriers on China Food Exports: Based on the Perspective of Food Safety of Agricultural Products*), 5 财经问题研究 (Research on Financial and Economic Issues), 50 (2011).

RMB 138.80, accounting for 20.22% of per capita net income; in 2011, the wage income of farmers was RMB 2,969.43, accounting for 42.47%.[79] Correspondingly, the proportion of agricultural income has decreased from 66.45% in 1990 to 36.12% in 2011.[80] The scarcity of labor and the increase in non-agricultural income render the farmers reluctant to allocate labor to heavy and "inefficient" works (such as the use of farm manure). They prefer "quick-effect" chemicals. Household with more cash income, especially non-agricultural income, tends to purchase chemical fertilizers rather than manure.[81]

Even in absence of economic motivations, small farmers are inclined to overuse agricultural inputs due to the unawareness and imperfect rationality. Although farmers are the direct victims of rural environmental pollution, their understanding is very limited. A survey of 200 peasant households showed that 75.3% of the farmers thought that agricultural activities were harmless to the environment.[82] Because agriculture became the "sideline" of the peasants, most of them adopted a kind of extensive behavior without caring about the cost-benefit of agriculture. In the process of planting major grain crops, the application rate of chemical fertilizers in China has not conformed to the rational assumption of profit maximization.[83] Due to the lack of education among farmers and weak promotion of agricultural technology by government, farmers do not know how to use pesticides in a right way.[84]

D. Fairness: Historical Pollution and Extrinsic Pollution

The fourth reason for stronger APA regulations is that a large portion of APA in China has already been polluted by past owners or extrinsic sources. Until these problems of historical and extrinsic pollution are properly addressed, APAs' current users, especially the small peasants, would be unwilling and incapable to restore the environment by themselves. Even worse, the existing situation may discourage them to take care of the farmlands. Obviously, end-control measures are incapable to address this fairness resulting from historical and extrinsic pollution.

In April 2014, the Ministry of Environmental Protection and the Ministry of Lands

---

[79] See *China Agriculture Yearbook in 2011*, fn. 19.

[80] Id.

[81] GONG Qianwen, ZHANG Junbiao & LI Jin, 农户施肥量决策的影响因素实证分析——基于湖北省调查数据的分析 (*Empirical Study on Impact Factors of Farmer Fertilizer Application Amount Decision: Based on Data of Hubei Province*), 10 农业技术经济 (Issues in Agricultural Economy), 63 (2008).

[82] RAO Jing & JI Xiaoting, 微观视角下的我国农业面源污染治理困境分析 (*Microscale Analysis of Governance Predicament of Agricultural Non-Point Pollution*), 12 农业技术经济 (Journal of Agrotechnical Economics), 11 (2011).

[83] PEND Chao, 中国农民化肥施用行为：一个新古典经济学的反例 (*Fertilizer Input Behavior of China Farmers: A Counter-Example of Neoclassic Economics*), in ZHAO Changbao ed. 农村发展：25 年的村户观察 (*Rural Development: 25-Year Observation of Villages*), China Agriculture Press (Beijing), at 209–220 (2012).

[84] See DOU, CHEN & LIU, fn. 12.

and Resources jointly issued a report on the status of pollution in nationwide soil.[85] It showed that 16.1 percent of all investigated lands exceeded relevant soil environmental quality standards, and the number was even higher for arable lands to be 19.4%.[86] Primary pollutants include metals like cadmium, nickel, copper, arsenic, mercury and lead, and pesticides like DDT and polycyclic aromatic hydrocarbons.[87] In general, the report concluded that human activities such as industrial production, mining and agricultural production were the main causes of excessive pollutants.[88]

Apparently, for the farmers living on the polluted arable lands, it is not a meaningful policy to simply require them to produce safe agricultural products. Facing high food safety standards that their polluted lands do not be allowed to achieve, they have to spend unbearable amount of money on dealing with soil pollution, otherwise they must give up their lands and find new jobs. As most small farmers have no other skills than farming, they will probably continue to produce unsafe agricultural products regardless of legal violations. In this view, before Chinese farmers become less reliant on their lands for living, a more meaningful policy is to assist farmers in improving their lands and instructing them to use lands more wisely.

E. Political Feasibility: Lack of Government Enforcement

The fifth reason is that regulatory agencies usually fail to fully enforce the edible agricultural product quality standards due to political reasons. When agricultural products have already been produced, local governments tend to balance farmers' interests (selling agricultural products might be their only source of income) and food safety. In comparison, APA safety regulations will not render enforcing agencies to face such "difficult" decision and leave less room for political intervention.

It can be seen from the fact that high-poison and high-residue pesticides are allowed in markets.[89] By the end of 2005, about 600 pesticide varieties were registered in China, of which more than 350 pesticide varieties were produced and used in large scale.[90] More than 22,000 kinds of pesticide products were registered.[91] With regards to the toxicity, high-toxic varieties of organic phosphorus pesticides currently accounted for more than half of the pesticides, about 35% of all insecticides.[92] Excessive use of pesticides results

---

[85] Ministry of Environmental Protection & Ministry of Land and Resources, 全国土壤污染情况公报 (*Nationwide Soil Pollution Investigation Report*), Apr. 17, 2014, available at http://www.zhb.gov.cn/gkml/hbb/qt/201404/W020140417558995804588.pdf (last visited Mar. 7, 2017).

[86] Id.

[87] Id.

[88] Id.

[89] See DOU, CHEN & LIU, fn. 12.

[90] AN Jian, ZHANG Qiong & NIU Dun eds. 中华人民共和国农产品质量安全法释义 (*Explanation of the Agricultural Product Quality Safety Law*), Legal Press (Beijing), at 48 (2006).

[91] Id.

[92] Id.

in a large number of toxic and hazardous substances remaining in the APA environment.

Cadre promotion system and local protectionism have been intensively criticized as underlying reasons for loose enforcement. ZHANG Weidong found that local officials' promotion mechanism and protectionism were important reasons of the inadequate implementation of environmental policies.[93] The thoughts of "GDP overrides all" and "do what leaders say" made local governments busy with implementing the targets assigned by higher-level governments, launching large projects but ignoring the problem of local sustainable development, such as environmental pollution. ZHOU Li'an believed that the "promotion tournament" as an incentive model was an important source of Chinese miracle, but also resulted in a series of distorting consequences, such as food and drug safety supervision, environmental pollution.[94] Lorentzen found that the local environmental protection bureaus got funds from local government, and environmental decision-making of local government was vulnerable to the kidnapping of large local enterprises.[95] Therefore, in the absence of adequate funding sources, local environmental protection bureaus were difficult to really do a good job in environmental governance.

F. Accountability: Lack of Consumer Supervision

When agricultural products have entered into marketplace, consumers are unable to participate in supervision of agricultural products safety and hold the competent government agencies accountable due to the "experience goods" and "trust goods" nature of agricultural products. Lack of information disclosed on APA pollution has further aggravated this problem. In view of this fact, source control of APA safety is necessary and relevant information should be disclosed.

First, the nature of agricultural product safety makes it difficult for consumers to supervise farmers. Agricultural product safety has both characteristics of experiencing goods and trusting goods.[96] The characteristic of experiencing goods refers to the fact that consumers are unable to obtain safety information until they consume them. For instance, only after eating beef with Escherichia coli and becoming sick could consumers be aware of the problem. The characteristic of trusting goods refers to a more serious situation that even after consuming them, consumers may be still unable to know about the safety of agricultural products, such as pesticides residues. Because of such

---

[93] ZHANG Weidong & WANG Hai, 我国环境政策对经济增长与环境污染关系的影响研究 (*China Environment Policy's Impact on the Relationship between Economic Growth and Environmental Pollution*), 12 中国软科学 (China Soft Science), 32 (2007).

[94] ZHOU Li'an, 中国地方官员的晋升锦标赛模式研究 (*Governing China's Local Officials: An Analysis of Promotion Tournament Model*), 7 经济研究 (Economic Research Journal), 50 (2007).

[95] Peter Lorentzen, Pierre Landry & John Yasuda, *Undermining Authoritarian Innovation: The Power of China's Industrial Giants*, 76(1) The Journal of Politics, 13 (2014).

[96] LI Gongkui & YING Ruiyao, "柠檬市场"与制度安排——一个关于农产品质量安全保障的分析框架 (*Lemon Market and Institutional Arrangement: An Analytic Framework for Agricultural Quality and Safety Control*), 3 农业技术经济 (Journal of Agrotechnical Economics), 15 (2004).

information asymmetry, it is difficult for individual consumers to effectively supervise agricultural producers by themselves. Compared to low-quality agricultural products, producing high-quality demands higher input without higher price in the market. Therefore, numerous farmers choose to produce low-quality agricultural products.[97]

Second, though the government can promote consumer supervision by disclosing information regarding APA environment, government agencies have failed to do this job well. The Ministry of Environment and the Ministry of Land and Resources have conducted a national soil pollution survey since April 2005, which was the first soil pollution survey covering the whole country to find out the specific situation of soil pollution.[98] Though a report of this survey was finally released on April 2014, it only provided information on soil pollution in general without specific locations and pollutants.[99] Due to the trusting goods nature of cadmium rice, even farmers themselves can hardly realize the problem of excessive cadmium in rice.[100] If the pollution is not disclosed, consumers are unable to figure out unsafe agricultural products and thus unable to use their purchase power to force them out of markets.

III. PRIMARY DRAWBACKS OF CURRENT APA SAFETY REGULATION

The analysis above showed that APA safety regulations is necessary for ensuring edible agricultural product safety. Though the APQSL has already established a legal framework for APA safety regulations, they are ineffective in practice. There are three primary drawbacks: First, standards for demarcating prohibited APAs are unreasonable; second, rules on pollution prevention are incomprehensive and ambiguous; third, enforcing authorities are problematic for regulatory overlaps and gaps.

A. Unreasonable Prohibited APA Standards

Considering that 19.4 percent of arable lands have already been seriously polluted, demarcating prohibited APAs could prevent the production of unsafe agricultural products and thus eliminate food safety at the source. But the standards for demarcating prohibited APAs have not sufficiently considered the needs of food safety.

Current standards for demarcating prohibited APAs are set based on the absolute amount of pollutants in soil, rather than that ultimately entering into the agricultural products. In many heavy metal pollution incidents, APAs did not violate legal standards, but the agricultural products growing on them did. Multiple surveys on environmental quality of farming soil also showed that though farming soil did not contain excessive

---

[97] See DOU, CHEN & LIU, fn. 12.

[98] See Ministry of Environmental Protection & Ministry of Land and Resources, fn. 85.

[99] Id.

[100] ZHANG Man, ZHANG Jing & PU Mingzhe et al., 我国农业产地环境污染成因及治理对策——以镉大米为例 (*China's Production Environmental Pollution Reasons and Countermeasures: Taking Cadmiun- Tained Rice as an Example*), 6 林业经济 (Forestry Economics), 26 (2014).

lead, their products had lead exceeding legal standards,[101] which indicates that it is inaccurate to evaluate soil quality exclusively by total amount of heavy metals in soil, and instead more attention should be paid to how much of them are indeed absorbed by crops.

At present, prohibited APAs have been demarcated in accordance with the national Soils Environmental Quality Standard (hereinafter "SEQS").[102] Because SEQS only stipulates maximum levels of eight types of heavy metals in soil, it can only provide information on the potential reserves of heavy metals without reflecting the amount of heavy metals entering the plants.[103] To correctly evaluate the impact of heavy metal pollution on agricultural products, it is necessary to reveal such "effective amount." Hence, the SEQS can only serve as "screening standard," "guideline standard," or "target value," but cannot be used as the basis for demarcating APAs.[104]

Another shortage in the SEQS is that it provides the same limits of heavy metals applicable to the whole country. As China has vast territory, various soil types and crop varieties, the capacity of crops to absorb heavy metals from soil is highly diversified.[105] Therefore applying the same limits to different districts is likely to deviate from the real needs of local agricultural situations and an evaluation standard system of farmland soil pollution adapting to China's national conditions should be set up.

B. Unclear Pollution Prevention Rules

Rules on pollution prevention are crucial for maintaining and restoring farming lands' capacity of producing qualified vegetables, but currently they are not sufficiently comprehensive and unambiguous. Some significant sources of pollution are left unregulated by APQSL. Consequently, local regulations on pollution prevention have been highly diversified.

With respect to exogenous pollution, the primary problems are that: Firstly, the scope

---

[101] For example, some provinces in southern China have acidic soil with low pH value. Though its quality conforms to the SEQS, the agricultural products from it exceed the food safety standards. Though some pollution-free bases in Yunnan, Guangxi, Guangdong and Sichuan exceed the SEQS, the output of agricultural products did not violate food safety standards. See ZHOU Qiwen & SHI Rongguang, 关于推进农产品产地安全管理的思考 (*Thoughts on Pushing Forward Management of APAs*), 3 农产品质量安全 (Quality & Safety of Agro-Products), 10 (2010).

[102] GB 15618—1995 土壤环境质量标准 (*Soils Environmental Quality Standard GB 15618—1995*), issued by the National Environmental Protection Agency and the National Technology Supervision Agency on Jul. 13, 1995, effective on Mar. 1, 1996.

[103] LIU Fengzhi, SHI Rongguang & JIA Lanying et al., 土壤污染与食用农产品安全 (*Soil Pollution and Edible Agricultural Product Safety*), 3 农业环境与发展 (Agricultural Environment and Development), 1 (2010).

[104] LUAN Yunxia, LU Anxiang & WANG Jihua, 镉米问题形成原因及对策思考 (*Thoughts on Reason and Solution of Cadmium-Tained Rice*), 6 农产品质量安全 (Quality and Safety of Agro-Products), 49 (2013).

[105] Planting crop varieties vary greatly. Soil type, crop variety, soil pH value, cation exchange capacity, climatic conditions, organic content and many other factors will affect the crops on soil heavy metal absorption.

of "waste water" in most local regulations has been overly limited to exclude village sewages. For instances, the agricultural environmental protection regulations in seven provinces (the Inner Mongolia Autonomous Region, Gansu, Hubei, Anhui, Jiangsu, Guangxi, Liaoning) interpret "waste water" as "industrial waste water and urban sewage," not rural sewage.[106] In a comparison, very few local regulations like the Shandong Agricultural Environmental Protection Ordinance revised in 2013 interprets "waste water" as "industrial wastewater and domestic sewage."[107] Considering the increasing rural domestic garbage in recent years, and its homogenization trend with urban domestic garbage, the APQSL should adopt Shandong Province's understanding of "waste water," incorporating rural sewage into the normative field of vision.

Secondly, the concept of "waste gas" is not comprehensive enough to include all kinds of air pollutants affecting agricultural environment. Article 18 of the APQSL forbids emitting "waste gas" to APAs without specifying its scope. In interpreting the meaning of "waste gas," the legislative practices of different provinces are quite divergent. For instance, Article 18 of the Shandong Agricultural Environmental Protection Ordinance revised in 2013 interprets the "waste gas" as "waste emissions, smoke dust and fine dust."[108] Article 17 of the Inner Mongolia Autonomous Region Agricultural Environmental Protection Ordinance revised in 2010 interprets "waste gas" as "toxic and harmful gases, dust and so on."[109] In addition, Article 25 of the Gansu Agro-Ecological Environmental Protection Ordinance, as amended in 2007, interprets "waste gas" as "waste gas, dust or other gas containing toxic and harmful substances."[110] The interpretations of "waste gas" in other provinces' legislative practice are also different.

---

[106] 内蒙古自治区农业环境保护条例 (*Inner Mongolia Autonomous Region Agricultural Environmental Protection Ordinance*), issued by the Mongolia Autonomous Region People's Congress Standing Committee on Jan. 12, 1995, revised on Sep. 21, 2010; 甘肃省农业生态环境保护条例 (*Gansu Agro-Ecological Environmental Protection Ordinance*), issued by the Gansu Province People's Congress Standing Committee on Dec. 20, 2007, effective on Mar. 1, 2008; 湖北省农业生态环境保护条例 (*Hubei Agro-Ecological Environmental Protection Ordinance*), issued by the Hubei Province People's Congress Standing Committee on Sep. 29, 2006, effective on Dec. 1, 2006; 安徽省农业生态环境保护条例 (*Anhui Agro-Ecological Environmental Protection Ordinance*), issued by the Anhui Province People's Congress Standing Committee on Jun. 6, 1999, revised on Jun. 29, 2006; 江苏省农业生态环境保护条例 (*Jiangsu Agro-Ecological Environmental Protection Ordinance*), issued by the Jiangsu Province People's Congress Standing Committee on Dec. 29, 1998, revised on Jun. 17, 2004; 广西壮族自治区农业环境保护条例 (*Guangxi Zhuang Autonomous Region Agricultural Environmental Protection Ordinance*), issued by the Guangxi Zhuang Autonomous Region People's Congress Standing Committee on May. 30, 1995, revised on Jun. 3, 2004; 辽宁省农业环境保护条例 (*Liaoning Agricultural Environmental Protection Ordinance*), issued by the Liaoning Province People's Congress Standing Committee on Jan. 19, 1996, revised on Jun. 30, 2004.

[107] 山东省农业环境保护条例 (*Shandong Agricultural Environmental Protection Ordinance*), issued by the Shandong Province People's Congress Standing Committee on Apr. 21, 1994, revised on Nov. 29, 2013, art. 17.

[108] Id. art. 18.

[109] See *Inner Mongolia Autonomous Region Agricultural Environmental Protection Ordinance*, fn. 106.

[110] See *Gansu Agro-Ecological Environmental Protection Ordinance*, fn. 106.

With respects to endogenous pollution, the primary problem is that agricultural wastes have not been sufficiently regulated, especially the livestock wastes. Agricultural wastes such as agricultural films, agricultural inputs packages, livestock waste, straw and other agricultural waste have caused increasingly serious pollution to APAs. But at present the provincial regulations on the disposal of agricultural wastes are not inclusive enough. Of the seven provinces that have promulgated agricultural product quality and safety regulations, only four provinces (Henan, Hainan, Shanxi, the Ningxia Hui Autonomous Region) regulate livestock wastes in addition to agricultural films and agricultural inputs packages.[111] Another two provinces (Jiangsu and Shandong) only require reasonable disposal of agricultural films and agricultural inputs packages.[112] Xinjiang's regulation even do not mention the rational disposal of agricultural wastes.[113] Adding provisions on the reasonable disposition of agricultural wastes will help to change the existing deficiencies in the provincial practices.

C. Regulatory Overlaps and Gaps

In addition to the drawbacks in laws, the enforcing authorities are problematic for regulatory overlaps and gaps. Many departments have authority on the supervision of APA environment, including the Ministry of Environmental Protection, Ministry of Land and Resources, MOA, China Food and Drug Administration, National Development and Reform Commission. Specifically, the Ministry of Environmental Protection is responsible for restricting the discharge of industrial waste gas and waste water; the Ministry of Land and Resources is responsible for monitoring the pollution in the land; the MOA is mainly responsible for the management of pollution in agricultural products; the China Food and Drug Administration is responsible for regulating food safety in

---

[111] 河南省实施中华人民共和国农产品质量安全法办法 (*Regulations of Henan Province on Implementing Agricultural Product Quality Safety Law of the People's Republic of China*), issued by the Henan Province People's Congress Standing Committee on May 30, 2013, effective on Oct. 1, 2013; 海南省农产品质量安全条例 (*Regulations of Hainan Province on Agricultural Product Quality Safety*), issued by the Hainan Province People's Congress Standing Committee on Mar. 30, 2013, effective on Jun. 1, 2013; 山西省农产品质量安全条例 (*Regulations of Shanxi Province on Agricultural Product Quality Safety*), issued by the Shanxi Province People's Congress Standing Committee on Dec. 1, 2011, effective on Mar. 1, 2012; 宁夏回族自治区实施中华人民共和国农产品质量安全法办法 (*Regulations of Ningxia Hui Autonomous Region on Implementing Agricultural Product Quality Safety Law of the People's Republic of China*), issued by the People's Congress Standing Committee of the Ningxia Hui Autonomous Region on Dec. 1, 2011, effective on Jan. 1, 2012.

[112] 江苏省农产品质量安全条例 (*Regulations of Jiangsu Province on Agricultural Product Quality Safety*), issued by the Jiangsu Province People's Congress Standing Committee on May 25, 2011, effective on Sep. 1, 2011; 山东省农产品质量安全条例 (*Regulations of Shandong Province on Agricultural Product Quality Safety*), issued by the Shandong Province People's Congress Standing Committee on May 27, 2011, effective on Oct. 1, 2011).

[113] 新疆维吾尔自治区实施中华人民共和国农产品质量安全法办法 (*Regulations of the Xinjiang Uygur Autonomous Region on Implementing Agricultural Product Quality Safety Law of the People's Republic of China*), issued by the People's Congress Standing Committee of the Xinjiang Uygur Autonomous Region on Jul. 29, 2011, effective on Oct. 1, 2011.

production, circulation, sales and other sections.

Multi-departmental management, however, is prone to cause the problems of unclear division of labor, conflicts of interest, and low management efficiency. Various problems will arise such as how to monitor and communicate the pollution, how to resettle farmers, how to deal with the produced crops, which department is responsible for pollution control and so on.[114] Therefore, there is a great potential of regulatory overlaps and gaps between the regulatory authorities.

IV. RECOMMENDATIONS FOR IMPROVING APA SAFETY REGULATION

Preceding discussion shows that current APA safety regulations are ineffective due to drawbacks in laws as well as its enforcement. To ensure edible agricultural product safety, current APA safety regulations should be improved in the following three aspects: first, to demarcate prohibited APAs reasonably and compensate farmers' losses; second, to tighten exogenous pollution regulations and encourage endogenous pollution reduction; third, to rearrange agency responsibilities to eliminate regulatory overlaps and gaps; fourth, to disclose the information regarding pollution in APAs for public supervision.

A. To Demarcate Prohibited APAs Reasonably and Compensate Farmers' Losses

To improve the agricultural product safety, China should first forbid agricultural production in seriously polluted APAs and then take measures to restore their quality. To this end, demarcating prohibited APAs could be a promising policy. However, the analysis above shows that current standards for demarcating prohibited APA are unreasonable. The standards need to be rationalized and revised based on the number of pollutants indeed absorbed by plants, considering local conditions including soil, irrigation water, the atmosphere and other environmental factors.[115]

In addition, compensating farmers' losses resulting from demarcation of prohibited APAs is important to promote their compliance. Usually the pollution is not from endogenous pollution like agriculture activities, but endogenous sources such as industrial and urban wastes[116] Endogenous pollution often results from accumulated pollution, not necessarily the responsibility of the current producers.[117] The areas may be devalued when becoming prohibited APAs. Considering the fact that current agricultural production is still dominated by small scattered farmers, whose capacity to bear losses is weak, it is necessary to give some economic compensation to the non-responsible producers when delineating the prohibited APAs.

---

[114] See ZHANG, ZHANG & PU et al., fn. 100 at 23–25.

[115] Id. at 23.

[116] ZHOU Ying, ZHOU Qingbo & ZHOU Xuying et al., 国外农业清洁生产补偿政策模式及对我国的启示 (*Study on the Compensation Policy Model of Agricultural Cleaner Production abroad and the Enlightenment to China*), 36(1) 农业现代化研究 (Research of Agricultural Modernization), 7 (2015).

[117] Id.

Some local regulations have already required compensation for such losses. For example, the Regulations of Shanxi Province on Agricultural Product Quality Safety stipulate that the parties responsible for the pollution should compensate for such losses, if people in charge cannot determine, the county government should make appropriate compensation.[118] In view of this, it is necessary to add the provision for compensation for losses caused by demarcation of prohibited APAs to the APQSL.

B. To Tighten Exogenous Pollution Regulation and Encourage Endogenous Pollution Reduction

Laws should be revised to tighten exogenous pollution regulations. For instance, the APQSL forbids emissions and dumping of waste gas to APAs.[119] To fully protect agricultural products from air pollution, the terms of "waste gas" should be interpreted expansively as covering all possible air pollutants that affect agricultural product safety, including exhaust gas, smoke dust, fine dust and other gases containing toxic and hazardous substances. Among them, "Gas containing toxic and harmful substances" should function as a miscellaneous provision and regulate all other air pollutants not included in the enumeration list to provide comprehensive protection of agricultural products from the adverse effects of air pollution. In view of the divergent interpretations of "waste gas" in local legislations, this concept should be refined and specified in the APQSL.

With regards to endogenous pollution, the APQSL should adopt a encouraging approach instead of mandatory requirements. Due to the small-scale and decentralized pattern of agricultural production, agricultural producers have not paid enough attentions to agricultural waste pollution, and usually lack knowledge and means to deal with agricultural waste pollution by themselves. Therefore, local government needs to play a more active role in encouraging and instructing them. In fact, this approach has already been confirmed by Environmental Protection Law, which stipulates that "the people's governments at various levels shall strengthen the protection of agricultural environment and promote the use of new technologies for agricultural environmental protection, strengthen the monitoring and early warning of agricultural pollution sources, and coordinate relevant departments to take measures to prevent soil pollution."[120] As a special law regulating the agricultural product safety, the APSQL should refine the responsibilities of local government in protecting agricultural environment.

---

[118] See *Regulations of Shanxi Province on Agricultural Product Quality Safety*, fn. 111.

[119] See fn. 21 art. 18.

[120] 中华人民共和国环境保护法 (*Environmental Protection Law of the People's Republic of China*), revised on Apr. 24, 2014, effective on Jan. 1, 2015, art. 33.

C. To Rearrange Agency Responsibilities to Eliminate Regulatory Overlaps and Gaps

APA safety regulations involve multiple departments whose responsibilities should be specified and coordinated with each other. Regulations on APA safety mainly involve the Ministry of Environmental Protection, the Ministry of Land and Resources, the MOA, China Food and Drug Administration, National Development and Reform Commission and so on. As multi-departmental management is prone to encounter problems such as unclear division of labor, conflicts of interest, and low management efficiency, the involved departments need to clarify their own responsibilities and common management.

To realize the objective of ensuring edible agricultural product safety, emphasis should be put on prevention and treatment of APA pollution. To this end, the Ministry of Environmental Protection needs to regulate the discharge of industrial wastes, urban wastes, agricultural wastes and other pollutants, preventing them from contaminating agricultural lands.[121] For already contaminated lands or water, departments should take measures to reduce their impacts on food safety. In line with this principle, the Ministry of Land and Resources should monitor the specific situation of soil pollution, and exchange information with other departments; the MOA and China Food and Drug Administration should monitor food from polluted APAs in the market.[122]

D. To Disclose Information regarding Pollution in APA Standards to Spur Public Supervision

Chinese soil cadmium pollution generally shows point-like distribution. Disclosing information regarding pollution is not only conducive to guiding governance of contaminated areas, preventing pollution from spreading to non-polluted areas, but also allowing consumers to supervise agricultural products safety.

American practices could be referred to address this issue. The National Health and Nutrition Survey (NHS), conducted by the National Center for Health Statistics (NCHS), has been in operation since the early 1960's. From its official website, the public can see the data about soil pollution nationwide over the years. In addition, the Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture is responsible for monitoring heavy metals in the APAs, and the monitoring reports are also available on its official website. The information and data systems provide the basis for national decision-making.[123] Compared to the US, Chinese investigations on soil pollution have not been continuous, and the soil survey results are usually not published.[124] Which areas

---

[121] See ZHANG, ZHANG & PU et al., fn. 100.

[122] Id.

[123] WANG Wei, 典型国家和地区农产品产地土壤污染防治立法对我国的启示 (*Enlightenment of Agro-Soil Pollution Prevention and Control Legislation in Typical Countries and Regions*), 32(2) 农业资源与环境学报 (Journal of Agricultural Resources and Environment), 150 (2015).

[124] See ZHANG, ZHANG & PU et al., fn. 100.

have been polluted? By which kinds of pollutants? How much area has been polluted? Only when such information is investigated and disclosed on a regular basis could the consumers win the battle of food safety.

CONCLUSION

To improve edible agricultural product safety, firstly better APA safety regulations are needed to strengthen the source control. Compared to end-control measures like market-entry regulations, APA safety regulations could offer more flexibility when the gap between Chinese and foreign standards exists or even expands. Secondly, though market-entry regulations tend to create a gap of food safety level between domestic markets and exporting markets, APA safety regulations could avoid such equity issue. Thirdly, APA safety regulations are more administratively feasible given the fact of numerous small farms and diffused peasants. Fourthly, before historical and extrinsic pollution issues are properly addressed, it is unfair to require the affected farmers to comply with market-entry regulation. Fifthly, it is politically infeasible for local government to fully enforce market-entry regulations when numerous unsafe agricultural products have already been produced. Sixthly, the nature of agricultural products makes it hard for consumers to supervise when they have already been put on sale.

Current APA safety regulations established by APQSL and AMSAPA have been troubled by problems of unreasonable prohibited APA standards, unclear pollution prevention rules, and regulatory overlaps and gaps. This article believes that this situation could be improved by demarcating prohibited APA standards reasonably and compensating farmers' losses, tightening exogenous pollution regulation and encouraging endogenous pollution reduction, rearranging agency responsibilities to eliminate regulatory overlaps and gaps, and disclosing information regarding pollution in APAs for public supervision.