



CAFOs IN THE US AND CHINA: A COMPARISON ON THE LAWS THAT PROTECT WATER

QUALITY FROM FACTORY FARMING

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Americans are infamous for their love of meat. On average, Americans eat about three hamburgers a week,¹ 150 million hot dogs over the July 4th holiday,² and approximately 46 million turkeys are eaten on Thanksgiving Day.³ Overall, Americans consume about 224 pounds of meat a year.⁴

China, on the other hand, is famous for a low meat diet that some have pronounced as the solution to heart disease, diabetes, and even cancer.⁵ However, some in China are turning away from their traditional meals of vegetables flavored with meat and embracing a Western-style, meat and fast-food heavy diet.⁶ In fact, meat consumption is dramatically rising in China – “China’s annual meat consumption of 71 million tons is more than double that in the United

¹ Ellen Rolfes, *The Hidden Costs of Hamburgers*, PBS.ORG (Aug. 2, 2012) available at <http://www.pbs.org/newshour/rundown/the-hidden-costs-of-hamburgers/>.

² Tim Clark, *How Many Hot Dogs will American’s Consumer over the July 4th Holiday?*, FORBES (July 3, 2014) available at <http://www.forbes.com/sites/sap/2013/07/03/how-many-hot-dogs-will-americans-consume-over-the-july-4th-holiday/>.

³ Toby Lyles and Amy Roberts, *Thanksgiving by the Numbers*, CNN (Nov. 25, 2014) available at <http://www.cnn.com/2012/11/21/living/thanksgiving-by-the-numbers/>.

⁴ Mia MacDonald and Sangamithra Iyer, *Skillful Means: The Challenges of China’s Encounter with Factory Farming*, Brighter Green 2008, at 2 available at http://brightergreen.org/files/brightergreen_china_print.pdf.

⁵ FORKS OVER KNIVES, <http://www.forksoverknives.com/synopsis/>

⁶ Malcolm Moore, *China is Now Eating Twice as Much Meat as the United States*, TELEGRAPH (Oct. 12, 2012) available at <http://www.telegraph.co.uk/news/worldnews/asia/china/9605048/China-now-eats-twice-as-much-meat-as-the-United-States.html>.

States.”⁷ Though the Chinese, per capita, still eat far less meat than an American,⁸ China’s meat consumption is rising while the meat consumption in the US has been dropping.⁹

Now the question on many people’s lips is how will China feed its growing meat consumption when its country has a scarcity of resources¹⁰ and 40% of its arable land is already degraded?¹¹ One solution has been China’s adoption of industrial meat production, otherwise known as a concentrated animal feeding operations or “CAFOs.”¹² A CAFO, or factory farm, “is a large industrial operation that raises large numbers of animals for food.”¹³ CAFO production in America began in the early 20th century and is now responsible for most of America’s meat production and feeding its love for cheap meat, eggs and dairy.¹⁴

If China decides to fully follow the US’s CAFO path, it will be at a great cost. CAFOs degrade air quality¹⁵, are a major contributor to climate change,¹⁶ raise major public health concerns,¹⁷ contribute to antibiotic resistant pathogens,¹⁸ are inhumane to livestock,¹⁹ and

⁷ Janet Larsen, Meat Consumption in China Now Double that in the United States, Earth Policy Institute (April 24, 2012) available at http://www.earth-policy.org/plan_b_updates/2012/update102.

⁸ MacDonald, *supra* note 4, at 2.

⁹ Larsen, *supra* note 7.

¹⁰ Tom Levitt, *Should China Replicate the US Factory Farming Model?*, CHINA DIALOGUE (Mar. 3, 2014) available at <https://www.chinadialogue.net/blog/6779-Should-China-replicate-the-US-factory-farming-model/-en>.

¹¹ Dominique Patton, *More Than 40 Percent of China’s Arable Land Degraded: Xinhua*, REUTERS (Nov. 4, 2014) available at <http://www.reuters.com/article/2014/11/04/us-china-soil-idUSKBN0IO0Y720141104>.

¹² Levitt, *supra* note 10; Moore, *supra* note 6.

¹³ ASPCA, <https://www.aspc.org/fight-cruelty/farm-animal-cruelty/what-factory-farm>.

¹⁴ *Id.*; FARM FORWARD, <http://farmforward.com/ending-factory-farming/>.

¹⁵ *Iowa Concentrated Animal Feeding Operations: Air Quality Study Final Report*, IOWA STATE UNIVERSITY AND THE UNIVERSITY OF IOWA STUDY GROUP (February 2002) available at http://www.public-health.uiowa.edu/ehsrc/CAFOstudy/CAFO_final2-14.pdf.

¹⁶ David N. Cassuto, *The CAFO Hothouse: Climate Change, Industrial Agriculture and the Law*, ANIMALS & SOCIETY INSTITUTE, 5 (2010).

¹⁷ Paul Ebner, *CAFOs and Public Health: Pathogens and Manure*, ID-356, PURDUE EXTENSION available at <https://www.extension.purdue.edu/extmedia/ID/cafo/ID-356.pdf>; Kendall M. Thu, Public Health Concerns for Neighbors of Large-Scale Swine Production Operations, *Journal of Agricultural Safety and Health of ASAE* 175, 182 (2011).

¹⁸ Carrie Hribar, *Understanding Concentrated Animal Feeding Operations and Their Impact on Communities*, NATIONAL ASSOCIATION OF LOCAL BOARDS OF HEALTH, 10 (2010), available at http://www.cdc.gov/nceh/ehs/docs/understanding_cafos_nalboh.pdf; ANTIBIOTIC RESISTANCE PROJECT: THE PEW

destroy our water.²⁰ Though each of these problems are important, this paper will only focus on the water quality problems that are created from CAFO pollution.

China, in their march to becoming an industrialized animal agricultural country, has been proactive in creating laws that try to prevent environmental degradation from CAFOs. In fact, they have already written a law that attempts to regulate and prevent pollution from CAFOs,²¹ while the US does not have a single law solely dedicated to the regulation of CAFOs. The purpose of this paper is to compare each country's approach to preventing water pollution from CAFOs. Part I will discuss the growth of CAFOs in the US and in China. Part II will describe the water quality issues associated with CAFOs. Part III will compare four different parts of water protection laws in each country: (a) Water permits in US and China; (b) Best Management Practices and the CAFO Law; (c) Public Participation; (d) Incentive Measures. Part IV will discuss why each country, despite a seemingly robust law system, is failing to prevent water pollution from CAFOS. Finally, in Part V, will discuss some new avenues in each country that may be possible solutions to CAFO water pollution.

I. The Growth of Industrialized Farming in the United States and in China

CHARITABLE TRUSTS, <http://www.pewtrusts.org/en/projects/antibiotic-resistance-project/about/antibiotic-use-in-food-animals>.

¹⁹ Michael Pollan, *THE OMNIVORE'S DILEMMA: A NATURAL HISTORY OF FOUR MEALS* 317 (2006)

²⁰ Henning Steinfeld, et. al., *Livestock's Long Shadow: Environmental Issues and Options*, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (2006); *Environmental Impact of Industrial Farm Animal Production*, PEW COMMISSION ON INDUSTRIAL FARM ANIMAL PRODUCTION; Claudia Copeland, CONG. RESEARCH SERV., RL31851, ANIMAL WASTE AND WATER QUALITY: EPA REGULATION OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs) 5 (2008); UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, *What's the Problem?*, <http://www.epa.gov/Region9/animalwaste/problem.html#river> (last visited April 21, 2015); UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, EPA-821-R-99-002, Preliminary Data Summary: Feedlots Point Source Category Study, 1 (1999); Frank R. Spellman & Nancy E Whiting, ENVIRONMENTAL MANAGEMENT OF CONCENTRATED ANIMAL FEEDING OPERATIONS (CAFOs), 223 (CPC Press, 2007).

²¹ The Regulation on the Prevention and Control of Pollution from Large-Scale Breeding of Livestock and Poultry (promulgated by the State Council of the People's Republic of China, Nov. 11, 2013, effective Jan 1, 2014) (China [hereinafter CAFO Law]).

For centuries, the US and China were both largely agrarian cultures where most animals were raised on small farms. However, this has recently begun to change for both countries.

A. *The United States*

A number of key facts and changes allowed the US to transition from a country reliant on small, family farms to feed its citizens to a country that is reliant on CAFOs. The US's farming culture began to change after World War II when America's affluence allowed it to become more concerned with not only feeding its own citizens, but also the world.²² The time after World War II also brought in the "Green Revolution", which despite its name, did not mean a tidal wave of organic agriculture in America, but instead a transformation that relied on a "regime of genetic selection, irrigation, and chemical fertilizers, and pesticides" that resulted in significant increases in output for corn and grains.²³ This surplus of corn and grain made it very inexpensive to feed these products to animals and made industrialized animal agriculture more profitable.²⁴ New technologies in farm animal management allowed for the farmers to raise the

²² *Putting Meat on the Table: Industrial Farm Animal Production In America*, PEW COMMISSION ON INDUSTRIAL FARM ANIMAL PRODUCTION 3 (2008) [hereinafter *Putting Meat*].

²³ *Id.*; see also, Cassuto, *supra* note 16, at 3 ("The availability of synthetic fertilizer meant that rotating crops became unnecessary and the growing demand for corn could be met with an even larger output by the nation's farms.").

²⁴ *Id.*; see also, Pollan, *supra* note 19, at 39 ("Iowa livestock farmers couldn't compete with the factory-farmed animals their own cheap corn had helped spawn, so the chickens and cattle disappeared from the farm, and with them pastures and hay fields, and fences."); Cassuto, *supra* note 16, at 4 ("The overflowing storehouses and ever-growing supply of corn created an urgent need to make use of the resulting stockpiles.").

animals in increasingly higher concentrations.²⁵ Finally, when the animal industry became “vertically integrated”²⁶ the CAFO industry was created.

These farms are focused one thing and one thing only – producing the cheapest animal products.²⁷ To fulfill this goal, factory farmers raise a high concentration of one type of animal in the smallest amount of space possible,²⁸ feed those animals a high-calorie diet of corn and soy, and try to maximize the animals’ growth in the shortest period of time.²⁹ In this environment, the “animals are treated as machines” where their pain or comfort is unimportant.³⁰ For example, broiler chickens are confined to long-warehouse-like sheds where up to 20,000 birds are tightly confined, sometimes with no more than sixty-seven inches of space to move and making any natural behavior – like foraging or even just stretching their wings, impossible.³¹ Breeding sows are confined in gestation crates with cement floors where the sow cannot turn around, walk or engage in any natural behavior.³² The non-breeding pigs raised for meat will also be put into intensive confinement where the animals can become aggressive and their tails must be docked to prevent tail-biting among the confined animals.³³ Egg-laying hens, who spend their whole life stuffed into cages with half-dozen other hens, have no ability to behave

²⁵ *Id.* at 5.

²⁶ *Id.* Vertical integration means that the grower (farmer) who raises the animals no longer owns the animals, but only owns the buildings where the animals are raised. Rather, an integrator (company) controls all phases of the production from the ownership of the animals, the feed, to the slaughter. In the US, vertical integration began with the poultry industry and was quickly picked up by the pork industry. *id.*, at 5-8.

²⁷ THE CAFO READER: THE TRAGEDY OF INDUSTRIAL ANIMAL FACTORIES, at xiv (Daniel Imhoff ed., 2010) [hereinafter, The CAFO Reader].

²⁸ Putting Meat, *supra* note 22, at 5.

²⁹ The CAFO Reader, *supra* note 27, at xiv.

³⁰ Pollan, *supra* note 19, at 317.

³¹ Bruce A. Wagman & Matthew Liebman, WORLDVIEW OF ANIMAL LAW 71 (2011).

³² *Id.*, at 77.

³³ *Id.*, at 57.

naturally so they will begin cannibalizing their mates and rub their skin against the cage until it bleeds.³⁴

Types of CAFOs in America tend to be concentrated in certain areas. Broiler chickens are found along the eastern shore of the Chesapeake Bay, Arkansas, Alabama, Georgia, western Kentucky, and North Carolina.³⁵ CAFOs that raise eggs are concentrated in Iowa and Ohio while swine CAFOs are mostly found in Iowa and North Carolina.³⁶ These pockets of CAFOs are dependent upon the different policies in each state where some state governments encourage animal agriculture by promulgating policies that allow CAFOs to avoid paying for the full cost of their operation or receive subsidies from the state.³⁷

China

Since 1980, the meat consumption in China has quadrupled to nearly 119 pounds per person each year.³⁸ (Though they still lag behind America in their carnivorous appetite – Americans, on average, consumes about 220 pounds per year.³⁹) This is a massive change from only 50 years ago when from 1959 and 1961, during a period known as “Three Bitter Years”, the country suffered through a national famine that killed nearly 30 million Chinese.⁴⁰ Peter Li, who grew up in Jiangxi province and is now a professor at University of Houston in Texas, remembers when he was a child that “every person was allotted one pound of pork a month.⁴¹” Now, he says that now the Chinese are “eating meat in revenge” and the Chinese government is

³⁴ Pollan, *supra* note 19, at 317.

³⁵ The CAFO Reader, *supra* note 27, at xvi.

³⁶ *Id.*

³⁷ *Id.*

³⁸ MacDonald, *supra* note 4, at 2.

³⁹ *Id.*, at 1.

⁴⁰ *Id.*, at 3.

⁴¹ *Id.*

concerned that they will not be able to feed their citizens.⁴² The government knows that only “12 percent of China’s land is arable..., rapid urbanization has created a massive exodus of rural labor into cities,⁴³ and that the country only has about “a quarter of the per capita freshwater resources globally.”⁴⁴ Many in the government believe that CAFOs are the solution to this problem.⁴⁵

But before industrialized farming began in China, for thousands of years farming in China was focused on the small-scale family farms. Pork, as it is today, was a key source of protein for thousands of years,⁴⁶ and small-scale farming raised all of the pork.⁴⁷ The farmers raised indigenous pigs who played a key role on the farm as they ate weeds, leftovers from the kitchen and the fields, and their manure was a nutrient-rich fertilizer for the farmer’s crops.⁴⁸ Comparatively, the chicken and dairy has been a much smaller industry in China. Broiler meat and chicken eggs were not an important part of the Chinese diet, but were only luxury meals that should only be eaten on special occasions.⁴⁹ Dairy has also not been a major part of the Han Chinese’s diet because of “cultural preferences and high rates of lactose intolerance.”⁵⁰

Today, China’s consumption of chicken, pork, and dairy products has soared. In only three decades, the Chinese have gone from eating 1kg of chicken to over 9kg per year,⁵¹

⁴² *Id.*

⁴³ Shefali Sharma, *The Need for Feed: China’s Demand for Industrialized Meat and Its Impacts*, THE INST. FOR AGRIC. AND TRADE POLICY 14 (Feb. 2014).

⁴⁴ Linden J. Ellis and Jennifer L. Turner, *Surf and Turf: Environmental and Food Safety Concerns of China’s Aquaculture and Animal Husbandry*, 9 WOODROW WILSON INT’L CTR FOR SCHOLARS 19 (2007).

⁴⁵ MacDonald, *supra* note 4, at 5.

⁴⁶ Mindi Schneider, *Feeding China’s Pigs: Implications for the Environment, China’s Smallholder Farmers and Food Security*, INST. FOR AGRIC. AND TRADE POLICY 3 (May 2011).

⁴⁷ *Id.*, at 6.

⁴⁸ *Id.*

⁴⁹ Chendong Pi with Zhang Rou & Sarah Horowitz, *Fair or Fowl? Industrialization of Poultry Production in China*, INST. FOR AGRIC. AND TRADE POLICY 11 (Feb. 2014).

⁵⁰ Shefali Sharma & Zhang Rou, *China’s Dairy Dilemma: The Evolution and Future Trends of China’s Dairy Industry*, INST. FOR AGRIC. AND TRADE POLICY 13 (Feb. 2014).

⁵¹ Chendong, *supra* note 49, at 9.

producing 41 million tons of milk in 2010 (which is an annual growth rate of 12.8% since 2000),⁵² and producing 50 million metric tons of pork which is almost half of the global total of 101.5 million metric tons.⁵³ Significantly, this steady growth has been achieved by both modern, industrialized farms and small, peasant farms.⁵⁴ In 2005, “in pig, dairy cow, beef cattle, sheep/goat, layer and broiler farming, peasant household-based farms accounted for 93.77% of the farm total producing 44.14% of the livestock slaughtered.”⁵⁵

Despite this, the domination of small farmers in China is ending.⁵⁶ By 2005, one study found that 51% of all animals raised for food came from CAFOs with 75% of chickens coming from industrialized farms.⁵⁷ China is enthusiastic to adopt foreign industrial farming and to Chinese officials, “adoption of the Western farming model was a proud sign of progress.”⁵⁸ China is also following the US model by becoming more vertically integrated “with large corporations increasingly owning not just factory farm facilities but also slaughterhouses and feed companies.”⁵⁹

There is also a push to follow in the industrialized food system because of the number of food safety scares that have occurred in China. One of the most influential food-safety scares was in 2008 when the Chinese media broke the news that tens of thousands of infants in China had fallen sick from eating infant formula that had been laced with melamine.⁶⁰ Unfortunately,

⁵² Sharma, *supra* note 50, at 13.

⁵³ Schneider, *supra* note 46, at 5.

⁵⁴ Peter J. Li, *Exponential Growth, Animal Welfare, Environmental and Food Safety Impact: The Case of China's Livestock Production*, 22 J. OF AGRIC. AND ENVTL ETHICS 217, 226 (2009).

⁵⁵ *Id.*, at 9.

⁵⁶ *Id.*

⁵⁷ See Ellis, *supra* note 44, at 20 (noting that “a CAFO is defined as a farm having an output of greater than 50 pigs, 500 egg-laying chickens, 2,000 meat chickens (broilers), 10 beef cows, 5 milk cows, or 30 sheep.”), p20.

⁵⁸ Li, *supra* note 54, at 13.

⁵⁹ MacDonald, *supra* note 4, at 8.

⁶⁰ Sharma, *supra* note 50, at 15.

six infants died from the formula and over 30,000 children suffered from kidney stones.⁶¹ The scandal was blamed on a number of individuals in the dairy sector, including government officials that ignored the practice of using melamine, but the media put the biggest blame on small-scale farmers.⁶² Other food safety scares involving *streptococcus suis* in pigs, pork laced with clenbuterol, and melamine found in eggs, pet food, and pork⁶³ have pushed China to “move away from small-scale, integrated, more environmentally sound animal husbandry to large CAFOs” that can be better monitored.⁶⁴

II. CAFOs and Water Quality

Industrialized livestock operations have an incredible impact on water.⁶⁵ First, intensive animal agriculture uses a significant amount of water. Water is needed to clean the facilities and waste management systems.⁶⁶ Additional water is needed to water the animals because animals raised in CAFOs are only fed corn or grain and cannot forage, where they would receive some water from the grass or plants, so the animals must be provided with additional water.⁶⁷ Water is also used to produce the grain, soy, and corn that is used to feed the animals.⁶⁸ It has been estimated that it could take up to 5,214 gallons of water to produce one pound of beef.⁶⁹

Second, CAFOs pollute the water.⁷⁰ The main source of pollution is from the animal waste which contains a number of pathogens including salmonella, cryptosporidium,

⁶¹ *Id.*

⁶² *Id.*

⁶³ MacDonald, *supra* note 4, at 9.

⁶⁴ Ellis, *supra* note 44, at 27.

⁶⁵ Steinfeld, *supra* note 20, at 167.

⁶⁶ *Environmental Impact of Industrial Farm Animal Production*, *supra* note 20, at iv; Copeland, *supra* note 20, at 5.

⁶⁷ Steinfeld, *supra* note 44 at 128.

⁶⁸ George Wuerthner, *Assault on Nature: CAFOs and Biodiversity Loss*, in *THE CAFO READER: THE TRAGEDY OF INDUSTRIAL ANIMAL FACTORIES* 182, 186 (Daniel Imhoff, ed, 2010).

⁶⁹ Cassauto, *supra* note 16, at 9.

⁷⁰ Copeland, *supra* note 20, at 5.

streptococci, and giardia, and millions of fecal coliform bacteria.⁷¹ The waste usually contains pesticides, heavy metals, antibiotics, hormones, and salt.⁷² The chief concern with animal waste, however, is the excess nutrients, including nitrogen, ammonia, and phosphorus which are dangerous for humans and the environment.⁷³

While animal waste was once considered an important tool of farming, as it provided a wonderful (and free) source of fertilizer for the farmer's crop fields, with the industrialization of animal farming, animal waste has gone from a positive to a negative merely because of the incredible amount of animal waste that is produced. The large farms can produce anywhere from 2,800 to 1.6 million tons of manure annually.⁷⁴ For comparison, a hog farm with 800,000 hogs can produce over 1.6 million tons of manure per year, which is one and a half times more than the annual sanitary waste produced by Philadelphia, Pennsylvania, a city of almost 1.5 million people.⁷⁵ But the difference between human waste and animal waste is that human waste is treated with a rigorous process and held to high standards while animal waste remains a fairly unregulated process.⁷⁶

In the US, livestock and poultry waste is handled either as a liquid, slurry, or solid⁷⁷ and generally the waste is either stored in lagoons or it is sprayed onto land.⁷⁸ Both techniques have their host of problems which will be explained below.

⁷¹ *What's the Problem?*, *supra* note 20; EPA-821-R-99-002, *supra* note 20, at 1. .

⁷² Spellman, *supra* note 20, at 220-27; EPA-821-R-99-002, *supra* note 20, at 1; Putting Meat, *supra* note 22, at 25.

⁷³ EPA-821-R-99-002, *supra* note 20, at 1.

⁷⁴ U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-944, Concentrated Animal Feeding Operations: EPA Needs More Information and a Clearly Defined Strategy to Protect Air and Water Quality from Pollutants of Concern 5 (2008).

⁷⁵ *Id.*, at 19.

⁷⁶ The CAFO Reader, *supra* note 27, at 84.

⁷⁷ Spellman, *supra* note 20, at 101.

⁷⁸ The CAFO Reader, *supra* note 27 at 84. There are other ways that the animal waste can be used, including in composting and biogas production, and these methods will be explained later in the paper.

For lagoon storage, the farmers create a massive pit or dry waste pile where the manure is held.⁷⁹ The pit can cover as much as 120,000 square feet and a single CAFO can have hundreds of lagoons that can be thirty feet deep.⁸⁰ The pits are lined with polyethylene shells, but they can become punctured so that animal waste begins to leak out of the lagoon into the water and soil.⁸¹ Rain or storms can also cause the lagoons to leak.⁸²

Unfortunately, it is not uncommon for spills to occur at these lagoons. In 1995, a lagoon dike in a hog CAFO ruptured, causing nearly 25.8 million gallons of waste into the New River in North Carolina.⁸³ The spill was twice as big as the Exxon Valdez oil spill, the waste so thick that it took two months for it to make it sixteen miles to the ocean, and it killed millions of fish.⁸⁴ Extreme weather is also dangerous for CAFOs. CAFOs near high risk areas, like floodplains, are vulnerable to extreme weather because the flooding can cause the lagoons to overflow into nearby bodies of water which can cause large fish kills.⁸⁵ For example, in 1999 Hurricane Floyd hit North Carolina's hog CAFOs and washed 120 million gallons of hog waste into six of North Carolina's rivers, killing most of the freshwater marine life in its wake.⁸⁶

Much of the waste in the US is handled through land application.⁸⁷ The waste, because it is a rich source of nitrogen, is applied to the cropland as a fertilizer.⁸⁸ However, CAFOs have such a high quantity of waste that often the manure is over-applied to the fields which overloads

⁷⁹ Spellman, *supra* note 20, at 102.

⁸⁰ Jeff Tietz, *Boss Hog: The Dark Side of America's Top Pork Producer*, ROLLING STONE (Dec. 14, 2006) available at <http://www.rollingstone.com/culture/news/boss-hog-the-dark-side-of-americas-top-pork-producer-20061214?page=5>.

⁸¹ *Id.*

⁸² *Id.*

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ Putting Meat, *supra* note 22, at 25.

⁸⁶ Tietz, *supra* note 80.

⁸⁷ EPA-821-R-99-002, *supra* note 20, at 14.

⁸⁸ GAO-08-944, *supra* note 74, at 5.

the soil's nutrient capacity and causes excessive nutrients to leach into the water source⁸⁹ and contaminate both surface and groundwater.⁹⁰

According to an Environmental Protection Agency (EPA) report, the agriculture and waste from CAFOs has impacted 35,000 miles of rivers in 22 US states.⁹¹ The United States Department of Agriculture (USDA) estimates that many CAFOs in the US had farm-level excess nitrogen and phosphorous.⁹² The contamination from the chemicals and nutrients in the waste is also a major culprit for the dead zone⁹³ in the Gulf of Mexico.⁹⁴

In China, the water quality problems from CAFOs are very similar to the problems seen in the US. With the recent rapid growth of animal agriculture in China, the livestock industry has become the leading contributor to non-point source pollution in China.⁹⁵ China treats their animal waste in a similar manner as the US. It is treated as a liquid waste which is either used as fertilizer or stored in pits, but some Chinese farmers will also dry the waste and store it in piles.⁹⁶ China is also battling with pollution from nitrogen, phosphorous, antibiotics, and heavy metals being released into surface or groundwater either deliberately by the farms or accidentally from rainfall.⁹⁷ However, unlike in the US, straw waste is an immense problem in China.⁹⁸ During

⁸⁹ *Id.*; EPA-821-R-99-002, *supra* note 20, at 14.

⁹⁰ See Putting Meat, *supra* note 22, at 47 (explaining that a dead zone is where there is an “excessive richness of nutrients in a body of water... that causes a dense growth of plant life and the death of animal life due to a lack of oxygen.”).

⁹¹ EPA-821-R-99-002, *supra* note 20, at 1.

⁹² Copeland, *supra* note 20, at 4.

⁹³ Putting Meat, *supra* note 22, at 25.

⁹⁴ The CAFO Reader, *supra* note 27, at 102.

⁹⁵ Zhang Ke-zian, et al., *Pollution from Livestock and Crop Waste*, in GUIDELINES TO CONTROL WATER POLLUTION FROM AGRICULTURE IN CHINA: DECOUPLING WATER POLLUTION FROM AGRICULTURAL PRODUCTION 71 (FAO Water Reports, 2013).

⁹⁶ *Id.*

⁹⁷ *Id.* at 73.

⁹⁸ *Id.* at 74.

harvest season, a large amount of straw is dumped in drains, rivers, or river banks and when it begins to decompose it causes a loss of oxygen which negatively impacts the aquatic life.⁹⁹

The effect that non-point source pollution animal agriculture has on water is not well-documented in China, but there are estimates that the impact is significant.¹⁰⁰ Animal agriculture's effect on groundwater is estimated to be "substantial" while it is believed that it is a major contributor to nitrogen and phosphorous in China's surface waters.¹⁰¹ The Chinese suffer from algae blooms in lakes, reservoirs, and rivers as well as nitrogen in groundwater.¹⁰² Also, just like in the Gulf of Mexico in the US, livestock agriculture is having a negative effect on the South China Sea.¹⁰³ It is estimated that the hog production in East and Southeast Asia contributes up to 90% of the phosphorous in the South China Sea, which is a leading contributor to eutrophication and hypoxia.¹⁰⁴

III. Protecting Water from CAFO Pollution

Both China and the US recognize that CAFOs have a negative effect on the environment and, specifically, on the water. Both countries have laws that try to stem any environmental damage to each country's waterways. In the US, the Clean Water Act (CWA)¹⁰⁵ is the federal law that protects US waterways from CAFO pollution while in China, The Regulation on the Prevention and Control of Pollution from Large-Scale Breeding of Livestock and Poultry (CAFO

⁹⁹ *Id.* at 75.

¹⁰⁰ Edwin D. Ongley & Yu Tao, *Role of Agriculture in Water Pollution*, in GUIDELINES TO CONTROL WATER POLLUTION FROM AGRICULTURE IN CHINA: DECOUPLING WATER POLLUTION FROM AGRICULTURAL PRODUCTION 8 (FAO WATER REPORTS, 2013).

¹⁰¹ *Id.*

¹⁰² *Id.* at 12.

¹⁰³ LIVESTOCK IN A CHANGING LANDSCAPE: DRIVERS, CONSEQUENCES, AND RESPONSES, Vol. 1, at 121 (Henning Steinfeld et al. eds, 2010).

¹⁰⁴ *Id.*, at 153.

¹⁰⁵ The Clean Water Act, 33 U.S.C. §§ 1251-1387.

Law),¹⁰⁶ and the Water Pollution Prevention and Control Law of the People's Republic of China (Water Pollution Law)¹⁰⁷ protect China's waters.

The following sections will compare and contrast four areas from each country's laws. The first part will consider each country's permitting system that attempts to regulate the discharge of pollutants from CAFOs into bodies of water. The second section will consider the US's Best Management Practices (BMP) and China's CAFO Law. The third will describe the public participation and citizen suit provision, or lack thereof, in each law. The final section will consider the incentive measure chapter in China's CAFO Law.

A. Water Pollution Permits in the USA and China

In the US, water pollution permits for CAFOs are governed under the CWA¹⁰⁸ while in China these permits are governed by the Water Pollution Law. Each country's permitting system is similar, but we will discuss each system.

The US's CWA gives the EPA or authorized states the jurisdiction to require CAFOs to acquire discharge permits.¹⁰⁹ Under the CWA, a CAFO is a point source¹¹⁰ and any point source that discharges into the waters of the US¹¹¹ must obtain a permit under the National Pollutant

¹⁰⁶ CAFO Law, *supra* note 21.

¹⁰⁷The Water Pollution Prevention and Control Law of the People's Republic of China, (promulgated by the Standing Committee of the Nat'l People's Cong., Feb., 28, 2008, effective June 1, 2008) (China) [hereinafter Water Pollution Law].

¹⁰⁸ 33 U.S.C. § 1342.

¹⁰⁹ 33 U.S.C. § 1342(a).

¹¹⁰ 33 U.S.C. § 1362(14). "The term 'point source' means any discernible, confined and discrete conveyance, including but not limited to... concentrated feeding operation."

¹¹¹¹¹¹ See 33 U.S.C. § 1362(7) ("The term 'navigable waters' means the waters of the United States, including the territorial seas."). See also *Rapanos v United States*, 126 S.Ct. 2208, 2248 (2006) ([W]ith the need to give the term 'navigable' some meaning, the Corps' jurisdiction over wetlands depends upon the existence of a significant nexus between the wetlands in question and navigable waters in the tradition sense."). /

Discharge Elimination System (NPDES) program.¹¹² Therefore, if a farm is a CAFO, and it is discharging a pollutant into a navigable water, it must obtain a permit to discharge.

Congress did not define CAFOs, but instead left this definition to the discretion of the EPA.¹¹³ The EPA has decided that this definition is dependent on numbers. First, the EPA says that before a farm can be defined a CAFO, it must first be defined an animal feeding operation (AFO).¹¹⁴ An AFO is a “lot or facility where... animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period.”¹¹⁵

If a farm is an AFO, it must next determine if they are a large or medium CAFO. Under the EPA regulations a large CAFO has:

700 mature dairy cows...; 1,000 cattle; 2,500 swine each weighing 55 pounds or more; 10,000 swine each weighing less than 55 pounds;... 10,000 sheep or lambs; 55,000 turkeys; 30,000 laying hens or broilers...; 125,000 chickens (other than laying hens);...¹¹⁶

To be a medium CAFO the farm must have:

200 to 699 mature dairy cows... 300 to 999 cattle... 750 to 2,499 swine weighing 55 pounds or more; 3,000 to 9,999 swine weighing less than 55 pounds;... 3,000 to 9,999 sheep or lambs; 16,500 to 54,999 turkeys; 9,000 to 29,999 laying hens... 37,5000 to 124,999 chickens;...¹¹⁷

The medium CAFO must also have a discharge into waters of the US either through a ditch or directly into the waters.¹¹⁸ The approved state programs or the federal EPA designates any AFO

¹¹² 33 U.S.C. § 1344. *See also* NPDES PERMIT WRITERS’ MANUAL, Ch. 1, Development of the Clean Water Act and the NPDES Program, 1-5 (Sept. 2010) *available at* http://www.epa.gov/npdes/pubs/pwm_chapt_01.pdf (explaining the history of the NPDES Program and also the statutory framework of the program).

¹¹³ 33 U.S.C § 1362 (noting that there is no definition of the word “CAFO” in this section of the statute).

¹¹⁴ *Id.* at § 122.23(b).

¹¹⁵ *Id.* at § 122.23(b)(1)(i)

¹¹⁶ *Id.* § 122.23(4)(i-xi).

¹¹⁷ *Id.* § 122.23(6)(i)(A-K).

¹¹⁸ *Id.* § 122.23(c)(ii)(A-B).

as a CAFO¹¹⁹ by doing an on-site inspection of the AFO¹²⁰ and a consideration of a number of other factors including the size of the farm, the amount of waste, the nearness of the farm to the waters of the US, any conveyances of waste into water, and the physical factors that affect the likelihood of frequency of discharge into water.¹²¹

If the farm is designated as a CAFO, then the CAFO must not discharge waste into waters of the US unless it is authorized to do so by a NPDES permit.¹²² The CAFO owner may apply for one of two types of permits: an individual NPDES permit or general permit.¹²³ The permits are issued by EPA or a federally-approved state or tribal NPDES program.¹²⁴

Any person that wishes to apply for an individual NPDES permit must submit an application.¹²⁵ They must provide certain information including dimensions and size of the CAFO, a map of the geographic area where the CAFO will be located, specific information about the number and type of animals, the type of containment and storage, and the estimated amount of manure and process wastewater.¹²⁶ Finally, the applicant must submit a nutrient management plan (NMP) for the CAFO and another NMP if the owner plans to apply the animal waste to the land.¹²⁷

¹¹⁹ *Id.* § 122.23(c).

¹²⁰ *Id.* § 122.23(c)(3).

¹²¹ *Id.* § 122.23(c)(2)(i-v).

¹²² *Id.* § 122.23(d)(1).

¹²³ *Id.* § 122.23(d)(1). A general permit allows the director to grant general permits to like sources.*id.* § 122.28.

¹²⁴ *EPA v California ex rel. State Water Resources Control Bd.*, 426 U.S. 200, 208 (1976). *See also* Public Participation in the Permit Issuance Process (Sept. 2013) *available at* <http://www.epa.gov/npdes/pubs/publicparticipation.pdf> (explaining that “in most cases, the NPDES permit program is carried out by authorized states, but the EPA is the permitting authority in four states (Massachusetts, New Hampshire, New Mexico, and Idaho)”).

¹²⁵ *Id.* § 122.21(2)(i).

¹²⁶ *Id.* § 122.21(2)(1)(i-ix).

¹²⁷ *Id.* § 122.21(2)(1)(x).

If a CAFO owner wishes to apply for a general permit, the owner must submit a notice of intent which will be reviewed to ensure that the notice of intent contains the correct information, like a NMP.¹²⁸ After a period of public notice and comment, if the CAFO's coverage is approved under the general permit, the terms of the NMP become part of the permit for this CAFO, the public will be notified, and the public can enforce these terms.¹²⁹

There are a few different elements in a NPDES permit for a CAFO. Each permit must contain the effluent limitations and standards which “serves as the primary mechanism for controlling discharges of pollutants to receiving waters by identifying the specific or numeric limitations” of pollutants.¹³⁰ Next, the permit must contain the CAFO owner or operator's monitoring and reporting requirements as well as their record-keeping requirements.¹³¹ Finally, CAFO permits must include a Nutrient Management Plan (NMP) and its nine minimum practices which will be described further below.¹³²

China's Water Pollution Law has a similar system. This law requires an institution that discharges into bodies of water to apply for a water pollutant discharge permit.¹³³ Like in the US, China's water permits are given by the province, not the national government.¹³⁴ The law states that “enterprises and public institutions which directly or indirectly discharge industrial waste water... to waters are required to obtain the pollutant discharge license before discharging.”¹³⁵ In order to get this permit, the institution that “directly or indirectly” discharges

¹²⁸ *Id.* § 122.23(h)(1).

¹²⁹ *Id.* § 122.23(h)(1).

¹³⁰ NPDES PERMIT WRITERS' MANUAL FOR CONCENTRATED ANIMAL FEEDING OPERATIONS, E.P.A, 833-F-12-001, 4 (Feb. 2012), available at http://water.epa.gov/polwaste/npdes/afo/upload/cafo_permitmanual_chapter4.pdf.

¹³¹ *Id.*

¹³² *Id.*

¹³³ Water Pollution Law, *supra* note 107.

¹³⁴ *Id.* at Article 20.

¹³⁵ *Id.*

into waters must register to the “administrative department of environmental protection of the local people’s government”¹³⁶ and, like the US, the institution must register the “category, quantity and concentration of water pollutants discharged under normal operating conditions and provide the relevant technical data about the prevention and control of water pollution.”¹³⁷ Any changes of quantity or concentrating of pollutants must be registered with the local people’s government.¹³⁸

A significant difference between the two countries, though, is that in the US there are a few important limits in the regulations that reduce the CAFOs which are required to apply for a permit while in China, generally, all large CAFOs must go through the regulatory scheme in the Water Pollution Law.

First, only CAFOs that actually discharge are statutorily obligated to apply for a NPDES permit.¹³⁹ The EPA tried to remedy this loophole in 2003 by writing a new rule that mandated “all CAFOs to either apply for NPDES permits or otherwise demonstrate[] that they have no potential to discharge,”¹⁴⁰ but this attempt was rejected by both the farm industry and the 2nd Circuit Court of Appeals. In 2005, a number of farming groups challenged the EPA for a number of their proposed rules, including this “duty to apply” rule which they said exceeded the EPA’s statutory jurisdiction.¹⁴¹ The 2nd Circuit agreed with the farming industry and said that “in the absence of an actual discharge of any pollutant to navigable waters from any point, there is no point source discharge, no statutory violation, no statutory obligation of point sources to comply with EPA regulations for point source discharges, and no statutory obligation of point

¹³⁶ *Id.* at Article 21.

¹³⁷ *Id.*

¹³⁸ *Id.*

¹³⁹ *Waterkeeper Alliance, Inc. v. U.S. E.P.A.*, 399 F.3d 486, 504 (2005 2nd Cir.).

¹⁴⁰ *Id.*

¹⁴¹ *Id.*

sources to seek or obtain an NPDES permit in the first instance.”¹⁴² Six years later this rule was reiterated by the Fifth Circuit which held that “the EPA cannot impose a duty to apply for a permit on a CAFO that ‘proposes to discharge’ or any CAFO before there is an *actual* discharge.”¹⁴³

Second, the CWA exempts “agricultural storm water discharges.”¹⁴⁴ Generally, when waste from CAFOs is applied to the land as a fertilizer but the waste is an addition into a water of the US from a point source, a NPDES permit is required.¹⁴⁵ However, if the discharge into the waters of the US is a result of an agricultural storm water discharge, the discharge is exempted and no permit is required.¹⁴⁶ Environmental groups challenged this exemption in 2005 and said that the CWA defines CAFOs as a point source, therefore, the CWA “requires the regulation of *all* CAFO discharges” but the 2nd Circuit disagreed.¹⁴⁷ They held that both the CWA and CAFO Rule seek “to remove liability for agriculture-related discharges primarily caused by nature, while maintaining liability for other discharges”¹⁴⁸ and the court rejected the environmental group’s challenges.¹⁴⁹

¹⁴² *Id.* at 505.

¹⁴³ National Pork Producers Council v. U.S. E.P.A., 635 F. 3d 738, 751 (5th Cir. 2011).

¹⁴⁴ See 33 U.S.C. § 1362(14) (“The term ‘point source’ . . . does not include agricultural stormwater discharges.”); See also 40 C.F.R § 122.23(e) (“[W]here the manure, litter, or process wastewater has been applied in accordance with site specific nutrient management practices. . . a precipitation-related discharge of manure, litter, or process wastewater from land areas under the control of a CAFO is an agricultural stormwater discharge.”).

¹⁴⁵ 40 C.F.R § 122.23(e).

¹⁴⁶ *Id.*

¹⁴⁷ Waterkeeper, *supra* note 139, at 507.

¹⁴⁸ *Id.* at 508-9.

¹⁴⁹ *Id.* at 509.

B. Best Management Practices and the CAFO Law

Both China and the US have emphasized the importance of trying to regulate CAFO pollution discharging into water bodies and both countries have emphasized a number of different ways to implement this prevention.

The CAFO Law in China is dedicated to the prevention of pollution from CAFOs.¹⁵⁰ This law is, essentially, a zoning law that controls where “large” CAFOs may be built.¹⁵¹ A person who wants to build a large CAFO in China must have the Department of Agriculture and the Ministry of Environmental Protection (MEP) develop “livestock husbandry development plan,” which must consider the carrying capacity of the environment, make a “rational layout”, and then “scientifically determine” the scale of the CAFO.¹⁵² Next, those two departments must develop a “plan for prevention and control of pollution from livestock and poultry breeding,”¹⁵³ which is integrated with the “livestock husbandry development plan.”¹⁵⁴ Together these integrated plans must consider the overall production layout of the CAFO, develop key areas of pollution control, and then “clarify the construction of key pollution control facilities... and control measures” for the animal waste.¹⁵⁵ Under the CAFO law, a large farm that may have a “major impact” on the environment is also obligated to conduct an environmental impact

¹⁵⁰ CAFO Law, *supra* note 21. .

¹⁵¹ *Id.* at Article 11. The law explains that the CAFOs cannot be built near drinking water sources, that there needs to be buffer areas for the protection of nature, culture, education, and scientific research areas, *id.* at Article 40(1-2).

¹⁵² *Id.* at Article 9.

¹⁵³ *Id.* at Article 10.

¹⁵⁴ *Id.* The law states that the plan “shall take an overall consideration of the environmental carrying capacity and the requirements of the prevention and control of pollution from livestock and poultry breeding, make rational layout, and scientifically determine the varieties, scale and total quantity of livestock and poultry breeding,” *id.*, Article 9.

¹⁵⁵ *Id.*

assessment¹⁵⁶, though if they have a “major impact” the farm will have to create an environmental impact report.¹⁵⁷

Significantly, this law realizes that an important aspect of the prevention of water pollution from CAFOs is not just in the permitting, but also in where the CAFOs are built and how the waste is handled. Article 11 explains that it is “forbidden” to build a CAFO by a drinking water source, core buffer areas, areas near urban residents, areas of cultural, educational or scientific research, or near a population intensive area.¹⁵⁸ Then, Articles 13-25 specifies how the farms should handle the animal waste,¹⁵⁹ including an establishment of manure, sewage and rainwater “separation facilities”¹⁶⁰ and that the farms should not spread the waste beyond the soil’s absorptive capacity.¹⁶¹ If the farm does not establish such waste facilities, the farm “shall not be put into production or use.”¹⁶²

The CAFO law even goes into a great amount of detail how the waste should be utilized and treated.¹⁶³ The law emphasizes the use of manure as fertilizer as well as the preparation of biogas from the waste.¹⁶⁴ It even mandates the state to “encourage and support” the utilization

¹⁵⁶ *Id.* at Article 12. The law also lays out “key points” of the EIA including “the varieties and quantity of the wastes generated from livestock and poultry breeding, the plans and measures for the comprehensive utilization and harmless treatment of wastes, the consumption and disposal of wastes, the direct discharges of wastes into environment, the possible impacts of such wastes on water bodies, soils and other environmental factors as well as on human health, and the plans and measures for controlling and reducing the impact among others.” *Id.*

¹⁵⁷ *See Id.* at Article 12 (explaining that “the EIA will include: “the varieties and quantity of the wastes generated from livestock and poultry breeding, the plans and measures for the comprehensive utilization and harmless treatment of wastes, the consumption and disposal of wastes, the direct discharges of wastes into environment, the possible impacts of such wastes on water bodies, soils and other environmental factors as well as on human health, and the plans and measures for controlling and reducing the impact, among others”)

¹⁵⁸ *Id.* at Article 11 (1-4).

¹⁵⁹ *Id.* at Articles 13-25. Article 13 suggests some treatment facilities like “anaerobic digestion and stack retting, organic fertilizer processing, biogas preparation, biogas residue and biogas slurry separation and transport.” *Id.*

¹⁶⁰ *Id.* at Article 13.

¹⁶¹ *Id.* at Article 18.

¹⁶² *Id.* at Article 13.

¹⁶³ *Id.* at Chapter III.

¹⁶⁴ *Id.* at Article 15.

waste on fields, the preparation of biogas, and the manufacture of organic fertilizer.¹⁶⁵ The law even requires that the waste be “collected, stored, and cleared and transported in a timely manner to prevent odors and seepage and leakage of livestock and poultry waste.”¹⁶⁶ One drawback to this law, though, is that it does not require that the CAFOs apply for a pollutant emission license. Instead, it only requires that the discharging farms must comply with state and local pollutant emission standards¹⁶⁷ which may have more “teeth” if there was a permit behind it.

The US takes another route. Zoning requirements are left in the hands of the local government, so some state or local government have passed ordinances or laws that regulate where CAFOs may be built.¹⁶⁸ But the CWA has had an indirect impact on where and how CAFOs should be built.

In its regulations, the EPA requires any CAFO permit to implement a NMP and use best management practices to meet all of the requirements.¹⁶⁹ The regulations mandate that the NMP must contain nine minimum requirements.¹⁷⁰ These nine requirements, like the CAFO Law in China, require CAFOs to ensure the proper storage of manure and wastewater, include appropriate buffers between the CAFO and waters of the US, establish a protocol for land application of the manure, identify testing of the manure, wastewater, and soil, and, finally, it

¹⁶⁵ *Id.* at Articles 15-17.

¹⁶⁶ *Id.* at Article 19.

¹⁶⁷ *Id.* at Article 20?

¹⁶⁸ S. Mark White, *Regulation of Concentrated Animal Feeding Operations: The Legal Context*, available at <http://www.sraproject.org/wp-content/uploads/2007/12/regulationofcafosthelegalcontext.pdf>. See State of Indiana, A Guide to Local Land Use Planning for Agricultural Operations, www.in.gov/isda/files/Model_Ordinance_Concepts__4_.pdf (explaining that Indiana has created a Site Scoring System which establishes that if a person wants to build a CAFO they must attain a minimum score of 245 (out of 400) before they can build. The CAFO will gain points if they make proactive, positive design decisions. For example, “the system awards points for odor abatement practices utilized in the animal housing facility and when conducting manure application.”)

¹⁶⁹ 40 C.F.R. § 122.2(e)(1).

¹⁷⁰ E.P.A, 833-F-12-001, *supra* note 130, at 5.

specifies the type of records that must be maintained by the farm.¹⁷¹ Also, any swine, poultry, veal calves, dairy and beef cattle CAFO must also have a best management practices for “land application of manure, litter, and process wastewater.”¹⁷² A CAFO that wants to apply manure, litter, or wastewater on the land must have a NMP that is based on a specific study of the field that assesses the field’s capabilities for handling nitrogen and phosphorous so that the nutrients will not leach into the surface waters.¹⁷³ The NMP also requires annual manure and soil sampling and periodic inspections of land application to look for leaks.¹⁷⁴ Finally, the regulations also establish requirements that the land application cannot be applied any closer than 100 feet to anything that may contaminate the surface waters.¹⁷⁵

C. Public Participation

In the US, the public has an important role in both the NPDES permit as well as in the enforcement of these permits while in China the public still only plays a limited role. The CWA requires that “a copy of each permit application... shall be available to the public.”¹⁷⁶ This means that once a permit writer is finished drafting the permit, the draft permit is posted to the public for notice and comment.¹⁷⁷ The commenter “may submit written comments on the draft permit and accompanying fact sheet and/or request a public hearing on the draft permit.”¹⁷⁸ The

¹⁷¹ 40 C.F.R. § 1 22.42(e)(1)(i-ix). The regulations also explain that the NMP must ensure the proper disposal of dead animals, ensure that clean water does not go through the production area, prevent animal contact with waters of the US, and ensure that chemicals are not disposed of in the wastewater or storm water storage.

¹⁷² *Id.* at § 412.4.

¹⁷³ *Id.* at § 412.4(c)(1).

¹⁷⁴ *Id.* at § 412.4(c)(3 and 5).

¹⁷⁵ *Id.* at § 412.4(c)(5). The regulation states that “manure, litter, process wastewater may not be applied closer than 100 feet to any down-gradient surface waters, open tile line intake structures, sinkholes, agricultural well heads, or other conduits to surface waters.”

¹⁷⁶ 33 U.S.C. § 1342(j).

¹⁷⁷ PUBLIC PARTICIPATION IN THE PERMIT ISSUANCE PROCESS, E.P.A. 832-F-12-033 (Sept. 2013) *available at* <http://www.epa.gov/npdes/pubs/publicparticipation.pdf>. This file also lists the different methods that are available to comment including online, email, and mail.

¹⁷⁸ *Id.*

permitting authority is also required to comment to all significant comments from the public and also explain any changes that is being made to the permit.¹⁷⁹ Any interested person also has the right to request a public hearing on a proposed CAFO permit, and if there is a “significant” public interest the hearing will be scheduled.¹⁸⁰ Once the permitting authority takes into account all of the information, the permit may be rejected or approved by the authority, but if an individual has made comments on the permit and is dissatisfied with the terms of the permit, that person may appeal the permit.¹⁸¹

Importantly, the public is also allowed to review public data about whether someone is in compliance with the permit.¹⁸² The EPA’s website contains the “Discharge Monitoring Report (DMR) Pollutant Loading Tool” which will allow anyone to search for information on specific discharges¹⁸³ and also “ECHO” which allows anyone to search for additional information on the enforcement and compliance history of any facility in the country.¹⁸⁴ If any person discovers that a CAFO is violating its permit, that person may report violations or emergency violations.¹⁸⁵

Finally, if a citizen has an interested that is “adversely affected”¹⁸⁶ by a CAFO’s discharges, they may utilize the citizen suit provision of the CWA to ensure that the EPA and the CAFO operators are performing their duties.¹⁸⁷ In the 1970s when Congress began to create America’s major environmental statutes, like the CWA, governmental entities did not have good

¹⁷⁹ *Id.*

¹⁸⁰ *Id.*

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ *Id.*

¹⁸⁵ *Id.*

¹⁸⁶ 33 U.S.C. § 1365(g).

¹⁸⁷ *See id.* (“Any citizen may commence a civil action on his own behalf against any person (including the United States and any other governmental instrumentality or agency... who is alleged to be in violation of an effluent standard or limitation.”).

track records for enforcing environmental provisions.¹⁸⁸ Therefore, Congress decided to allow citizens to help enforce these laws by creating the citizen suit provisions which force the government to do its mandatory duties.¹⁸⁹ If someone has been injured by a CAFO's violations of the CWA, that person may bring a lawsuit against the CAFO and seek injunctive relief, civil penalties, recovery of costs, and attorney's fees.¹⁹⁰

For China, the Water Pollution Law and the CAFO Law both lack any citizen suit provisions and, in fact until recently, so did all environmental laws in China.¹⁹¹ Individuals in the public did not have the right to sue a CAFO for water pollution violations, though they do have a role in protecting the environment from CAFO pollution. The CAFO Law explains that members of the public have the right to report violations to the MEP or other departments at the county level.¹⁹² This law mandates that the government entities that receive such reports must "immediately conduct investigations and handle the violations" and the law even rewards individuals or entities that have provided this information: "entities and individuals that have made outstanding contributions to the prevention and control of pollution... shall be commended and rewarded in accordance."¹⁹³

D. Incentive Measures

Finally, China's CAFO law has an important provision that the CWA does not have – Chapter IV sets out a number of incentive measures.¹⁹⁴ Unfortunately, this chapter begins by

¹⁸⁸ Jeffrey G. Miller et al., INTRODUCTION TO ENVIRONMENTAL LAW: CASES AND MATERIALS ON WATER POLLUTION CONTROL 661 (Environmental Law Institute, 2008).

¹⁸⁹ *Id.*

¹⁹⁰ E.P.A., 832-F-12-033, *supra* note 177.

¹⁹¹ Robert V. Percival, *Environmental Law Goes Global: Taking Back Eden: Eight Environmental Cases that Changed the World*, by Oliver A. Houck, 41 ELR 10194, 10195 (2011).

¹⁹² CAFO Law, *supra* note 21, at Chapter I, Article 8.

¹⁹³ *Id.*

¹⁹⁴ *Id.* at Chapter IV.

mandating that local governments must encourage the development of CAFOs.¹⁹⁵ It goes on to mandate zoning plans for farms that will utilize “unused lands”: “[t]he state shall encourage the implementation of large-scale and standardized livestock and poultry breeding by utilizing waste land and... unused land [such] as barren hills, valleys, hillcocks, and desolated beaches.”¹⁹⁶

While it is frustrating that China’s government is encouraging the development of CAFOs, the rest of the chapter goes on to encourage proper environmental management of the farms. Article 34 rewards the CAFOS that comply with their permits and keep their pollution within the mandated volumes.¹⁹⁷ It instructs the local governments to financially reward farms for reducing the amount of discharged pollutants.¹⁹⁸ Article 32 allows local governments to subsidize expenditures needed for any consultation on the environmental impact before the construction of any CAFO.¹⁹⁹ Some articles encourage the farms to engage in organic fertilizer and biogas production by offering “preferential tax policies”²⁰⁰ or “preferential policies”²⁰¹ if they use biogas for self-use or sell the surplus electricity to the power grid.²⁰² Another article explains that if a farm builds “comprehensive utilization and harmless treatment facilities” to reduce pollutant discharges, the farm “may enjoy the relevant incentive and support policies.”²⁰³

It is still early to know how effective these incentive measures will be for preventing water pollution from CAFOs. Many of the incentive measure articles are not mandatory, so they lack a certain amount of teeth, but it is encouraging to know that the Chinese government wants to create better environmental management. This is a technique that is not found in the CWA,

¹⁹⁵*Id.* Article 26.

¹⁹⁶*Id.* at Article 27.

¹⁹⁷*Id.* at Article 34.

¹⁹⁸*Id.* at Article 34.

¹⁹⁹*Id.* at Article 32.

²⁰⁰*Id.* at Article 29.

²⁰¹*Id.* at Article 31.

²⁰²*Id.*

²⁰³*Id.* at Article 34.

but it is an area that should be considered. The proper use and management of animal waste is vital to protecting our waterways and these incentive measures may be an effective tool for the US to consider.

IV. Why both Countries are Failing to Prevent Water Pollution from CAFOs

Though it seems that each country has strong laws that could regulate and control water pollution from CAFOs, the truth is there is still a great water quality problems associated with CAFOs. There are a number of reasons why each country is unable to regulate water pollution from these factory farms.

In the US, the EPA leaves the regulation of CAFOs in the hands of the states where it can turn into a “‘race to the bottom’ when it comes to permitting facilities, enforcing the rules and preventing water... pollution.”²⁰⁴ In other words, some states may not strictly monitor, enforce, or regulate CAFOs so that operators will be encouraged to build CAFOs. For example, the EPA investigated the Illinois environmental agency and found that of the 12 NPDES permits issued, only two were still valid and that there were permit applications still in the office that had been filed 10 years ago.²⁰⁵ And many states have no problem with weaker CAFO laws -- a program director at an environmental organization explained that “A lot of the factory farms or CAFOs are owned by or have very close business relationships with slaughterhouses that are owned by national companies... and they’re the kind of companies that would shop around when deciding where to locate and would likely to choose a place with a weak regulatory regime.”²⁰⁶

²⁰⁴ Amanda Peterka, *States Struggling to Regulate “Factory Farms”*, GREENWIRE NEWS (Feb. 23, 2011) available at <http://www.eenews.net/greenwire/2011/02/23/stories/1059945573>.

²⁰⁵ *Id.* The EPA threatened to take over regulations from the Illinois office and since then the state agency has improved its program by hiring new workers, improving its regulations and issuing eight more CAFO permits – though the number of CAFOs in Illinois is still estimated to be around 500. *Id.*

²⁰⁶ *Id.*

One of the biggest reasons for the US's lack of enforcement, though, is simply a lack of funding and staff resources for either the federal or state EPAs. In Iowa, the state that has the most CAFOs in the nation, their state's agency was regulating "3,500 facilities with only 27 full-time equivalent positions devoted to inspection, permitting and enforcement of CAFOs... twenty-one of these positions were field staff who inspected the facilities... and the majority of the enforcement work fell on just one attorney." The federal EPA has also seen their budget cut by 18% over the last two years.²⁰⁷ But the agency has not had its statutory obligations reduced – it must still go to sites, test the environment, and review documents with a lowered budget which means that "laws about environmental enforcement are just paper."²⁰⁸

Unfortunately, a lack of enforcement of environmental laws is the main reason there is still pollution from CAFOs in China. Though there is a little information about CAFO enforcement in China, there is research on the deficiencies in Chinese environmental law enforcement.²⁰⁹ We have used this research to suggest the main causes for water pollution from CAFOs in China.

First, the MEP staff is very limited – in 2007, there were only 200 employees overseeing a country of 1.4 billion.²¹⁰ This extremely low number of staff makes it nearly impossible to regulate and manage all polluters in China and it is probable that the overworked MEP staff just do not have time to regulate CAFO pollution.

²⁰⁷ Coral Davenport, *EPA Funding Reductions Have Kneecapped Environmental Enforcement*, NATIONAL JOURNAL (Mar. 3, 2013) available at <http://www.nationaljournal.com/daily/epa-funding-reductions-have-kneecapped-environmental-enforcement-20130303>.

²⁰⁸ Id.

²⁰⁹ Wang Canfa, *Chinese Environmental Law Enforcement: Current Deficiencies and Suggested Reforms*, 8 VT. J. ENVTL LAW 159 (2007); Erin Ryan, *The Elaborate Paper Tiger: Environmental Enforcement and the Rule of Law in China* 24 DUKE ENVTL. L. & POL. F. 183 (2013).

²¹⁰ Erin Ryan, *The Elaborate Paper Tiger: Environment Enforcement and the Rule of Law in China* 24 DUKE ENVTL. L. & POL. F. 183, 196 (2013).

Second, unfortunately, corruption and bribery between factory owners and government officials is “all too common.”²¹¹ Personal connections, or *guanxi*, allow some in the industry to encourage government officials to ignore violations and these same officials may be fearful of enforcing laws in case it angers a “well-connected violator.”²¹² Therefore, it is possible that the CAFO owners are well-connected violators that are able to force officials to turn a blind-eye to the polluting farms.

Third, China’s prioritization of economic growth has meant that pollution is tolerated because any enforcement of environmental laws may interfere with economic growth.²¹³ Many local government officials are rewarded for economic targets, but they are not rewarded for pursuing environmental protection.²¹⁴ Traditionally, China has viewed the growth of the GDP as the “core measure of China’s economic standard against which achievements of local governments are measured” and many local governments pursue unfettered growth rather than sustainable development or environmental protection in order to meet their economic targets.²¹⁵ Now, the Chinese government must try to become self-sufficient in feeding their meat-hungry citizens²¹⁶ so the central government is encouraging the creation of big animal farms²¹⁷ so local governments may be rewarded for building more CAFOs and ignoring the pollution they create.

Finally, in China, public participation in enforcement or litigation is still limited.²¹⁸ Public participation encourages the enforcement of environmental laws by “bestow[ing] any entity and/or citizen with the right to bring actions against inattentive administrative

²¹¹ *Id.* at 198.

²¹² *Id.* at 199-200.

²¹³ *Id.* at 202.

²¹⁴ *Id.* at 206.

²¹⁵ Canfa, *supra* 209, at 171.

²¹⁶ Levitt, *supra* note 10.

²¹⁷ Moore, *supra* note 6.

²¹⁸ Canfa, *supra* note 209, at 172.

departments.”²¹⁹ Therefore, if the CAFO and Water Pollution Laws allowed citizens or citizen groups the right to bring actions against government agencies or industries that are inattentive to pollution from CAFOs, citizens affected by the CAFO could have a chance to not only to help enforce the laws but also remedy any harm they endure.

V. How to Solve Water Pollution from CAFOs

For better or for worse, it seems that both the US and China are committed to the further development and the use of CAFOs. This means that lawyers, policymakers, engineers, farmers, and scientists will need to find creative solutions to protect each country’s waterways from CAFO pollution. Luckily, many people are already finding solutions to these pollution problems.

A. *Using Other Laws*

A recent lower federal court decision may have given environmentalists in the US another tool for fighting CAFO water pollution. In January of this year, the U.S. District Court for the Eastern District of Washington held that manure from “Cow Palace”, a dairy CAFO that allowed waste to leak out of its lagoons and over-applied waste to its crops, could be considered a “solid waste” under the Resource Conservation and Recovery Act (RCRA) and was subject to this law’s regulations and permitting system.²²⁰

The objective of RCRA is to protect the health and the environment by “assuring that hazardous waste management [is] conducted in a manner which protects humane health and the

²¹⁹ *Id.* at 173.

²²⁰ Community Associations for Restoration of the Environment, Inc., v. Cow Palace, LLC, No. 13-CV-3016-TOR, 2015 U.S. Dist., (E.D. Wash. Jan. 15, 2015) [hereinafter CARE]; Jeremy P. Jacobs, *Judge Rules Dairy Manure Poses “Imminent and Substantial” Health Threat*, GREENWIRE (Jan. 15, 2015) available at <http://www.eenews.net/greenwire/stories/1060011755>.

environment.”²²¹ This law has never been used to regulate CAFO waste because normally animal waste that is used as a fertilizer is exempt under this law because the material is not considered waste.²²² However, in the Cow Palace case, the court considered that the farmers at Cow Palace were over applying the waste beyond the nutrient capacity of the soil as well as allowing the waste to leak out of the lagoons so that the animal waste was seeping into and polluting the surrounding water.²²³ The court held that when a farmer, like Cow Palace, conducts these bad practices like over-applying and allowing leakages from waste lagoons, the farmers are not using the waste as a fertilizer to help their farm, but rather the farmers are “discarding the manure” and this discarded manure is no longer exempt under RCRA.²²⁴

What does this mean for preventing water pollution from CAFOs in the US? First, if this case is upheld on appeal, it will give environmentalists another tool in their toolbox for fighting water pollution from CAFOs. Second, under RCRA if the owner is found responsible for the dumping of waste, the owner is must pay for the corrective actions for the pollution.²²⁵ With the extensive effects animal waste has on the environment, this could mean CAFO owners will spend a great deal of money correcting their mistakes and, thusly, this is a good incentive to CAFO owners to take proper care of the animal waste. Third, this will send a clear message to CAFO owners that the court has noticed that they are not properly handling the animal waste,

²²¹ The Public Health and Welfare Act, 42 U.S.C. § 6902(4).

²²² Theodore L. Garrett, *An Overview of RCRA*, in THE RCRA PRACTICE MANUAL 1, 3 (Theodore L. Garrett, ed., 3rd ed. 2013).

²²³ CARE, *supra* note 220.

²²⁴ *Id.*

²²⁵ Garrett, *supra* note 222, at 3.

this sort of behavior will no longer get an exemption, and the courts are upholding citizens' rights to clean water.²²⁶

In fact, this clear message is already reaching the livestock industry in the US. A recent article from a weekly online livestock journal warned its constituents:

The ruling suggests a higher level of rigor needs to be undertaken by CAFO operators to prevent RCRA from being applied to them. 'That is a concern,' said [Karen] Budd-Falen [of Budd-Falen Law Offices] flatly. 'If courts start saying that RCRA also applies to CAFOs, that is very concerning and dangerous. Not just for applying the RCRA standard itself, but for the citizen suit provisions. So it just means more litigation. That never turns out well for anybody except for the environmental attorneys who are making attorney fees off the deal.'²²⁷

In other words, the CAFO industry knows that being able to apply animal waste to RCRA could be a very powerful tool for those concerned with protecting their water and this industry will suddenly be subject to much stricter regulations and standards.

January was also a good month for environmentalists in China. On January 1st, 2015, the Environmental Protection Law of the People's Republic of China (EPL) entered into force.²²⁸ This law is actually a "sweeping series of amendments" to the previous environmental law²²⁹, but it is the first set of amendments to the original law since 1989 and it shows the country's leaders commitment to their "war against pollution."²³⁰ This law creates a number of amendments that could be effective in the fight against CAFO water pollution.

²²⁶ Katherine Paul, *Who Should Clean up Big Ag's Mess?*, OP ED NEWS (Feb. 26, 2015) available at <http://www.opednews.com/articles/Who-Should-Clean-Up-Big-Ag-by-Katherine-Paul-Corporations-Agriculture-Industrial-Agriculture-Megafarms-150226-471.html>.

²²⁷ Kerry Halladay, *WA Dairy Ruling a Warning for Feedlots*, WESTERN LIVESTOCK JOURNAL (Feb. 23, 2015) available at <http://www.wlj.net/article-4178-wa-dairy-ruling-a-warning-for-feedlots.html>.

²²⁸ The Environmental Protection Law of the People's Republic of China, EU-China Environmental Governance Programme, April 2014 [hereinafter EPL].

²²⁹ Ryan, *supra* note 210, at 237.

²³⁰ Karl Bourdeau, Scott Fullton, & Ryan Carra, *Major Questions Remain for Implementation of China's Strengthened Environmental Protection Law*, BEVERIDGE & DIAMOND, P.C., (Jan. 9, 2015) available at <http://www.bdlaw.com/news-1686.html>.

First, Article 59 imposes heightened fines for an enterprises that illegally discharges, including a daily fine for violations.²³¹ Second, there are enhanced enforcement incentives for local governments.²³² The local government now will have “environmental protection target as an appraisal criteria” which will be incorporated into the performance evaluation.²³³ In other words, while local governments were once only appraised by their economic growth, now the local governments officials will also be appraised by their protection of the environment. As local government controls much of the environmental enforcement in China and now that they will be assessed by their environmental protection, new law could have a great effect on protecting China’s environment – including protecting water from CAFO pollution.

The new EPL law also opens the door for greater government transparency and public participation in China.²³⁴ Now industries in China will be required to publicly, and truthfully, disclose any environmental information, like quality, monitoring, incidents, licensing, and penalties.²³⁵ Companies are now required to make their environmental impact assessment (EIA) reports public and even allow public comments during construction projects.²³⁶ In a move forward towards citizen enforcement, Article 58 of the EPL allows certain public interest groups to file lawsuits on behalf of the interested or harmed public.²³⁷ The law does restrict what groups

²³¹ EPL, *supra* note 228, at Article 59; Christina Larson, *China Gives Teeth, Finally, to Beijing’s New ‘War on Pollution’*, BLOOMBERG BUSINESS (April 28, 2014) available at <http://www.bloomberg.com/bw/articles/2014-04-28/china-gives-teeth-finally-to-beijing-s-new-war-on-pollution>.

²³² *Id.* at Article 26.

²³³ *Id.* at Article 26.

²³⁴ *Id.* at Article 53-56 and 58; Christina Larson, *China Gives Teeth, Finally, to Beijing’s New ‘War on Pollution’*, BLOOMBERG BUSINESS (April 28, 2014) available at <http://www.bloomberg.com/bw/articles/2014-04-28/china-gives-teeth-finally-to-beijing-s-new-war-on-pollution>.

²³⁵ *Id.* at Article 53-56.

²³⁶ *Id.* at Article 56.

²³⁷ *Id.* at Article 58.

may file lawsuits,²³⁸ but this is estimated to be about 300 environmental public interest groups in China who could bring lawsuits under this law.²³⁹

EPL is not perfect and many argue that there are some important elements missing,²⁴⁰ yet it may still be effective in protecting China's water from CAFO pollution. This law will finally give some public interest groups the right to fight for citizens hurt from CAFO pollution. It is also vital that this law gives the local government incentives to protect the environment from CAFO, rather than just rewarding the economic benefits from this industry.

B. Improved Management and Use of the Animal Waste

. Because each country is devoted to developing more CAFOs, solutions must be developed that will help manage the animal waste from these farms so that it will not pollute our waterways. Both countries are trying to develop new ways to use the animal waste in environmentally and economically friendly manners, but China has been strongly promoting the use of biogas digesters. China is encouraging this waste treatment method because biogas digesters use anaerobic digestion to create biogas which can be recovered and used for energy.²⁴¹

²³⁸ *Id.* This article restricts the litigation to groups that “(1) have their registration at the civil affair departments of people’s governments at or above municipal level with sub-districts in accordance with the law; (2) specialize in environmental protection public interest activities for five consecutive years or more, and have no law violation records.” *Id.*

²³⁹ Larson, *supra* note 234.

²⁴⁰ See Bo Zhang & Cong Cao, *Policy: Four Gaps in China’s New Environmental Law*, NATURE (Jan. 21, 2015) available at <http://www.nature.com/news/policy-four-gaps-in-china-s-new-environmental-law-1.16736> (arguing that there are four gaps in this law. “First, the power of the new law is limited... Second, enforcement of the EPL will be hampered by the fragmented and overlapping structure of environmental governance in China... Third,... the new EPL fails to acknowledge citizens’ basic rights to environment fit for life... Fourth, enforcement and implementation of the new law may be foiled by a lack of capacity and by conflicts of interest.”); See also Larson, *supra* note 234 (“Yet one key element is missing: a common, easily accessible public platform to collect such information. ‘This is really a problem,’ says Ma. ‘Without a single platform, information transparency is not consistent or systematic. It’s cumbersome to individually check records.’”).

²⁴¹ AGSTAR, Anaerobic Digestion 101, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, <http://www.epa.gov/methane/agstar/anaerobic/ad101/index.html> (last visited April 23, 2015); Eliza Barclay, *China Turns to Biogas to Ease Impact of Factory Farms*, YALE ENVIRONMENTAL 360, Nov. 11, 2010,

Biogas digesters rely on anaerobic digestion which is a biological process that occurs when organic matter, like animal waste, is allowed to decompose without oxygen so that bacteria can convert the material to the biogases methane and carbon dioxide and these gases are used as energy sources.²⁴² An anaerobic digestion system is also an attractive solution because it reduces the odors from the waste, improves the handling of waste nutrients, and it produces renewable energy.²⁴³ In fact many large biogas production systems are capable of producing more energy than the farm can consume so the energy can be sold to nearby industries or municipalities.²⁴⁴

Chinese farmers, by using an underground pit for food waste and animal manure, have been using biogas as a source of energy for centuries but recently the government has been encouraging its development as a solution to climate change and pollution from CAFOs.²⁴⁵ With the provisions in the CAFO Law that promote the development of biogas, many local governments and farmers have begun to embrace the use of biogas digesters. For example, Zhejiang Province in China mandated that all farms with more than 50 pigs must have a biogas digester.²⁴⁶ A pig farmer in Hainan Island, that was given an ultimatum from the local government to clean up the pollution from his farm, built a biogas digester and was able to fulfill the energy needs of 107 households in the village.²⁴⁷

http://e360.yale.edu/feature/china_turns_to_ecological_biogas_production_to_ease_impact_of_factory_livestock_farms/2338/.

²⁴² AGSTAR, *supra* note 241.

²⁴³ Brent A. Gloy, *Creating Renewable Energy from Livestock Waste: Overcoming Barriers to Adoption*, COLLEGE OF AGRIC. AND LIFE SCIENCES CORNELL UNIVERSITY 5 (2008).

²⁴⁴ *Id.*, at 9.

²⁴⁵ Barclay, *supra* note 241.

²⁴⁶ *Id.*

²⁴⁷ Fan Feng, *Implementation of Biogas Digestion to Clean up China's Livestock Industry and Provide Rural Energy*, A CHINA ENVIRONMENTAL HEALTH PROJECT RESEARCH BRIEF (July 2008).

The use of biogas production in the US has been in use for years and there are a number of farms that use this system on their farms²⁴⁸ but this system is not used extensively in the US. It is estimated that there are only 200 anaerobic digester systems operating at CAFOs.²⁴⁹

Why is this system not more popular in the US? First, it is an imperfect system. Biogas digesters still create dangerous byproducts for the environment,²⁵⁰ and the digestion process is unable to remove the nutrients, heavy metal, and antibiotics that are in the animal waste.²⁵¹

Second, they are very expensive to build.²⁵² They can cost up to three million dollars to build and it even costs money to sell the biogas back to the utility grid.²⁵³ Unlike China's CAFO law which encourages and incentivizes the development of these digesters, the CWA does not have this system. The US does have the AgSTAR program, a voluntary program which is coordinated by the EPA and the USDA and supports the development of biogas digesters.²⁵⁴ This program provides information for farmers, but does not provide funding for the development of a biogas digester.²⁵⁵ This lack of funding means that only large CAFOs can afford building and using these digesters.²⁵⁶

²⁴⁸ Donald L. Van Dyne & J. Alan Weber, *Biogas Productions from Animal Manures: What is the Potential?*, 4 INDUSTRIAL USES 20, 25 (1994).

²⁴⁹ Frequently Asked Questions, About AgStar, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, <http://www.epa.gov/methane/agstar/anaerobic/faq.html>.

²⁵⁰ *Id.*, at 374.

²⁵¹ *Id.*, at 375.

²⁵² Nicole G. Di Camillo, *Methane Digesters and Biogas Recovery: Masking the Environmental Consequences of Industrial Livestock Production*, 29 UCLA J. OF ENVTL LAW 365, 375 (2011).

²⁵³ *Id.*, at 375-76.

²⁵⁴ Frequently Asked Questions, About AgStar, UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, <http://www.epa.gov/methane/agstar/anaerobic/faq.html>.

²⁵⁵ *Id.*

²⁵⁶ *Id.*, at 377.

VI. Conclusion

At the time of the writing of this article, it is still not clear whether the EPL in China or RCRA in the USA will be an effective means for protecting these countries' waterways from CAFO pollution. However, it is clear that innovative lawyers and lawmakers in both countries are invested in fighting to protect water from CAFO pollution.

It is also important to know that innovative scientists, engineers, and farmers in both countries are trying to use the animal waste from CAFOs in an environmentally friendly manner. Though biogas digesters are far from perfect, it is one possible solution to this massive problem with animal waste. Other solutions are being considered by both countries, including composting the animal waste,²⁵⁷ and one can only hope that very soon each country will find viable and affordable solutions to these problems.

For now, both country's lawmakers should consider each other's laws for managing water pollution from CAFOs. Industrialized animal agriculture is an institution that both China and the US will be using for many years to come, and it is vital that both countries create strong laws and policies that can protect water ways from these institutions. Both China and the US policymakers can take a number of measures from each other's laws and policies, including incentive measures, public participation and citizen suits, and best management plans, and by learning from each law, it is possible that both countries will develop stronger laws that will maintain safe water for many generations.

²⁵⁷ Spellman, *supra* note 20 at 425; *contra* CAFO Facts, Sierra Club Michigan Chapter, <http://www.sierraclub.org/michigan/cafo-facts#feces> (“Can composting the manure solve the CAFO’s waste problem? In short, no.”).