

**B.Y.O.B. (BRING YOUR OWN BAG):
A COMPREHENSIVE ASSESSMENT
OF CHINA'S PLASTIC BAG POLICY**

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Our country consumes a huge amount of plastic shopping bags each year. While plastic shopping bags provide convenience to consumers, this has caused a serious waste of energy and resources and environmental pollution because of excessive usage, inadequate recycling and other reasons.

--Chinese State Council

EXECUTIVE SUMMARY

Abstract

On June 1, 2008, the Chinese government enacted a nationwide policy prohibiting all stores from freely distributing plastic bags to customers. This new policy requires that, henceforth, all retailers must charge a nominal fee for plastic bags and that those purchasable bags must meet certain quality requirements to improve their potential reusability. These retailers, which include everything from grocery and clothing stores to farmer's markets and food stalls, individually determine how much to charge for their bags and get to keep all related proceeds. The policy is an effort to mitigate the "white pollution" that is choking China's landscape, as well as to preserve valuable resources such as oil. Currently, the Chinese population uses up to *3 billion plastic bags each day*, which consume 37 million barrels of crude oil each year in production. Moreover, plastic bags take up to 1,000 years to break down, producing toxic petro-polymers and occupying valuable landfill space in the process.

Unlike past environmental regulations in China, which typically targeted specific business sectors or polluter types, this policy directly affects everyone nationwide and requires that *every* individual take economic and environmental responsibility for his plastic bag use. For

* This paper was compiled by Ms. O'Loughlin, during her time as a Fulbright Research Fellow from September 2009 - July 2010.

China, using this type of individualized policy approach to confront an environmental challenge is novel, creative, and—if successful—potentially prescient of a new Chinese approach to fighting the battle against pollution.

Policy Implementation

After ten months of study and data collection, I have found implementation of China's plastic bag policy to be *partial* at best. Most major supermarket and convenience store chains, particularly foreign-owned ones, have implemented the policy, however, the majority of other types of retailers have not.

Policy Enforcement

Policy enforcement by local authorities remains weak and erratic. Local police do not conduct regular or effective spot checks on retailers to ensure policy implementation. Central government oversight on local enforcement appears to be wanting as well.

Public Response

The Chinese government has achieved partial success in fostering general awareness among the population about the plastic bag policy. Nonetheless, many remain under informed about what the policy entails and when it should be applied. Additionally, many consumers, regardless of their level of familiarity with the policy, have yet to curb their regular use of plastic bags, continuing to expect and accept plastic bags when doing their shopping and snacking.

Policy Effects

Plastic bag use has declined in major chain grocery and convenient stores where the policy is enforced. Bag use in most other retailers, however—the majority of which still distribute free plastic bags—has yet to show indications of abating. As a result, Chinese plastic bag overconsumption continues to threaten fragile environments and overflowing landfills. The creation of a plastic bag recycling program or the adoption of environmentally friendly bags beyond beta development stages remains wanting.

Future Prognosis

Chinese plastic bag overconsumption continues to represent a major national environmental challenge. Until the Chinese government dramatically improves enforcement and awareness of the plastic bag policy, and adopts some supplementary measures to bolster its effectiveness, China's plastic bag consumption is unlikely to

significantly decline. As a result, plastic bags will remain a major source of environmental pollution in China for the foreseeable future.

THIS REPORT

Report structure and methodology

For the past ten months (September 2009-July 2010), I have lived in Wuhan, China and traveled throughout the country conducting research and recording my observations of China's plastic bag distribution policy. The following report is a summarization and analysis of my findings, as well as my recommendations for further bolstering the efficacy of this policy in the future.

After outlining China's plastic bag regulatory scheme and its underlying rationale, I evaluate its implementation and the effects of the policy on bag usage, plastic waste, and consumer attitudes. I conclude the report by suggesting methods for improving compliance and reducing domestic bag use.

I employed three primary data sources when writing my report: observational data (firsthand visits to stores, markets, eateries, recycling centers, garbage sites, etc.), anecdotal data (in-person interviews and small scale surveys), and reported data (secondary sources such as government reports, nongovernment organization reports, private company reports, newspaper articles, online information, etc.). I have cited these secondary sources in my endnotes.

THE POLICY

China's plastic bag policy:

On June 1, 2008, the Chinese government introduced a nationwide policy aimed at reducing the country's use of plastic bags.¹ The policy is effectuated by two regulations. The first bans the production, sale, and use of "ultrathin" plastic bags—any bags that measure less than 0.025 millimeters thick. The second prohibits all retailers from providing their customers with free plastic bags, requiring that they instead sell the bags to their customers for a nominal fee. Retailers can set this fee themselves as long as the fee is not below the wholesale cost of the bag. These fees typically average between 0.1-0.4 RMB (0.01 USD-0.06 USD). Retailers who do not comply with the policy risk

¹ A full text of the plastic bag policy directive issued by the State Council and supplemented by the Ministry of Commerce, the National Development and Reform Commission, and the State Administration for Industry and Commerce in its original form can be found on the Chinese government's website (http://www.gov.cn/flfg/2008-05/15/content_975809.htm)

facing fines of up to 10,000 RMB (US\$ 1,464).² The official name of this policy in Chinese is 《国务院办公厅关于限制生产销售使用塑料购物袋的通知》 but most among the general public simply refer to this two-part policy as 《限塑令》 or the “plastic limit order”.

The State Council, China’s chief executive organ, issued the plastic limit order by way of formal directive in the spring of 2008.^{3,4} Additionally, in May of the same year, three other government departments—the Ministry of Commerce, the National Development and Reform Commission, and the State Administration for Industry and Commerce—introduced a joint supplementary provision to enforce and expand the scope of the State Council’s initial plastic bag directive. In their auxiliary ruling, the three departments laid out detailed stipulations for the implementation and enforcement of the bag policy. These bodies compiled their stipulations in a document known as *The Administrative Measures for the Paid Use of Plastic Bags at Commodity Retailing Places*.⁵

The main goal of this policy, as determined by these various government bodies, is to reduce China’s plastic bag consumption and pollution. Additionally, this policy seeks to improve public awareness about environmental issues, such as waste production and resource preservation. The policy represents a component of the central government’s environmental legislative overhaul, which it initiated in the lead-up to the 2008 Beijing Summer Olympics.⁶ Unlike past domestic environmental policies, however, this policy is unique in that it theoretically requires every Chinese citizen to participate in its implementation.

China’s overuse of plastic bags:

Prior to the implementation of the new bag policy, China’s 1.4 billion people used an estimated 3 billion plastic bags per day and

² “China finds plastic bag habit hard to break,” *China Daily* [China] May 28, 2009 (http://www.chinadaily.com.cn/china/2009-05/28/content_7951007.htm)

³ China’s State Council is responsible for enacting administrative regulations that are relevant to national and constitutional law. (PRC Constitution, Art. 89) Under the State Council, the Commission for the Protection of Environmental and Natural Resources (ENRPC) coordinates environment protection work and develops environment-related policies and guidelines.

⁴ Stephanie Beyer, “Environmental Law and Policy in the People’s Republic of China”, *Chinese Journal of International Law*, Vol. 5, No. 1, pg. 188, 2006

⁵ Worldwatch Institute, “China Watch: Plastic bag ban trumps market and consumer efforts”, *Environmental News Network*, June 30, 2008 (<http://www.enr.com/pollution/article/37512>)

⁶ “China’s bag ban, one year later”, *China Dialogue*, July 10, 2009 (<http://www.chinadialogue.net/article/show/single/en/3158-China-s-bag-ban-one-year-later>)

disposed of more than 3 million tons of them per year.⁷ Several contributing factors explain this massive consumption and waste.

First, the Chinese habit of making many individual shopping trips to purchase their weekly consumables encourages extensive plastic bag use. Many Chinese people shop daily, preferring to buy their groceries in smaller quantities to maximize freshness, accommodate limited storage space, and ease transport (the majority of Chinese still do not own a car). As a result of this tendency to shop frequently, shoppers often end up with half-filled plastic bags on any given shopping trip, many of which contain only one or two items.

Second, many Chinese shoppers buy some or all of their groceries at farmer's markets (also called "wet markets"), rather than at supermarkets. The set-up of these farmer's markets encourages more plastic bag use. At such markets, each seller mans his or her own individual stall, usually only selling a few types of goods. The shoppers move from one stall to the next, inspecting the proffered goods and making purchases when these goods meet the shopper's requirements. This style of shopping encourages more use of plastic bags because often the shopper only purchases one or two items at each stall. Additionally, since items are priced on the spot and according to their weight, each item must be bagged separately so as to allow the shopkeeper to weigh each individually.

Third, Chinese street food vendors distribute much of their consumables (*xiaochi* 小吃) in small ultrathin plastic bags. They favor this distribution method because it is inexpensive, convenient, and relatively sanitary. Chinese street food is popular nationwide; its production and distribution is heavily under-regulated in most parts of the country.

Fourth, Chinese shoppers have grown accustomed to using excessive amounts of plastic packaging, including bags, in recent years. Excessive packaging has become associated with cleanliness and quality control in the minds of Chinese consumers. And, since plastic is cheap (especially in China, which serves as the world's factory for consumable plastic products), product producers have little independent incentive to change this mindset and reduce plastic packaging.

Finally, Chinese consumers do not efficiently recycle their used plastic bags. Domestic plastic bag recycling programs still remain in early their beta stages, making finding a venue for recycling bags a real challenge for even the most committed eco-citizen in China. Likewise, Chinese grocery stores and local trash collection centers have yet to

⁷ Hiroko Tabuchi, "Japanese Ministry Shuts off Heating in Race to Meet Kyoto Target," *Associated Press*, Feb. 24, 2006 (<http://www.enn.com/pollution/article/37512>)

follow the West's lead by providing receptacles for used plastic bags. Rather, they simply dispose of their used plastic bags in the nearest garbage can or onto the street.

Chinese government's rationale for limiting plastic bag use

Beginning in 2008, the Beijing government publicly acknowledged the nation's overconsumption of plastic bags and the negative impact of such consumption on the environment. In particular, it highlighted the dual threat that overuse posed to ecological stability and energy security.

As emphasized by the government, China's plastic bag waste represents a major challenge to its national ecological stability. Discarded bags primarily end up in official landfills and unofficial dumping sites. Very few of them get recycled. Once discarded, these bags usually take between 200 and 1,000 years to break down—producing toxic petro-polymers in the process. Additionally, a significant portion of these single-use carrier bags never make it into the garbage processing system at all. Instead, they end up in the environment—littering streets, floating in trees, and clogging up waterways. This type of visible plastic pollution has become so prevalent in recent years that locals have begun to refer to it by its own specific name: "white pollution" (白色污染).

The government also emphasized the negative impact that plastic bag production has on China's energy security because of its use of valuable crude oil. According to the China Chain Store & Franchise Association, China uses nearly 37 million barrels (5 million tons) of crude oil each year to produce plastic bags—1,300 tons of which is used daily to produce shopping bags for supermarkets alone.⁸ This amount represents the equivalent of one-third of the country's total oil imports.⁹ Thus, in a joint effort to ensure China's ecological stability and protect its energy supply, the Chinese government adopted its new plastic bag policy.

Successful Plastic Bag Reduction Policies in Ireland and Washington D.C.

International evidence suggests that a properly enacted plastic bag levy can significantly reduce the use of plastic bags among consumers. Take, for example, Ireland's experience with a similar plastic bag limit policy. When Ireland introduced its levy on plastic bags in 2002, the

⁸ Yvonne Chan, "China ban saves 40 million plastic bags," *BusinessGreen*, May 26, 2009 (<http://www.businessgreen.com/business-green/news/2242886/china-plastic-bag-ban-effective>)

⁹ Worldwatch Institute, "China Watch: Plastic Bag Ban Trumps Market and Consumer Efforts," *Environmental News Network*, June 30, 2008 (<http://www.enn.com/pollution/article/37512>)

levy was the first of its kind anywhere in the world. The levy—or the PlasTax as it is known—applies to all retailer-provided bags made wholly or partly of plastic (with a few specific exemptions as acknowledged in the related legislation). Since the levy's introduction eight years ago, plastic bag use in Ireland has fallen by 90% and per capita usage has fallen from an estimated 328 bags to just 21 bags annually.^{10 11} Additionally, at 0.22 EUR (0.27 USD) per bag, the policy has generated over 120 million EUR (146 million USD) for the state-run Environmental Fund, paying for waste recycling and garbage collection initiatives.¹²

Local Irish authorities bear primary responsibility for PlasTax enforcement. They regularly conduct spot checks on retail outlets ensuring that the bag levy is properly implemented and punishing violators appropriately when necessary.^{13 14} Additionally, local authorities have created a complaint hotline, which allows consumers to contact their local Environmental Awareness Officers about possible PlasTax violations.¹⁵ So far, these tip-offs have proved to be quite helpful.

Ireland has popularized the PlasTax among the public through effective marketing campaigns. According to an editorial in the *New York Times* about the Irish bag levy, “Plastic bags were not outlawed, but carrying them became socially unacceptable — on a par with wearing a fur coat or not cleaning up after one’s dog.”¹⁶ Within a year of the levy's introduction, 91% of those polled believed that the policy was “a good idea” and 90% brought reusable or long life bags with them to do their shopping.¹⁷ Through a combination of rigorous policy

¹⁰ “Irish bag tax hailed success,” *BBC News World Edition*, August 20, 2002 (<http://news.bbc.co.uk/2/hi/europe/2205419.stm>)

¹¹ “Plastic Bags Levy to be increased to 22c from 1 July 07,” *Department of the Environment, Heritage & Local Government*, Feb. 21, 2007 (<http://www.environ.ie/en/Environment/Waste/PlasticBags/News/MainBody,3199,en.htm>)

¹² Henry McDonald, “Ireland plans to double plastic bags tax,” *Guardian* [UK], Sept. 24, 2009 (<http://www.guardian.co.uk/world/2009/sep/24/ireland-tax-plastic-bags>)

¹³ “FAQs,” *Department of the Environment, Heritage & Local Government* [Ireland], 2007 (<http://www.environ.ie/en/Environment/Waste/PlasticBags/FAQs/>)

¹⁴ “FAQs,” *Department of the Environment, Heritage & Local Government* [Ireland], 2007 (<http://www.environ.ie/en/Environment/Waste/PlasticBags/FAQs/>)

¹⁵ Citizens Information, “Plastic Bag Environmental Levy,” *Department of the Environment, Heritage & Local Government* [Ireland], June 22, 2007 (http://www.citizensinformation.ie/categories/environment/waste-management-and-recycling/plastic_bag_environmental_levy)

¹⁶ Elisabeth Rosenthal, “Motivated by a Tax, Irish Spurn Plastic Bags,” *New York Times*, Feb. 2, 2008 (http://www.nytimes.com/2008/02/02/world/europe/02bags.html?pagewanted=1&_r=1)

¹⁷ Irish Environmental County Council, “National Survey: Environment ‘Attitudes and Actions 2003,’” (<http://webcache.googleusercontent.com/search?q=cache:2ipBR8yzqocJ:kildare.ie/CountyCouncil/Environment/PlasticBagLevy/LinkToDocument,14656,en.doc+public+opinion+on+the+plastic+>

enforcement and an effective awareness campaign, the Irish government has succeeded in generating a sound plastic bag policy model.

Similarly, on January 1, 2010, America's national capital, Washington D.C., introduced a new 0.05 USD levy on all plastic bags distributed at food and grocery establishments. In the months preceding its introduction, D.C. officials widely publicized the coming levy and ensured that retailers understood its requirements. This careful policy preparation and enforcement paid off—in the first month that the tax was enacted, plastic base use in the city dropped by 87%. According to a recent assessment of the effects of the levy produced by the D.C. Office of Tax and Revenue, food and grocery establishments reduced the average monthly number of plastic bags that they gave out by 19.5 million—from 22.5 million before the levy to 3 million bags following its implementation.”¹⁸

As in the example of Ireland, D.C.'s effective communication and strict enforcement of its policy to reduce plastic bag use has proven productive, resulting in a substantial drop in distributed bags. The successes of these international examples indicate that a properly implemented and enforced plastic bag levy in China should have similarly reductive effects on bag use as well.

POLICY IMPLEMENTATION

Partial policy implementation:

China has achieved partial implementation of the Plastic Limit Order in China. Specifically, the majority of major chain grocery stores, shopping centers, and convenience stores have implemented the Order—with most now charging between 0.1-0.4 RMB (0.01 USD-0.06 USD) for an appropriately thick plastic bag. Of these, stores in major cities—particularly in eastern China—seem to implement the policy most consistently. Foreign-owned brand name chain stores tend to represent the policy's most diligent adherents. Less regularly, but not uncommonly, government-operated stores, such as those in airports or at designated tourist sites, sometimes implement the policy as well.

Importantly, however, virtually all other domestic retailers, including farmer's market sellers, food stall vendors, private shopkeepers, and restaurateurs, have yet to implement the policy. In fact, in my ten months of research on this topic, I found only two retailers from this latter category that had begun charging for bags—although some retailers had at least replaced their ultrathin plastic bags

bag+levy+in+Ireland&cd=3&hl=zh-CN&ct=clnk&client=firefox-a)

¹⁸ Samuel Fromartz, “Plastic bag use plummets in D.C.,” *Chewswise*, April 10, 2010 (<http://www.chewswise.com/chews/2010/04/dc-drop-kicks-plastic-bags.html>)

with slightly sturdier ones or had substituted reusable bags in place of single-use ones. This lack of adherence in the domestic retail sector represents a major hole in policy implementation. Until the Chinese government can secure adherence to its policy across this sector of the retail market, implementation of its Plastic Limit Order will only remain partial at best.

Stores implementing the policy:

Based on my personal observations, I found that most major domestic chains and all major foreign-owned chains charged their customers for plastic bags. My interview subjects, who included chain grocery store workers in Guangzhou, Wuhan, and Shanghai and convenience store personnel in Beijing, Nanjing, and Jinghong in Yunnan province, corroborated these findings. Likewise, the responses that I received to a survey that I administered to foreigners living across China also supported my findings about the tendency of major chains to implement the Order.

Several studies and newspaper articles published during the past year in China also support these findings about the implementation of this policy at major chain stores. For example, in the summer of 2009, three Chinese environmental NGOs, including Friends of Nature, Green Longjiang, and Green Tuoling, conducted a comprehensive seven city survey in Beijing, Lanzhou, Harbin, Guangzhou, Chengdu, Zhengzhou, and Hangzhou evaluating the implementation of the plastic bag policy. According to the survey's findings, 85% of large grocery stores and shopping centers in these cities are implementing the Order.¹⁹

To a lesser extent, some government-affiliated stores, such as those in airports and at tourist sites, have also begun implementing this policy. At the Wuhan airport, for example, the snack shops charged 0.3-0.5 RMB for a plastic bag, depending on the size that the patron selects. In contrast, however, similar snack shops in airports in Yunnan Province did not charge for plastic bags and instead automatically bagged purchased items free of charge. Likewise, highly regulated tourist site-related stores, such as those servicing the Shanghai Expo, often charge for plastic bags, while most others, even those in visible venues such as at the Great Wall just outside of the nation's capital, still liberally distribute free bags to customers.

Stores not implementing the policy

Despite the impressive achievement of widespread policy

¹⁹ "More to do on plastic bag ban," *CRIEnglish* [China], Nov. 9, 2009 (<http://english.cri.cn/7146/2009/11/09/2161s527893.htm>)

implementation in large chain stores and some government stores, implementation in all other retail sectors remains weak. Among the most consistent and common violators of the policy are small-scale retail operators such as agricultural market sellers and street vendors, many of whom remain unwilling to implement the policy for fear of being undercut by noncompliant competitors.^{20 21}

One technique that I used to quantify this lack of adherence to the plastic bag policy among small-scale operators was to conduct a series of case studies (15 in total). For each study, I would begin by randomly selecting a single street in a given city. Then I would count the total number of retailers on the selected street (street level only), categorizing each retailer according to its products and/or services it had on offer. After establishing the number and nature of the retailers on the street, I would go into each store to determine whether it provided and/or charged for plastic bags. Through these case studies, I sought to gain a better general sense of how the “average city street” in China was responding to the new plastic bag policy. Through these studies, I determined that the vast majority of retailers sampled in this fashion continue to provide their customers with free plastic bags. In fact, in at least three of my case studies, I found 100% of all retailers to be in violation of the Plastic Limit Order.

Take, for example, one representative case study that I conducted on an average local shopping street called Guang Ba Lu (广八路) in Wuhan, the capital city of central China's Hubei province on the Yangtze River. This well-trafficked street services two of the cities major university campuses, Wuhan University and Huazhong Normal University, and is regularly patrolled by local law enforcement. On Guang Ba Lu, I counted 224 retail venues, including 93 clothing, shoe, and accessory stores, 43 restaurants, 16 food vendors, 15 hardware stores, 9 non-chain convenience stores, 7 drink stores, 5 fruit stalls, 5 specialty food stores, 5 hair salons, 4 electronics stores, 3 housing agents, 3 bicycle stores, 2 health clinics, 2 lottery ticket depots, 2 banks, 2 recycling centers, 1 dentist, 1 pharmacy, 1 book store, 1 pool hall, 1 music store, 1 DVD store, and 1 non-chain grocery store. Of these retailers, I found that over 95% of them distributed plastic bags to their customers free of charge. Moreover, the 5% of retailers that did not provide customers with plastic bags (the pool hall, lottery ticket depots, banks, housing agents, and recycling centers) did not appear to be doing

²⁰ “‘限塑令’难落实 ‘无偿塑料袋’还在用” (‘Plastic Limit Order’ is hard to implement—‘free plastic bags’ continue to be used), *四川新闻* (Sichuan News) [China], Dec. 28, 2009 (<http://sichuan.scol.com.cn/ncxw/20091228/20091228113934.htm>)

²¹ “中国‘限塑令’提高国人环保意识” (China’s ‘Plastic Limit Order’ raises Chinese environmental awareness), *新华网* (Xinhua News Online) [China], May 23, 2009 (http://news.xinhuanet.com/environment/2009-05/23/content_11422982.htm)

so out of deference to the national plastic bag policy, rather, they simply did not offer customers anything that would necessitate a plastic bag. Notably, of the 224 retailers on Guang Ba Lu, I did not find a single one in adherence with the Plastic Limit Order.²²

Moreover, in my interviews with these small-scale Guang Ba Lu retailers, many openly acknowledged their violation of the plastic bag policy. As one local fruit seller patiently explained to me, "I cannot charge for plastic bags because if I charge for my bags, but other sellers around me do not, then my customers will simply go to one of them instead. And I don't blame them for doing so. In fact, I would too." Likewise, a man standing on the sidewalk selling fresh garlic cloves from a wheelbarrow told me that he sells each clove for about 0.5 RMB (0.07 USD). "How can I justify requiring my customer to buy a bag that costs almost as much as the garlic clove inside of it?" he asked me. Additionally, in the course of my interviews, I also learned that many sellers continue to give out ultrathin plastic bags because they cost substantially less than do the legal ones. The average ultrathin plastic bag costs about 0.005 USD while the legal ones cost roughly four to six times that amount. According to these small-scale vendors, the plastic bag policy is simply unsustainable for their business model. As a result, they have no choice but to violate it in an effort to continue to attract customers.

Government efforts to improve implementation

The State Administration for Industry and Commerce (SAIC), one of the government bodies charged with oversight of the Plastic Limit Order, has publicly acknowledged that implementation of the policy remains incomplete. In June 2009, the SAIC issued a circular recommending that market managers encourage better policy adherence among their vendors. To encourage such adherence, the SAIC suggested that these management divisions arrange a special telephone number for consumers to call to report policy violators, publicize the plastic ban in prominent areas, sign a joint letter of indemnity with their vendors reiterating the repercussions that both would suffer if caught in violation of the policy, and limit bag distribution to special authorized bag sellers. At the same time, the SAIC also took the opportunity to remind market managers once again that they would ultimately be held responsible for any policy violations committed by their vendors.²³

²² As an interesting side note, upon inquiry at Guang Ba Lu's two recycling centers, both refused to accept plastic bags, directing me to put them in the regular garbage piles out front of the recycling centers instead.

²³ "Market Operators Held Responsible For Illegal Use Of Plastic Bags," *China Chain Store & Franchise Association*, June 22, 2009 (<http://www.chinaretail.org/shownews.asp?id=846>)

In a few cases, at least, this reiteration of the plastic bag policy appears to have had a positive effect on retail behavior. For example, according to an article in the *Xinhua News*, some farmer's market managers in Hangzhou City, capital of Zhejiang Province in China's eastern corridor, have begun requiring their vendors to provide standard thickness plastic bags for customers in accordance with the policy.²⁴ To enforce this requirement, the managers collect a 3,000 RMB (439 USD) deposit from each vendor. In the subsequent event that a vendor gets caught by authorities for distributing inferior quality ultrathin bags, the manager will use the deposit money to cover the cost of the fine levied, which range from 100 RMB for a first offense, 200 RMB for a second offense, and 1,000 RMB for a third offense (15 USD, 29 USD, and 146 USD, respectively). Upon a fourth offense, the manager will close the vendor's stall entirely. This mandate for a deposit has received a mixed response from vendors, many of whom argue that 3,000 RMB represents too much money to tie up in a deposit. Some vendors have even organized strikes over the mandate. Nonetheless, a handful of market managers continue to pursue new policies such as this one to try to find ways to ensure that their vendors comply with the Plastic Limit Order.

Likewise, according to the deputy director and secretary-general of the International Food Packaging Association Dong Jinshi, the well-trafficked Dongjiao Market (东郊市场) in Beijing, which grosses over 3 billion RMB (439 million USD) in annual sales, has enacted a similar program in coordination with the Chinese government to ensure that customers pay for the plastic bags that they receive.²⁵ The program controls plastic bag distribution inside the market by only permitting a few pre-authorized stallholders to sell plastic bags (six in total). These bags are then meant for carrying goods purchased throughout the market. To ensure that regular vendors do not violate this system, each must pay a deposit of 30,000 Yuan (4,393 USD) along with his monthly space rental fee. If a vendor is found to be violating this system then punishments will be levied—including loss of deposit or even removal from the market. Additionally, the program stipulates that the prices of the available plastic bags must be clearly marked. In theory, at least, this bag regulatory model represents a potential method for encouraging adherence to the plastic limit policy.²⁶

²⁴ “市场强收3000元环保袋押金 杭州一农贸市场歇菜了”(Market strongly receives 3000 RMB in deposits for environmentally plastic bags—One Hangzhou farmer's market is finished), *新华网 (Internet News)* [China], Dec. 23, 2009 (http://www.xinhuanet.com/chinanews/2009-12/23/content_18572041.htm)

²⁵ Dongjiao Market Address: 北京市朝阳区西大望路甲12号

²⁶ Note: I write “in theory” because my research suggests that this model has yet to be fully implemented at the Dongjiao Market. On a recent data collection visit to this market in June, I received free plastic bags from multiple vendors and witnessed no government oversight during

Nonetheless, despite these select efforts to bolster policy implementation, the government has had little impact on the distribution of plastic bags among the vast majority of small-scale retailers. Most retailers remain unwilling to adopt the policy strictures until their competitors do so first. Moreover, most of these retailers feel little legal or financial compulsion to become “first-adopters” of the policy since they know that it is (at least currently) unlikely that they will face negative repercussions for their noncompliance. Additionally, many of these small vendors live hand-to-mouth with little cash to spare or save, which means that many could not afford the government-advocated deposit-compliance system described in the preceding paragraph. Until the government tailors compliance incentives and enforcement conducive to these small business holders, policy implementation across this sector will remain critically inhibited.

POLICY EFFECTS

Decline in plastic bag use:

According to my research, plastic bag use in stores that charge for bags has declined significantly. According to a survey conducted by the China Chain Store & Franchise Association, plastic bag use at supermarkets across the country declined by 66% over the 12-month period following its introduction—with use at foreign and domestic supermarkets dropping by 80% and 60% respectively. The survey reported that this reduction in bag use saved an estimated total of 40 billion plastic bags and 1.6 million tons of oil.^{27,28,29} Prior to June 2008, supermarkets accounted for one-third of all plastic bags used in China.³⁰

Other studies measuring the efficacy of the policy at major supermarket chains demonstrated similarly successful results. An article in *People's Daily Online* (Rennin Wang 人民网) reported that plastic bag use in supermarkets in southern China's Guangzhou City dropped by almost half upon introduction of the Plastic Limit Order.³¹

the duration of my shopping experience.

²⁷ Yvonne Chan, “China ban saves 40 million plastic bags,” *BusinessGreen*, May 26, 2009 (<http://www.businessgreen.com/business-green/news/2242886/china-plastic-bag-ban-effective>)

²⁸ “Anniversary of Plastic Limit Order: Save 40 Billion Plastic Bags in supermarkets,” *China Chain Store & Franchise Association*, June 3, 2009 (<http://www.chinaretail.org/shownews.asp?id=766>)

²⁹ “限塑令实施一年” (Plastic Limit Order implemented for one year), *新华网(Xinhua News)* [China], June 1, 2009 (http://news.xinhuanet.com/environment/2009-06/01/content_11443883.htm)

³⁰ Yvonne Chan, “China ban saves 40 million plastic bags,” *BusinessGreen*, May 26, 2009 (<http://www.businessgreen.com/business-green/news/2242886/china-plastic-bag-ban-effective>)

³¹ “限塑首日:广州超市用袋减四成 街市仍见塑料袋”(First day of the Plastic Limit: Guangzhou grocery stores reduce bag use by 40%, street markets still seen using plastic bags),

Likewise, a similar article reported that some supermarkets in Beijing had reduced their plastic bag distribution by up to nine-tenths since the introduction of the policy.³²

Foreign-owned retailers have also reported similar reductions in plastic bag use at their Chinese locations. Within the first twelve months of the policy's introduction, IKEA Beijing cut its plastic bag distribution by 67%. Likewise, an executive at French retail giant Carrefour reported that its plastic bag use has fallen by 70% throughout China. Wal-Mart, which operates over 100 stores in China, recorded an 80% drop in plastic bag distribution.³³ Wal-Mart worker, Wu Dan, who has worked at Wal-Mart in Beijing for the past two years, said that, prior to the plastic bag policy, he used to use about two bundles of bags per work shift each day (each bundle contains about 100 bags). Twelve months after the implementation of the policy, he found that he was using less than half of a bundle of bags during his shift. He attributed this 75% drop in usage to people's willingness to put more items into fewer bags as well as their increasing tendency to bring their own bags to the store.

Growing support for reducing plastic bag consumption

Generally speaking, shoppers nationwide have embraced the new policy without complaint. Unlike in the United States, for example, where preliminary attempts to introduce bag charges have engendered bitter debate and reactionary newspaper editorials, overall Chinese reception to the bag charge has been largely positive. A study in the *People's Daily* reported that 80% of the population support the spirit of the plastic bag policy, citing the need to promote environmental consciousness whenever possible.³⁴

Moreover, as the general Chinese population has become more familiar with the dangers that overconsumption of plastic bags pose to the environment, they have shown an increased willingness to adopt more ecologically friendly bag alternatives. Particularly over the last two years, a growing number of shoppers have begun using reusable "huanbao" (环保) bags made from materials such as cloth, polyethylene, and hemp to carry their purchases. Shoppers have also begun to show an increased willingness to refuse plastic bags offered to

人民网 (People's Daily Online) [China], June 2, 2008 (<http://env.people.com.cn/GB/7328636.html>)

³² Worldwatch Institute, "China Watch: Plastic bag ban trumps market and consumer efforts", *Environmental News Network*, June 30, 2008 (<http://www.enr.com/pollution/article/37512>)

³³ "Plastic bag use in supermarkets drops 2/3," *People's Daily Online English* [China], August 27, 2009 (<http://english.people.com.cn/90001/90776/90882/6741053.html>)

³⁴ "Plastic bag use in supermarkets drops 2/3," *People's Daily Online English* [China], August 27, 2009 (<http://english.people.com.cn/90001/90776/90882/6741053.html>)

them at stores if they are able to comfortably carry their purchases without a bag.

Unintended consequences of the Plastic Limit Order

In a few cases, this policy has had an uneven impact on various production sectors related to the plastics industry, helping some and hurting others. For example, the policy has helped domestic trash bag producers by increasing demand for purchasable rubbish bags (presumably to replace the supply of shopping bags that people used to use to hold their trash). In response, the Standardization Administration of the People's Republic of China is currently speeding up the formulation of standards for trash bags, degradable trash bags, and other products.³⁵

Less happily for others, the ban on ultrathin plastic bags and free plastic carriers has prompted some wholesale bag producers to close their doors entirely due to an inability to continue to turn a profit under the new restrictions. The most notable closure to date occurred fewer than two months after the policy's introduction in February 2008 when Suiping Huaqiang Plastic, China's biggest plastic bag manufacturer, closed its production doors. Suiping, which employed 20,000 people, earned most of its 2.2 billion RMB (322 million USD) from the annual production of 250,000 tons of bags. With the introduction of the ban on free plastic bags and ultrathin bags, Suiping reported that it could no longer operate a profitable business. According to a company management official in the lead up to Suiping's shutdown, "over 90% of our products are on the limit list, so the only way forward for the factory is closure".³⁶ Likewise, many other factories and suppliers have also had to shut down or suffer significant losses as a result of the government's implementation of its new plastic bag policy.

POLICY SHORTCOMINGS

Shortcomings of the current Plastic Limit Order:

China's Plastic Limit Order remains imperfectly implemented, enforced, and understood by the public. As evidenced by the findings in the preceding sections of this report, the primary shortcomings that continue to hamper this policy from realizing its full potential include the following:

First, the policy remains inadequately implemented by small-scale

³⁵ "Plastic bag use in supermarkets drops by 75 pct," *People's Daily Online English* [China], May 22, 2009 (<http://english.people.com.cn/90001/90776/90882/6663682.html>)

³⁶ Jonathan Watts, "China's biggest plastic bag maker closes after ban," *Guardian* [UK], Feb. 27, 2008 (<http://www.guardian.co.uk/world/2008/feb/27/china.plasticbags>)

enterprises—particularly small shops and markets. This lack of implementation continues to prompt the consumption of billions of plastic bags daily, including substantial quantities of ultrathin bags. The government has taken little action to try to improve policy implementation in this sector.

Second, the policy remains ineffectively enforced by government authorities, which carry out only irregular and largely ineffective policy inspections. Without regular inspections by authorities to ensure that retailers are complying with the policy—and then exacting fines from those who are not—the latter have little incentive to improve policy implementation. Additionally, by announcing inspections before they occur, the authorities provide retailers ample opportunity to temporarily enact measures in compliance with the plastic bag policy so as to pass the inspection, undermining the purpose of the inspection entirely. Once the inspection is complete, the retailers return to their previous non-compliant ways.³⁷

Third, a substantial portion of the public remains ill informed about the policy. Despite improving awareness, many Chinese people still remain inadequately informed about the negative environmental repercussions of gratuitous plastic bag use and, thus, the need to limit their consumption when possible. Additionally, even among those who do understand the value of conserving plastic bags, many have yet to adjust their habits accordingly.³⁸ Undoing a generation's worth of acculturation to using single-use plastic bags remains an ongoing educational challenge.

Fourth, the policy lacks supporting measures to help it achieve its goal of reducing plastic bag waste. Without parallel measures to reduce plastic bag consumption in other aspects of consumer culture (such as those used to package foods or collect rubbish), the Plastic Limit Order's effectiveness at reducing plastic waste will remain severely limited.

Fifth, the policy will also have trouble achieving its ultimate goal of reducing plastic bag waste so long as the most common single-use plastic bag alternative remains a reusable non-biodegradable polyethylene (plastic) bag. Similar to single-use plastic bags, reusable plastic bags also pose a threat to the environment since they too require oil input for their production and will take many centuries to break down upon disposal. Alternative reusable bags should be made out of

³⁷ Xiufeng Xing, "Study of the Ban on Free Plastic Bags in China," *Journal of Sustainable Development* [China], Vol. 2, No. 1, March 2009 (<http://www.ccsenet.org/journal/index.php/jsd/article/view/299/267>)

³⁸ "限塑令实施一年" (Plastic Limit Order implemented for one year), *新华网(Xinhua News)* [China], June 1, 2009 (http://news.xinhuanet.com/environment/2009-06/01/content_11443883.htm)

biodegradable and/or sustainable materials instead.³⁹

Remedies for policy shortcomings of the Plastic Limit Order:

First, China's central government should require local police to take more responsibility for Plastic Limit Order enforcement. Local Chinese police officers represent the most practical body to enforce this policy because their offices are usually overstaffed, which means that they have surplus manpower available to take on policy enforcement work. Additionally, local officers frequently have some familiarity with the locality in which they operate that can prove useful while conducting inspections or following up on reported violations.

These local authorities should conduct spot checks on all types of retail shops to ensure policy compliance. These checks should occur on a regular and frequent basis and should be unannounced and preferably undercover. Spot check evaluations should ensure that the retailer: 1) charges the prescribed amount for each plastic bag distributed, 2) notifies the consumer about the plastic bag charge through prominently displayed signs 3) itemizes the plastic bag charge on the consumer's purchase receipt, 4) only distributes plastic bags thicker than .025 mm, and 5) only distributes free plastic bags to customers when applicable exemptions apply. Following each spot check, local authorities should complete a full standard write-up of their inspection to submit to a central database accessible to both local and central government. Additionally, when authorities discover policy violations, they should take swift and appropriate punitive action against the infringing retailer.⁴⁰

Second, the central government should monitor local enforcement efforts of the policy and should reserve the right to intervene should it determine local enforcement to be inadequate. Methods for overseeing local enforcement efforts should include: 1) conducting regular reviews of local authorities' official report findings, 2) conducting random spot checks on retailers already checked by local authorities to ensure that findings by the two bodies are the same, 3) meeting with local retailers and inquiring about their experiences with local authorities enforcing the Plastic Limit Order, and 4) following up promptly on any civilian complaints about local authority enforcement techniques. Should the central government detect wrongdoing by its local counterparts, it should respond with swift and severe action to discourage other local

³⁹ Note: The plastic limit policies in Ireland and Washington D.C. do not adequately encourage sustainable bag use either. They too should consider doing so as well.

⁴⁰ Note: The Irish authorities used a similar approach to policy enforcement through local authorities upon introduction of their plastic bag levy beginning in 2002. It has proven to be a very effective technique

police from following suit.

Third, the Chinese government should create a hotline for consumers to contact about policy violations. This technique would help local authorities to learn about violators more quickly and to schedule their spot checks more effectively. Moreover, by actively engaging the public in policy enforcement, the public will feel more personally connected with the policy—likely improving awareness and support for the policy over time.

Fourth, the Chinese government should do a better job improving awareness about the Plastic Limit Order among the general population. To achieve improved awareness, the government should devise a succinct standard message to describe the policy. This message should clearly outline the policy's two main components: 1) consumers must pay for every bag received and 2) consumers should not accept ultrathin plastic bags. Additionally, this message should briefly highlight the environmental rationale behind the policy.

Once devised, the government should then actively publicize this message through television ads, radio commercials, newspaper articles, internet notifications, text messages, government website feature stories, school assemblies, and public awareness events held in high traffic areas such as parks, shopping centers, and in front of banks. It should seek to publicize this message in a memorable and visually engaging way, perhaps by selecting a popular personality to act as the policy's spokesperson or by hiring a top marketing company to devise strategies to publicize and communicate the policy. The government could even think about adopting a mascot, such as those created for the Olympics and for the Shanghai World Expo, as these seem to be particularly popular among the Chinese public.

Fifth, the government should require retailers to provide more prominent notification about their plastic bag policies to customers. As of now, stores usually only have small signs announcing the plastic bag charge in the cash register area. More prominent signage would improve consciousness and awareness about the policy. Likewise, the government should ensure that retailers itemize the plastic bag charge on all customer receipts, as the law stipulates.

Sixth, the government should encourage employers and schools to promote policy awareness among their workers and students by organizing special events on the topic. To ensure that these events adhere to the government's message about the policy, the government should compile a Plastic Limit Order Press Kit. This press kit should include presentation materials to be used by the awareness event coordinator such as an easily digestible policy briefing, visual aids, and literature for distribution to the audience. Press kits should not include reusable polyethylene bags for distribution.

Seventh, the government should ensure that students learn about the risks of plastic bag refuse in school by incorporating the topic into regular environment education curriculums. By educating the next generation about the need to use more environmentally friendly bag alternatives before they have fully formed their shopping habits, perhaps future consumers will use fewer bags than their predecessors.

SUPPLEMENTARY POLICY RECOMMENDATIONS

In addition to improving enforcement and awareness about the Plastic Limit Order, the government should also consider enacting supplementary measures to reduce plastic bag use. Suggestions for such supplementary modifications include:

Raise the price

Other national markets such as Ireland have proven that consumers modify their plastic bag use habits largely based on the cost of the bags. In China, the price for plastic bags ranges from 0.1-0.4 RMB—a nominal sum for most Chinese, particularly for those who are able to afford living in big cities and frequenting large grocery stores. As a result, at these current rates, the cost of plastic bags does not act as a major fiscal deterrent to their use. By raising the price of bags, however, consumers might have more incentive to curb their plastic bag purchases.

Promote the use of plastic bag alternatives

Governments should encourage stores and consumers to use more environmentally friendly carrier bag alternatives such as biodegradable plastic bags, degradable plastic bags, and traditional carrier bags.

Biodegradable starch and plastic bags represent one of the most viable existing alternatives at present. Unlike regular plastic bags, biodegradable ones break down through a natural organic process. These bags break down much more quickly than do their traditional polyethylene counterparts (often in a matter of months) and do not produce any harmful byproducts in the process.⁴¹ They can be made out of a variety of renewable sources such as corn, potato, tapioca, and wheat as well as nonrenewable sources such as oil-based polymers that utilize an additive to enable biodegradation (the latter are often referred to as “oxo biodegradable” bags).⁴² Until recently, many businesses and

⁴¹ Marek Koutny, Jaques Lemaire and Anne-Marie Delort, “Biodegradation of polyethylene films with prooxidant additives,” *Chemosphere* 64, 2006

⁴² Marek Koutny, Jaques Lemaire and Anne-Marie Delort, “Biodegradation of polyethylene films with prooxidant additives,” *Chemosphere* 64, 2006

individual consumers eschewed using biodegradable bags, considering them to be too expensive or too weak to serve their function properly. As the bags have declined in price and improved in strength over the past few years, however, demand for these bags among businesses and individuals alike has increased dramatically.

Businesses across the world have begun to provide biodegradable bags for their customers. For example, in Spain, the French supermarket chain Carrefour has begun replacing its plastic carrier bags with biodegradable potato starch bags.⁴³ Similarly, major Mexican chain stores Soriana and Comercial Mexicana have begun offering customers oxo biodegradable plastic bags that take fewer than two years to fully breakdown in a landfill. In both countries, participating stores report receiving positive consumer feedback for their environmentally progressive bag-related efforts.

Additionally, bag production companies are also beginning to produce and promote biodegradable plastic bags for purchase by individual consumers for use at home. One company in particular, a U.S.-based biodegradable plastic bag company called Green Genius, has taken a leading role in this nascent market. Beginning in 2009, Green Genius began mass-producing, distributing, and selling biodegradable plastic bags, which utilize a new scientific technology to ensure rapid plastic bag biodegradation once discarded in a landfill. To achieve this outcome, Green Genius has injected an additive called EcoPure into its plastic bags, which bonds organic “nutrients” to the plastic’s molecular structure. When these plastic bags are discarded in a microbe-rich environment, such as a landfill, the microbes are attracted to the embedded “nutrients” and colonize on the plastic. After colonizing, the microbes then begin feeding on the nutrients, breaking down the plastic into basic organic matter (biogas, biomass, and water) as they eat until it is completely gone.

At present, Green Genius produces a variety of domestic use plastic bags including garbage, kitchen, and food bags, all of which are advertised as costing the same amount and being as strong as their non-biodegradable rivals—but with the added benefit that they only take a matter of months to break down in a landfill.⁴⁴ Similarly, other bag producers are beginning to produce biodegradable alternatives for home use as well. For example, online pet supplies provider, Gear 4 Dogs, recently began selling the DOO-n-GO—an 100% oxo biodegradable plastic bag for picking up after pets.⁴⁵

⁴³ Olwen Mears, “End of an era for plastic bags,” *e!tb News*, Sept. 22, 2009, (<http://www.eitb.com/news/society/detail/247562/end-of-an-era-for-plastic-bags/>)

⁴⁴ Green Genius, “Frequently Asked Questions,” *Green Genius Website* (<http://www.thegreengenius.com/proof/faq.php>)

⁴⁵ Gear 4 Dogs, “Doo-n-Go Biodegradable Bags,” *Gear 4 Dogs Website*,

Degradable plastic bags also represent a relatively environmentally preferable alternative to regular plastic bags. Degradable bags break down through “degradation”—the process by which moisture, heat, or UV light breaks down very large molecules into small ones. Degradable bags are commonly made out of polyesters (bacteria based polymers), which are manufactured from hydrocarbons (oil or gas). Similar to biodegradable bags, degradable ones also break down faster and more completely than do their polyethylene counterparts. However, it should be noted that they usually take longer to break down than do biodegradable bags and also require a catalyst such as a heat or light source to do so. Due to their eco-friendly appeal, some major grocery stores have begun to offer degradable bags. For example, starting in 2006, UK-based supermarket giant Tesco began to exclusively distribute degradable bags that break down within as few as 60 days into products such as water and carbon dioxide at all of its domestic stores.⁴⁶

Traditional carriers represent a third viable alternative to plastic bag carriers. China did not begin using plastic bags in significant quantities until the 1990s.⁴⁷ Until then, most people carried reusable alternative carriers made out of jute, cloth, wood, straw, or bamboo. These traditional carriers represent environmentally favorable options because they are reusable and are composed of biodegradable products that can break down in a landfill.

Many grocery stores in China have already begun encouraging the use of these traditional carriers. In the summer of 2009, German supermarket chain Metro stopped selling plastic bags at 38 of its Chinese outlets, encouraging customers to bring their own carriers instead.⁴⁸ Wal-Mart's China outlets have introduced 15 different reusable bag options for sale at its China outlets, including several traditional carrier options.⁴⁹ And Tesco recently began to offer a reusable “Bag for Life” option, which is made from recycled materials and comes with a lifetime guarantee.

Likewise, private individuals and companies have also recognized the potential popularity of traditional carriers and have begun promoting

(<http://www.gear4dogs.com/doongo-biodegradable-bags>)

⁴⁶ “All Tesco bags 'to be degradable,’” *BBC News* [UK], May 10 2006 (http://news.bbc.co.uk/2/hi/uk_news/4758419.stm)

⁴⁷ “中国‘限塑令’提高国人环保意识” (China's ‘Plastic Limit Order’ raises Chinese environmental awareness), *新华网* (*Xinhua News Online*) [China], May 23, 2009 (http://news.xinhuanet.com/environment/2009-05/23/content_11422982.htm)

⁴⁸ Metro China Drops Plastic Bags,” *China CSR* [China], June 10, 2009 (<http://www.chinacsr.com/en/2009/06/10/5410-metro-china-drops-plastic-bags/>)

⁴⁹ Wal-Mart, “Plastic Bag Initiative,” *2009 Global Sustainability Report*, 2009 (http://walmartstores.com/sites/sustainabilityreport/2009/en_w_plasticbags.htm)

their sale. In 2007, British fashion accessories designer Anya Hindmarc created a stir in the fashion world when she designed the cloth tote bag “I’m Not A Plastic Bag”. The tote bag, which she produced in collaboration with the global social change movement We Are What We Do, became an instant hit, selling out across the world and reselling online for ten times its original price. In fact, the bags proved to be so popular that *Vanity Fair* selected them as the goodie-bags for guests at the magazine’s 2007 Oscar night party.⁵⁰ Similarly, soft drink multinational PepsiCo, in collaboration with Envirosax, a world leader in designer reusable bags, have together developed a line of eco-friendly “Pepsi Bags” made out of recycled polyethylene terephthalate material (otherwise known as RPET). RPET is made from 100% post-consumer recycled materials like soda bottles and plastic bags.⁵¹ These bags represent a potential additional revenue source for PepsiCo as well as an opportunity to advertise the company’s environmentally sensitive business model—and all from leftover garbage that the company itself produced in the first place!

Anecdotal evidence also suggests that some Chinese are willing to use traditional carriers. In Yongjia in Zhejiang province, for example, an ordinary farmer surnamed Chen began handing out bamboo baskets to locals to discourage people from using plastic bags. Local residents approved of his efforts so much that not only did they begin using the carriers, but they also elected Chen to local government office as well. According to Chen, “Electing me as an NPC deputy is an indication itself that our country is more and more aware of environmental issues.”⁵² Since his election in 2008, Chen has continued to distribute baskets. In 2009, he even managed to send some to Copenhagen in time for the international climate change summit held there in December.⁵³

⁵⁰ Denise Winterman, “It’s in the bag, darling,” *BBC News Magazine* [UK], April 25, 2007 (http://news.bbc.co.uk/2/hi/uk_news/magazine/6587169.stm)

⁵¹ “Pepsi Turns Bottles Into bag,” *Our Ordinary Life (blog)*, Oct. 25, 2009 (<http://www.ourordinarylife.com/2009/10/pepsi-turns-bottles-into-bags/>)

⁵² “Farmer lawmaker pushes for green ideas in more eco-aware China,” *Xinhua News Online English* [China], March 9, 2010 (http://news.xinhuanet.com/english2010/china/2010-03/09/c_13203743_2.htm)

⁵³ **A Note about paper bags as a proposed alternative:** While paper bags have received much positive promotion in recent years as a more “sustainable alternative” to plastic bags (including by Whole Foods, Starbucks, and, most recently, the US State of California), I have chosen to omit them as a potential sustainable bag alternative as I remain unconvinced that they represent a more environmentally friendly option for four main reasons. First, paper bags take about four times as much energy to produce as do plastic bags and use up a lot of raw tree materials in the process. Second, the paper manufacturing process that is used to produce paper bags is highly polluting to the environment due to the chemicals and water supplies required for manufacturing production. Third, pound for pound, recycling paper is much more cost intensive than recycling plastic. And, finally, paper bags still take a long time to breakdown in a landfill, filling up valuable space as demand for garbage repositories continues to grow.⁵³

Encourage plastic bag recycling

At present, plastic bag recycling in China remains relatively nonexistent. Unlike in the West, Chinese grocery stores do not offer plastic bag reuse receptacles and Chinese recycling centers do not accept plastic bags. Chinese people do not have the option to recycle their plastic bags because their country lacks the necessary facilities and systems to process the bags for reuse. This lack of a workable recycling program represents a failure on the part of the Chinese government to develop one. So far, the government has made little political effort to expand its plastic bag recycling programs beyond (well publicized and celebrated) pilot initiatives, despite the growing demand and need for such a program.

According to a recycling report by U.S.-based Moore Recycling Associates, substantial preliminary evidence exists to suggest that a simple recycling program could help countries to reduce their domestic waste. In America, for example, the study found that plastic bag and film recovery has increased 28% since 2005, primarily due to greater consumer access to collection programs as well as the development of new markets for the recycled materials including backyard decking, fencing, railings, shopping carts, and new bags.⁵⁴ By offering bag recycling receptacles in prominent places and then developing a system to process these bags, the Chinese government could similarly reduce its country's bag waste.

China has acknowledged its deficiency in plastic bag recycling. According to Li Jing at the National Development and Reform Commission (NDRC)—the organizational body which helps oversee environmental legislation in China—plastic recycling requirements “are still low, or non-existent, and we’re working on that”.⁵⁵ According to an interview with Chinese Dialogue (中国对话) in mid 2009, Chinese Ministry of Commerce official Li Jiajian told reporters that the government had recently run plastic-bag recycling trials in 26 provincial capitals as well as in all local administrative centre cities.⁵⁶ (Although, as a side note, I was living in Wuhan, which is a provincial capital, at this time where, in theory, a bag recycling trial should have been in place. However, I found no evidence of such a trial program.) In any event, the government still has much work to do with regard to the development of this sector.

⁵⁴ Andy Soos, “Where Have the Plastic Bags Gone?” *Environmental News Network* [China], March 19, 2010 (<http://www.enn.com/pollution/article/41123>)

⁵⁵ “China’s bag ban, one year later”, *China Dialogue*, July 10, 2009 (<http://www.chinadialogue.net/article/show/single/en/3158>)

⁵⁶ “China’s bag ban, one year later”, *China Dialogue*, July 10, 2009 (<http://www.chinadialogue.net/article/show/single/en/3158>)

Additionally, many individuals have proposed innovative and creative ways to reuse plastic bag. Governments across the world, including China's, should encourage such efforts. For example, a group of researchers at Pennsylvania State University's College of Agricultural Sciences Center for Plasticulture recently developed a prototype machine to convert plastic waste into fuel. This fuel, nicknamed Plastofuel, can be co-fired with coal at existing power plants to produce energy.⁵⁷ Likewise, Trex Company Inc., a leading manufacturer of alternative decking products in the United States, produces its building materials from millions of pounds of recycled and reclaimed plastic and waste wood.⁵⁸ Through its reclamation efforts, the company recycles over 1.3 billion grocery retail bags annually.⁵⁹

Meanwhile, in India, K.K. Plastic Waste Management, founded by Ahmed Khan and his brother Rasool Khan, has built more than 745 miles of roads using 3,500 tons of plastic waste. Mixing this plastic waste with asphalt, Mr. Khan forms a compound called polymerized bitumen. Not only is this bitumen compound more sustainable than traditional pavement since it partially comprises recycled plastic, but it is also considerably stronger and more durable than regular asphalt, lasting an average of one to two years longer than average road asphalt.⁶⁰

Finally, Affresol, a Welsh prefabricated house making company, has developed the technology to build affordable low carbon homes from recycled waste plastic. The building material, which is called Thermo Poly Rock (TPR), is made through a low energy cold process that converts plastic waste into a strong structural element. Each house consists of approximately 18 tons of waste material that would otherwise end up in a landfill. TPR is also stronger and lighter than concrete, waterproof, fire retardant, rot resistant, and a natural insulator. The average TPR house has a life cycle of more than 60 years and is 100% recyclable at the end of its life. As of now, Affresol forecasts that it will build and sell 3,000 homes per annum, primarily to those seeking affordable public housing. In the process of doing so, Affresol will recycle 40,000 tons of waste.⁶¹

⁵⁷ "Plastofuel," *Department of Agricultural and Biological Engineering, American Society for Plasticulture, Pennsylvania State University Website* (<http://plasticulture.psu.edu/?q=node/92>)

⁵⁸ "14 schools set for recycling," *Suffolk News-Herald*, July 21, 2010 (<http://www.suffolknewsheald.com/news/2009/oct/27/14-schools-set-recycling/>)

⁵⁹ "Background Information," *Trex Website* (<http://www.trex.com>)

⁶⁰ Miridu Khullar, "Plastic Roads Offer Greener Way to Travel in India," *New York Times*, Nov. 13, 2009 (<http://www.nytimes.com/2009/11/14/business/global/14plastic.html>)

⁶¹ Anthony Clark, "Modular homes made from recycled plastic," *Plastics News Global Group Website*, Feb. 26, 2010 (<http://www.prw.com/subscriber/featured2.html?cat=1&featuredid=1267180929>)

Discourage the use of plastic packaging

While reducing the number of plastic bags that consumers receive upon leaving the grocery store clearly represents an important start to reducing plastic waste and white pollution, this endeavor alone should not represent the sum total of China's reduction efforts. The Chinese government should also take measures to minimize the use of unregulated plastic packaging that is currently used to wrap prepackaged goods and restaurant food items. According to the environmental watchdog website China.org, this unregulated packaging represents the *majority* of the country's plastic consumption.⁶²

For example, the government should discourage gratuitous plastic wrapping of restaurant dishware. In recent years in China, it has become increasingly common for restaurants to provide patrons with disinfected tableware tightly sealed in plastic shrink-wrap. According to a China Economic Net article, this packaging, which is currently not recycled or regulated, represents a major source of pollution throughout China. The city of Changchun alone discards an estimated 85 tons of disinfected tableware packaging annually. However, despite efforts by environmental advocates such as Li Xiaoqun to persuade the city government to address the problem, calls to reduce such plastic waste have been largely ignored.⁶³

Moreover, China should encourage the use of sustainable plastic packaging. For example, the California-based environmental nonprofit Earthshell now provides biodegradable packaging and biodegradable picnic utensils to fast-food giant McDonald's in some of its U.S. stores. China should encourage McDonald's to do likewise in its XX Chinese locations as well. Similarly, Minneapolis-based Cargill Dow LLC, Novamont Spa of Novara of Italy, and the German BASF Group also have all begun supplying restaurants across the globe with biodegradable (usually corn starch) packaging to replace traditional nonreusable plastic supplies.⁶⁴ In doing so, these companies have helped countries reduce their plastic packaging waste substantially.

CONCLUSION

After thirty years of rapid industrialization, China's environmental problems have reached a head: 25% of China is now desert, 30% of

⁶² Xi Mi, "Just say no to plastic garbage," *China Daily*, Dec. 19, 2007 (<http://www.china.org.cn/english/environment/236135.htm>)

⁶³ "消毒餐具包装膜挑战限塑令 使用规范应尽快出台"(Sterilized tableware presents an obstacle to the Plastic Limit Order) 人民网 (People's Daily Online), April 21, 2010 (<http://env.people.com.cn/GB/11418479.html>)

⁶⁴ "Two Words: Biodegradable Plastic," *Wired*, April 25, 2002 (<http://www.wired.com/science/discoveries/news/2002/04/51871>)

farmland regularly receives acid rain, 40% of the country suffers from soil erosion, 65% of its forests have disappeared, and 75% of its freshwater is unfit for drinking or fishing. China hosts 16 of the world's 20 most polluted cities and produces 254 million tons of garbage annually—representing a third of the world's annual trash and garbage output. In 2009, it surpassed the US as the world's largest national emitter of greenhouse gases and, at current rates, the International Energy Agency reports that it will emit twice as much carbon dioxide as all the countries of the Organization for Economic Cooperation and Development combined.

Environmental degradation and pollution is taking a toll on the country's health, economy, and stability. Lung-related diseases have become the nation's leading cause of death and pollution-related cancer rates have skyrocketed. According to Chinese environment expert Elizabeth Economy, pollution costs the Chinese economy between 8 %and 12% of its gross domestic product annually. And, in 2005, China's State Environmental Protection Agency (SEPA) reported 51,000 environment-related protests.

The reality of Chinese industrialization is now becoming evident—as is the need for solutions to this reality. The Plastic Limit Order represents a new and different approach by China in its search for sustainable solutions, directly engaging all individuals in the massive effort to clean up the country. While this policy has yet to achieve the ultimate results that it seeks—massive reduction in plastic bag use at all retailers nationwide—the initial limited successes that it has enjoyed suggest the potential promise of this policy. If properly strengthened and supplemented, this policy has the potential to massively reduce China's plastic bag use. Moreover, this policy has the chance to shift the approach that the Chinese government currently takes toward solving its environmental challenges—by giving every individual the chance to be part of the solution.⁶⁵

⁶⁵ To learn more about the current state and regulation of China's environment, visit the Woodrow Wilson Center International Center for Scholars' China Environment Forum (http://wilsoncenter.org/index.cfm?topic_id=1421&fuseaction=topics.home)