

POLICY POINTS

To create stronger local

linkages, Chinese firms need to continue stimulating plastic recycling activities and providing technological and financial support to local suppliers.

The Tanzanian government

should develop a strategy in response to the regulatory change in China as well as the international trade regime.

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should establish more comprehensive policies and measures to encourage knowledge transfer and regulate environmental and health consequences of the recycling and reprocessing industry.

Wealth from Waste? Chinese Investments and Technology Transfer in the Tanzanian Plastic Recycling Industry

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THE HISTORY OF RECYCLING IS ALMOST AS LONG AS THAT of industrialization. Many developed countries, including the US and Japan, have benefited from the cross-border waste trade and recycling activities during their early stages of industrialization. Since the 1990s, China has emerged as the center of the global waste trade and recycling industry, importing and reprocessing millions of tons of all kinds of waste materials every year. In recent years, due to rising costs of labor and environmental compliance in China's recycling industry, Chinese investors have been exploring the recycling industry in Africa. Chinese plastic factories have developed two lines of business, serving both the Chinese and African markets, with a variety of products. This research examines the potential of knowledge transfer from Chinese investments in the Tanzanian plastic recycling industry to the local economy. It also assesses how the recent regulatory change in China, that is, the imposition of an import ban on waste materials since 2018, has affected plastic recycling and reprocessing industries in Tanzania.

There is limited information available in public sources about the plastic recycling and manufacturing industries in Tanzania, and what information is found makes little mention of the growing number of Chinese investments. A possible reason for this is that Chinese investments in the plastic industry are smaller and more recent, which can explain why they were not included in previous industry surveys.

During our July 2017 scoping study of Chinese manufacturing projects in Tanzania, we identified a growing number of Chinese investments in plastic bags and slipper production. In January 2018, we decided to come back to Tanzania and study this plastic cluster more closely. Starting with existing contacts with Chinese plastic manufacturers, we were connected to local suppliers and Chinese investors' business partners. We also reached out to local government authorities and industrial associations, in particular, Tanzania Investment Center and Tanzania Confederation of Industries, and checked the business directory in the local yellow pages and advertisements in local newspapers to make "cold calls". In total, we interviewed thirty-one companies, fifteen Chinese, ten Tanzanian, and six other foreign investments.

Although Indo-Tanzanian investors started the Tanzanian recycling business in the 1990s, it has since become dominated by Chinese investments. Since 2012, Tanzania

has surpassed all other African countries in terms of waste or scrap plastic material exports to China.¹ About sixty Chinese factories are engaging in plastic recycling, granulation, and the manufacturing of a variety of plastic products in Tanzania. Twenty-five to thirty of them are producing plastic woven sacks and shopping bags using locally recycled materials, and another five plants are concentrating in granulation. There used to be more than fifteen Chinese investors focusing on recycling polyethylene terephthalate (PET) bottles and exporting plastic flakes to China, but they were the most affected by China's foreign waste ban. About another ten Chinese companies are engaging in the manufacturing of plastic slippers, targeting the local and regional markets. Except for plastic slipper manufacturers, which mainly use imported raw materials and occasionally production waste, most Chinese plastic factories use locally recycled waste plastics.

Compared to longstanding plastic manufacturers owned by large, local conglomerates and non-Chinese foreign investors, most Chinese plastic investments are concentrated in lower-end recycling and manufacturing activities, which is likely the reason why they appear to have developed stronger local linkages than other plastic firms. Chinese investors have stimulated local supply and growth of plastic recycling activities. Because plastic recycling was almost non-existent before Chinese factories opened, all the local workers have to be taught from the beginning. Training includes the introduction of general knowledge about plastic materials, basic sorting techniques, as well as the operation of shredding machines. Secondly, more than half of interviewed Chinese plastic recycling and manufacturing plants reported that Tanzanians who used to work for their factory have left to set up their own trash collection centers. In most cases, these former workers have become suppliers for their previous Chinese employers. Chinese buyers, through the practice of sub-contracting and quality inspections, teach their suppliers knowledge about plastic materials as well as waste plastic sorting and cleaning techniques.

Moreover, some local waste transfer stations have been able to upgrade their activities and set up recycling plants or workshops in rural Tanzania to reduce transportation costs. Interviewed Chinese investors reported that at least twenty to thirty local recyclers have bought used machines from Chinese factories, while another dozen or so have bought machines from Indian factories. Chinese factories sell their used shredding and washing machines for about US\$ 3,000 each, or half the price of a new one. Some Chinese investors have also provided

local recyclers with installment loans when they were unable to make upfront payments.² It is understood by both parties that the Chinese factories providing the machines shall retain “a preserved right to buy” plastic flakes from the local recyclers who buy their second-hand machinery.³ By providing suppliers with technological and financial support and transmitting information about opportunities to participate in global value chains, Chinese investors have facilitated knowledge transfer through their interactions with local suppliers.

In July 2017, the Chinese government announced that it would stop importing twenty-four types of solid waste, including unprocessed waste plastics, as of January 1, 2018. This has increased both the uncertainty and risk for plastic recyclers that depend on Chinese polyester fiber manufacturers as their buyers. In response to the Chinese ban, Chinese plastic recyclers in Tanzania have resorted to different adaptation strategies. For example, several Chinese investors have turned to alternative destinations for their products, such as India and South Africa. Most of these new buyers are also Chinese who have relocated their operations overseas due to increasingly stricter environmental enforcement in China. Nevertheless, several Southeast Asian countries such as Malaysia, Thailand, and Vietnam have moved to restrict waste plastic imports due to rising concerns of environmental violations in the plastic recycling industry, adding more uncertainties for Chinese plastic recyclers interested in exporting to these alternative markets.

Other Chinese investors have decided to upgrade their manufacturing activities and diversify their production in Tanzania in order to sustain profit margins. For example, three Chinese factories have imported granulation machines from China to make PET granules, which can be exported to China as semi-manufactured inputs for polyester fiber factories. While two Chinese investors have made plans to not only produce plastic packaging straps and plastic furniture for regional markets in Africa, but potentially also for the Chinese market.

More notably, while many Chinese plastic plants aimed at mitigating the negative impact of the export market loss since the foreign waste ban, some viewed the loss as an opportunity to play a larger role in the global recycling value chain. Several factories in Tanzania have started to import plastic waste from Europe and the US, which could no longer be exported to China, for granule production. There were also discussions between a Chinese plastic factory and some local investors about setting up a polyester fiber factory in Tanzania. Once completed, this would be a critical step toward local value chain integration because

it could help set up linkages between the plastic recycling and garment manufacturing industries.

While the Chinese foreign waste ban has created various opportunities for industrialization in Tanzania, there are other considerable economic and environmental implications as well. First, industrial upgrading and production expansion are not necessarily associated with employment creation. In fact, several Chinese plastic manufacturers reported that they had cut down their local employment by up to 30 to 40 percent because newly imported machines had helped improve productivity and efficiency. Moreover, since imported waste plastics are cleaner and better sorted than locally recycled materials, the import of waste plastics from Europe also reduces the workload in labor-intensive activities such as sorting and cleaning.⁴ Therefore, it is likely that these industrial upgrading efforts will boost demand for local technicians but reduce demand for laborers.

Secondly, the expansion of plastic recycling in Tanzania is accompanied by a foreseeable environmental cost. Since mid-2018, rising environmental concerns about the operation of plastic recycling factories in Southeast Asian countries have driven their governments to adopt more restrictive measures on waste imports.⁵ In Tanzania, most plastic recycling facilities visited during this research hadn't installed any waste management systems at all, nor did they provide any protective health or safety equipment for their workers. Many local workers we saw in granulation and wire drawing workshops, where waste plastics are melted and reshaped, had burn or scalding scars. Conditions at small recycling workshops in rural areas are even more precarious. Many workshops are located within or near residential areas, where they can easily find temporary workers. There was even one facility we visited that was dumping their discarded materials, like flexible labels, into an open well near a local school's soccer playground.

Besides controversies over plastic recycling facilities' environmental compliance, increased waste plastic imports may have the long-term effect of discouraging domestic recycling in Tanzania. The three Chinese recyclers that have started importing waste from Europe confirmed that they have already reduced their purchasing from local recycling facilities because imported waste plastics are cleaner and better sorted. This also resonates with the Chinese foreign waste ban's policy objective, which is to prioritize domestic recycling and reprocessing. In practice, Chinese investors reported that local governments were more interested in enforcing tax and immigration regulations than regulations geared towards health and environmental

protection. Even when health and environmental violations have been found, local authorities have put a greater emphasis on the monetary penalty than on the requiring the violation be corrected and rectified.⁶ Looking to the future, the Tanzanian government needs to play a more active role in clarifying its policy priorities and enforcing environmental and health regulations.

In Tanzania, Chinese plastic manufacturers have facilitated technology spillover to the local recycling industry. A 2013 study on the informal recycling industry in Dar es Salaam found that informal waste pickers on average reported a monthly income of US\$ 108, which is 40 percent higher than the national minimum wage in Tanzania for formal employment.⁷ On the other hand, more investment in plastic recycling and waste imports following the Chinese foreign waste ban may cause greater environmental and health hazards for both employees in the industry and the host communities, if they are not properly regulated.

I found that Chinese investments in plastic recycling and reprocessing have created stronger backward linkages with local suppliers. Through supply, sub-contracts, and machinery cooperation networks, many local waste transfer stations have obtained technical and financial support to engage in preliminary processing activities, such as crushing and grinding, and have been able to increase their profit margins. A small number have also taken advantage of their connections with Chinese plastic factories and machinery suppliers to set up manufacturing plants of their own.

POLICY RECOMMENDATIONS

1. In order to create stronger local linkages, Chinese firms need to continue stimulating plastic recycling activities and providing technological and financial support to local suppliers.
2. In order to balance economic and environmental interests and ensure that more local recyclers and workers in the recycling industry can harness more benefits from the expansion of the recycling industry, the Tanzanian government should develop a strategy in response to the regulatory change in China as well as the international waste trade regime.
3. The Tanzanian government should establish more comprehensive policies and measures to encourage knowledge transfer and regulate environmental and health consequences of the recycling and reprocessing industry. ★

ENDNOTES

1. UN Comtrade data, <https://comtrade.un.org/data/> (last visited: May 12, 2018).
2. Interview with Jiang, owner of Jiafeng Plastics, in Dar es Salaam, January 15, 2018.
3. Interview with Xue, owner of a PET plastic recycling plant, in Dar es Salaam, January 17, 2018.
4. Interview with Samaki, a plastic woven sack producer, July 27, 2018.
5. For example, in June 2018, environmental violation of a plastic recycling facility owned by Chinese investors in Thailand was reported by the local media, which led to a nationwide environmental enforcement campaign in the country, targeting the recycling industry. In October 2018, Malaysia announced an import tax to be imposed on waste plastic imports. Thailand about to issue new regulations on waste plastic recycling (泰国废塑料将出新规), Sohu news, June 18, 2018, http://www.sohu.com/a/236347038_270404. International Policies Affecting Global Commodity Markets, California Recycle, <https://www.calrecycle.ca.gov/markets/nationalsword/globalpolicies> (last visited: November 12, 2018).
6. Interview with Jiang, January 15, 2018, in Dar es Salaam.
7. Joshua Palfreman, A Study about waste pickers in Dar es Salaam, Tanzania, Report by Global Alliance of Waste Pickers (2015), <http://globalrec.org/2015/05/13/a-study-about-waste-pickers-in-dar-es-salaam-tanzania/>.

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