

**BOTTLED WATER IN CHINA  
BOOM  
OR BUST?**



# **BOTTLED WATER IN CHINA – BOOM OR BUST?**

## **Exposure To Water Risks Point To An Uncertain Future**

It has only taken China two decades to become the world's largest bottled water consumer and a major producer. Concern over drinking water safety is one of the key drivers of the rapid growth. In this report we seek to go behind the bottle to explore the rise of the bottled water industry and its exposure to physical water risks. The report also reviews the steps taken by the government to protect water sources and regulate the bottled water industry. We also take a look at provincial actions which may be somewhat contradictory to national actions.

In a country with not a lot of water, the future of bottled water could look very different. The bottled water you are drinking has great impact. Know what you are drinking.

This report is funded by China Water Risk and forms a series of investigative reports into water in China.

**Report author:** Hongqiao Liu

**Editors:** Debra Tan & Feng Hu

**Production:** Dawn McGregor

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### **Contact us**

For any enquiries, please contact: [info@chinawaterrisk.org](mailto:info@chinawaterrisk.org)

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### About China Water Risk China

China Water Risk (CWR) is a non-profit initiative dedicated to addressing business & environmental risk arising from China’s limited water resources. We aim to foster efficient and responsible use of China’s water resources by engaging the global business and investment communities. As such, we facilitate discussion amongst industry leaders, investors, experts & scientists on understanding & managing water risk across six industry sectors: Agriculture, Power, Mining, Food & Beverage, Textiles and Electronics. CWR also has been commissioned by financial institutions to conduct research analysing the impact of water risks on the Power, Mining, Agricultural and Textile sectors. These reports have been considered groundbreaking and instrumental in understanding China’s water challenges. Join the discussion at [www.chinawaterrisk.org](http://www.chinawaterrisk.org).



## OVERVIEW: A FORK IN THE ROAD - AN UNCERTAIN FUTURE

It has only taken China two decades to become the world's largest bottled water consumer. Concern over drinking water safety is one of the key drivers of the rapid growth.

Today, bottled water has become one of China's fastest growing Fast Moving Consumer Goods (FMCG). In 2013, China consumed 15% of bottled water globally<sup>1</sup>, surpassing the US to become the No.1 consumer of bottled water. By 2012, China's packaged water production (be it in bottles or carboys) reached 55.6 million m<sup>3</sup> with total sales output value of over RMB 83 billion.<sup>2</sup>

But given China's much publicized water woes from pollution to scarcity and droughts, can China's bottled water market continue to boom and drive global bottled water market growth? China is one of the largest countries in the world that suffers serious water scarcity – the average per capita fresh water resource is only 26% of the world's average<sup>3</sup> and rampant pollution has plagued China's precious water resources. The latest official data classifies 61% of the country's groundwater quality as “unfit for human touch” and 36.9% of rivers and lakes are unqualified for drinking water sources.<sup>4</sup>

While some may consider bottled water a water-friendly product, the reality is contrary. Bottled water is water intensive and energy intensive – according to various benchmarks, up to almost three extra bottles of water as well as a quarter bottle of oil are needed to produce one bottle of water. Given China's limited water resources and intensifying competition for water resources between food and energy, can the bottled water industry be allowed to continue its unregulated explosive growth?

Our answer is no. Already the Chinese government has been actively taking actions in tackling water pollution and dealing with water scarcity. In 2014, Premier Li Keqiang declared war on water pollution. In the new 'Water Pollution Prevention and Control Action Plan' (“Water Ten Plan”) released earlier this year, China's State Council once again showed its determination in improving public water quality, cutting down overall water use and protecting precious groundwater resources. This further strengthens the 'Three Red Line Policy' on managing water resources introduced in 2011 to control water use, water efficiencies and water pollution.

Policies implemented to protect water resources and to ensure water security have impact across industries – agriculture, coal, steel, textiles and pulp & paper to mention a few. The bottled water industry is no different. National water use quotas have been set; so have provincial water use caps. At the time of writing this report, water use caps by sector for each province are being set. With over 70% of China's bottled water produced in water scarce and stressed provinces, the multi-billion dollar bottled water industry could be at risk. Will the Chinese government as part of the new Water Ten Plan protect China's water sources by limiting access to pristine watersheds? Does over-extraction of groundwater mean that groundwater springs will be closed off to mineral water producers?



China's bottled water stands at a fork in the road: the future is uncertain. Given the energy and water intensive nature of bottled water, better tap water quality promised by the government could lure the public back to the tap. After all, a large portion of bottled water is just bottled purified tap water due to the lack of regulations. Is the premium you are paying worth it—is bottled water really better quality? What about water quality at the source?

A deeper dive into the issue raised even more questions: why do so few bottled water brands (local or foreign) in China disclose the quality of the water inside the bottle? Do any Chinese bottled brands have corporate water strategies? Even if they do (like some foreign brands), is this enough? Does it really help solve China's water scarcity challenges given that water is needed to ensure continued economic development and urbanization as well as agriculture, energy and food security? Can China afford a quadrupling of per capita bottled water consumption to the level of Hong Kong?

In this report, we seek to address these questions; to go behind the bottle to explore the rise of the bottled water industry and its exposure to water risks. The report also reviews the steps taken by the government to protect water sources and regulate the bottled water industry. We also take a look at provincial actions which may be somewhat contradictory for a country with limited water resources: China exports some of its highest quality water resources to Japan and Korea. What steps (if any) have food & beverage companies whether domestic or foreign taken towards mitigating these risks? In a country with not a lot of water, the future of bottled water could look very different. The bottled water you are drinking has great impact. Know what you are drinking.



# THE RISE OF BOTTLED WATER



## CHAPTER 1: THE RISE OF BOTTLED WATER

### China has become the No.1 consumer of bottled water globally

"Click", the cap is unscrewed. For many in China, drinking water is synonymous with drinking bottled water. Grabbing a bottle of water at a convenience store is a normal way of life. But this was not the case 20 years ago.

Although China's first bottled water brand, "Laoshan Mineral Water" can be traced back to a century ago, the bottled water market only really took off in 1996 when local brand Wahaha launched a joint venture company Hangzhou Wahaha Beverages Co. Ltd with French food & beverage group Danone,<sup>5</sup> and officially entered the bottled water market.

According to the International Bottled Water Association (IBWA), China's bottled water consumption has exploded from a mere 2.8 million m<sup>3</sup> in 1997 to 39.5 million m<sup>3</sup> in 2013, growing faster at a CAGR of 18.1% compared to

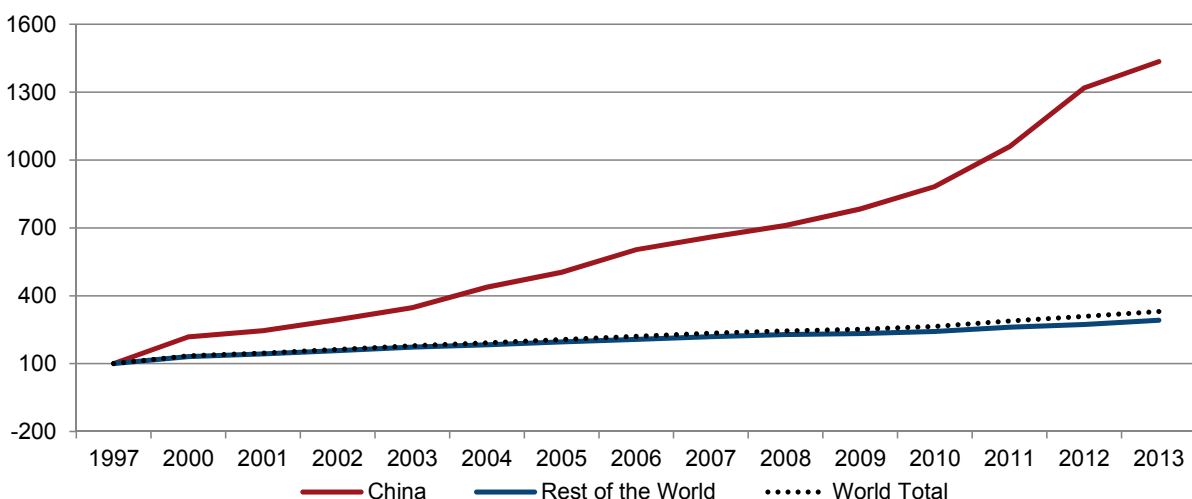
the global average of 7.8%<sup>6</sup> (see chart below). Indeed, the industry's growth has been nearly double that of China's GDP growth for the same period in terms of CAGR.

The below chart shows that the growth spurt is especially pronounced since 2010 when the public became increasingly concerned over the quality of tap water on the back of official pollution data, showing deterioration in the environment. In 2010, the Ministry of Environment Protection's (MEP) State of Environment Report indicated that 40.1% of China's rivers were unfit for human contact (Grade IV-V+) and 57.2% of the monitored groundwater was badly and very badly polluted.<sup>7</sup>

Today, China accounts for 15% of bottled water consumption globally and has surpassed the US to become the No.1 consumer of bottled water.<sup>8</sup> Though 39.5 million m<sup>3</sup> of annual consumption has pushed China into pole position, the actual packaged water (be it in bottles or carboys) consumption could be under estimated.

**China vs World Bottled Water Consumption\* 1997-2013**

INDEXED TO 100



Source: China Water Risk based on International Bottled Water Association's statistics

\*Note: this may include some carboy water consumption



## Water safety fears drive the Chinese to the bottle

China's bottled water market for the last two decades has moved in tandem with China's overall economic growth. During the same period, China's water quality has been rapidly deteriorating due to increasing water pollution from rampant industrial wastewater discharge, as well as increased municipal wastewater from urbanization.

Water pollution is evident across the country. According to the MEP, 36.9% of the country's surface water failed to meet the 'Surface Water III Standard' in 2014.<sup>9</sup> On top of this, the latest data published by the Ministry of Land and Resources (MLR) showed that more than 60% of groundwater monitored is of "bad" or "very bad" quality. Indeed, groundwater quality has continuously deteriorated over the last four years.<sup>10</sup>

Worsening water quality and contaminated watersheds threaten the quality of water sources and therefore drinking water safety. As highlighted in the report *"China's Long March to Safe Drinking Water"* published in March 2015, China has ambitious national targets for safe drinking water but many challenges lie ahead.<sup>11</sup> One of the major issues is that good quality water (meeting Grade I and II standards) in China is becoming a rarer commodity, forcing many cities in China to reluctantly tap Grade III or lower quality water sources. *"Some cities in China have to drink contaminated water"*, Professor Gong Peng from Tsinghua University commented in his Lancet article.<sup>12</sup>

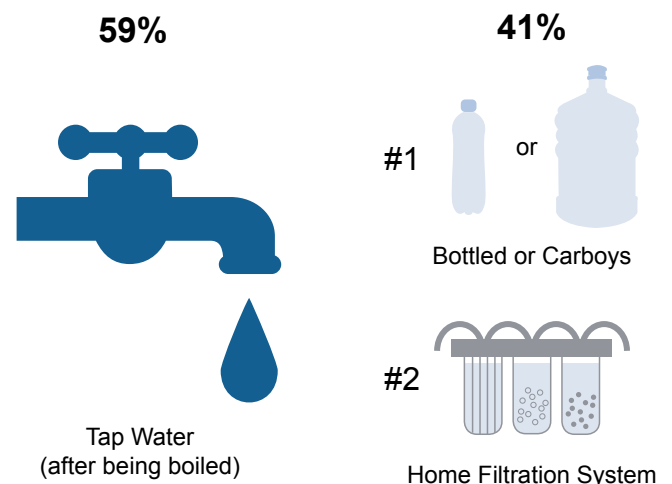
Gong Peng,  
Professor from Tsinghua University

*"Some cities in China have to drink contaminated water"*

China's current 'Drinking Water Safety Standard' is among the world's strictest. If it is enforced, drinking water safety is theoretically achievable. However due to challenges and concerns over tap water quality, many people have turned to bottled water. Official data from the National Development and Reform Commission (NDRC) reinforces such fears – according to them, tap water in nearly 20% of Chinese cities was sub-standard in 2011.<sup>13</sup>

All the above economic and environmental variables have contributed to a flourishing bottled water market. With bottled water providing a self-proclaimed alternative to tap water, China embraced bottled water causing sales in bottled water to double over the last five years.<sup>14</sup> Now, bottled water is embedded into the lives of the Chinese: a 2014 survey of 30,000 urban residents in 100 cities by the China Water Supply Services Union showed that only 59% drink tap water (after being boiled). For those who have moved away from the tap their first choice is bottled water or water in carboys, over residential water purification equipment and a home water filtration system.<sup>15</sup>

### Urban Residents Drinking Water Choices



Source: 'Urban Water Supply Service Satisfaction Index: A 100 City Survey (中国100个城市供水服务满意度指数)', China Water Supply Services Promotion Alliance, 29 March 2014





## Blue gold! Companies of all sorts rush in

Naturally, this booming market has attracted both domestic and foreign investments from various industries. Nestlé, Danone and Coca-Cola poured money in through sole or joint venture investments over the past ten years while domestic brands such as Laoshan, Nongfu Spring, C'estbon (China Resources), Hengda Ice Spring (Evergrande) gained first-mover advantage as market leaders. These are all still expanding their production.

Cash-rich companies in other sectors such as pharmaceutical, confectionery, petroleum and biotechnology, have also taken note of the growing market. Today, Sinopec Group, Bright Food Group, China National Gold Group and the Three Gorges Group have signed agreements with the local authorities in Tibet to bottle water from Tibet's glaciers<sup>16</sup> whilst Shaanxi Buchang, Fujian Yake, Hengda Group, Shenzhen Haiwang Wanda, Fanhai Yifang and Lenovo, are also moving into or expanding their bottling operations to tap the famous pristine springs of Changbaishan region (the Ever White Mountains) in Jilin province. <sup>17/18/19/20</sup>

Brands which bottle at source (mineral water) do not shy away from advertising the high quality of their water sources with slogans such as Evergrande's "*one source serves the globe*". Nongfu Spring even calls itself the "*carrier of nature*".

The irony is that China does not have an abundance of high quality water sources but yet the highest quality water in the country is flowing to such bottled water brands. Meanwhile billions of taxpayer money is spent protecting these sources to their benefit. Should the pockets of companies/tycoons who own these brands continue to fill up while some cities in China have to make do with contaminated water? Or should bottled water brands pay

a resource tax like coal miners? *More on what domestic and foreign bottled water brands are doing (or not doing) in Chapter 4: "In Need of a Bottled Water Revolution"*



The irony is that China does not have an abundance of high quality water sources but yet the highest quality water in the country is flowing to such bottled water brands

Can or should this boom be allowed to continue? Will the billions of yuan the government is pouring into improving the quality of tap water be the end of the blue gold rush?

## RMB700 billion to improve water quality and deliver safe drinking water

Although drinking water safety in China is not completely satisfactory, the Chinese government has shown huge determination with ambitious targets. Large sums of money to secure drinking water safety in both urban and rural areas have been invested. In the 12<sup>th</sup> Five Year Plan period (12FYP) (2011-2015) alone, various ministries set aside a total of RMB700 billion<sup>21</sup>, which includes RMB58 billion for a national plan on urban drinking water source protection<sup>22</sup> and RMB34.7 billion plan on groundwater pollution control and prevention.<sup>23</sup> The amount spent on water source protection whether surface or groundwater is small. It is only over 13% of the total spend.

However, if we look at the broader picture by counting separate conservation plans, the total investment on protecting water sources is much bigger. These examples of separate protection plans include protecting 'lakes with good water quality', and ecological compensation with billions of yuan transferred from central finance to Sanjiangyuan (source of the Three River) and Danjiangkou Reservoir. However, the impacts of such investment in protecting water sources and improving source quality still lack evaluation.



The 12FYP wants to achieve a ‘stable standard of drinking water in urban areas’ by 2020.<sup>24</sup> This means there is still five years for the bottled water industry to market itself as the quality drinking water of choice in urban areas. Both local government and private investors already have plans for this with significant investment in bottling permits and production pipelines.



“The 12FYP wants to achieve a ‘stable standard of drinking water in urban areas’ by 2020 - still five years for the bottled water industry to market itself as the quality drinking water of choice”

Beyond 2020, the future is uncertain. The Water Ten Plan includes regulations to limit and/or prohibit groundwater extraction (depending on location) by 2020. Ultimately, it states that water resource standards for groundwater will be higher and more stringent than that of surface water.<sup>25</sup> This includes an increase in resource fees for groundwater use. It is certain that the 13<sup>th</sup> Five Year Plan 2016-2020 (13FYP) will see continued spending in pollution prevention and control in order to improve water source quality and public water supply services. Moreover, Premier Li Keqiang has declared ‘War on Pollution’ and efforts from both the Ministry of Housing and Urban-Rural Development (MOHURD) and the NDRC indicated the will to improve tap water quality by 2020. *More on government action in Chapter 2: “No Water, No Bottled Water Market”.*

Assuming everything goes according to the government’s plan, the quality of tap water will improve drastically. But will this mean consumers will switch back to the tap? Maybe, but it is not that simple – there is the matter of convenience.



### It's not just concern over quality, convenience matters

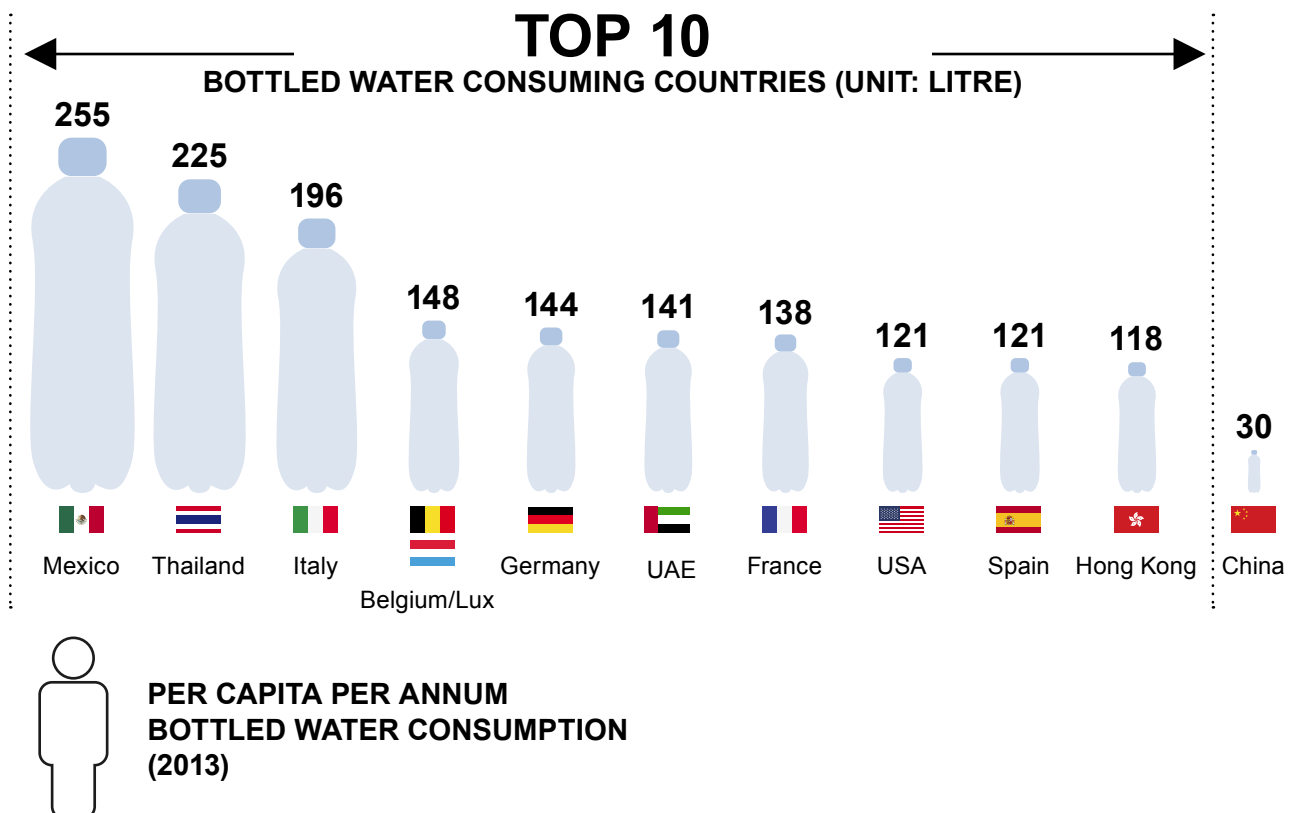
What bottled water provides is convenience, one of the many reasons for its popularity and sales. Amongst the Top 10 countries with high per capita bottled water consumption, only Mexico and Thailand face significant water quality concerns.

In Mexico and Thailand, drinking 255 and 225 litres per person per year respectively may be understandable, but the others in the Top 10 include developed countries such as Italy, Belgium, the UAE, Germany, France, the US and Spain, which are blessed with good public water supply. In these countries, you can turn on the tap and have clean safe drinking water. Yet, consumption of bottled water is still high. Germany and France still drink 144 and 138 litres per person per year while in the US, 121 litres are consumed.

Higher consumer spending, mature markets and comprehensive sale networks may be contributing factors but convenience is often cited as one of the main reasons why people buy bottled water. In Hong Kong, where the per capita consumption per annum is 118 litres according to IBWA, a recent survey showed that 'convenience/availability' is the primary reason why people drink bottled water, with 58.2% saying this. Additionally, 22.4% of bottled water drinkers said they drink bottled water as there was 'no other choice'. In the workplace, for example, with no potable public water facilities available, they have to drink bottled or carboy water that their employers provide. In such cases, bottled water drinkers are passively consuming bottled water for its 'convenience/availability'.<sup>26</sup>



58.2% drinking water for convenience, 22.4% drinking because there is 'no other choice'



Source: China Water Risk based on International Bottled Water Association's statistics



It's a common practice in China that conference organizers give away free bottled water as part of the service. This was also the case in this year's annual Chinese People's Political Consultative Conference (CPPCC) and the National People's Congress (CPC). Since 2014, CPPCC and CPC cancelled tea service in favour of self-service bottled water to signal they are "a government for the people". Separately, in another event, the 'Annual Environment Figure Ceremony' held in June 2015, in an attempt to lower the environmental footprint, the host clearly stated in the invitation letter that participants should bring their own bottles to the ceremony as refilling services were provided. However, not many people took this seriously and attendees later even criticized the organizer against such "carelessness" of not providing any cups.

In Chinese cities, convenience stores can be found on every corner, in which different brands of bottled water can be found on display. Thanks to successful marketing and advertising campaigns, bottled water is seen as trendy and healthy, reflecting a quality lifestyle for those who consume it. Riding the healthy lifestyle wave, "other types" of bottled water have proliferated. These include "oxygen rich water", "molecular water", "vitamin water" and even "water for babies". However, all these lack solid scientific evidence and effective regulations, leading to information asymmetry, leaving consumers in the dark.

In fact, consumers will most likely select a bottle with either a recognizable brand or a good-looking label. Some simply go with the most pricy one. Does anyone really know the difference among mineral water, mineralized water, glacier water and snow water? It's just confusing.

! Does anyone really know the difference among mineral water, mineralized water, glacier water and snow water?

Many believe they are paying for better, healthier water but some may just be paying more to drink purified tap water due to the lack of regulations. Moreover, there is a significant environmental price tag associated with every purchase of bottled water. Consumers should start paying attention to the classifications on the bottle. But beware that not everything that is contained inside the bottle is required to be disclosed on the label, whether in China or globally.

*More on labelling and what's inside the bottle in "**8 Things You Should Know About Bottled Water in China**".*



### Kaching \$\$\$! China’s bottled water market can be 8.5x larger

It appears that in mature economies, bottled water is a matter of convenience. So even if China spends billions on delivering clean and safe tap water, the bottled water market could still in reality boom.

In 2013, an IBWA study indicated that China’s per capita bottled water consumption per year was roughly 30 litres; 19% lower than the global average of 37 litres. To put this into perspective, China’s consumption of bottled water is only a third of Brazil, a quarter of the US and a mere ninth of Mexico’s bottled water consumption.<sup>27</sup>

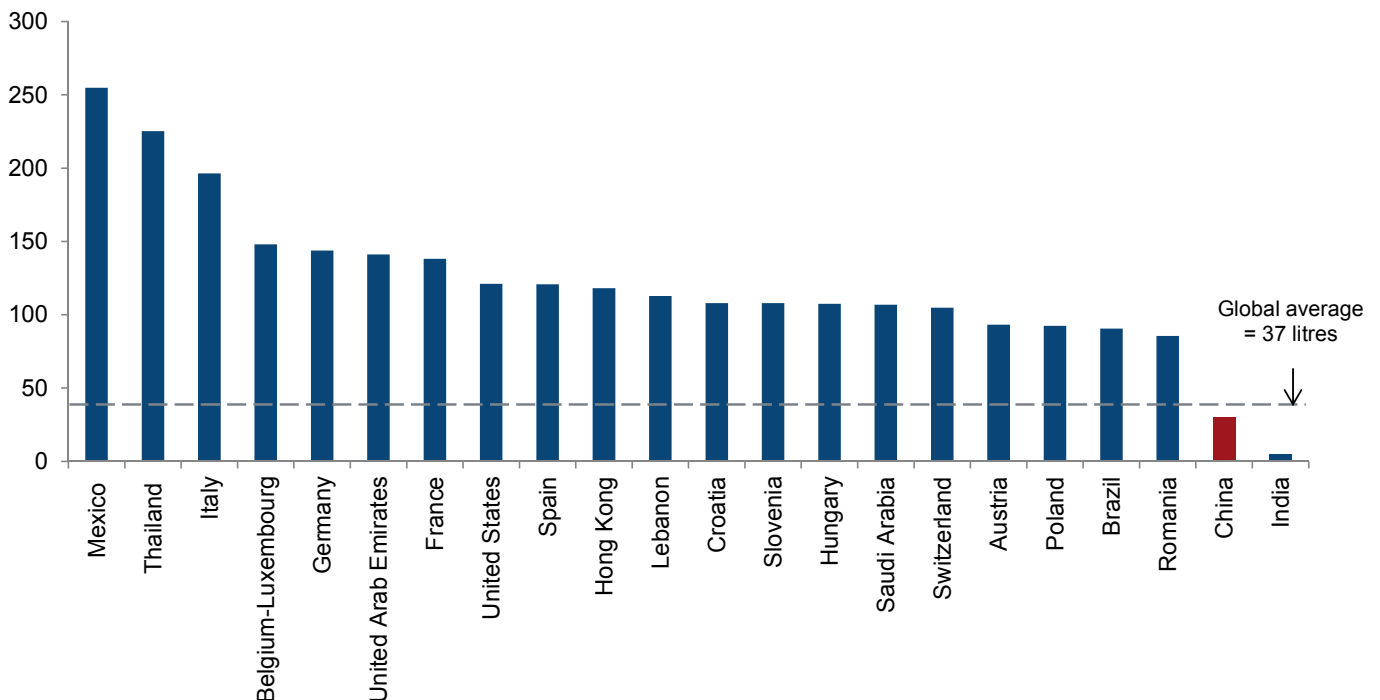
The chart below shows the substantial gap in consumption when compared to other countries signalling tremendous potential ahead.

If China was to catch up to Brazil’s level of bottled water consumption, it would have to grow threefold; if it was to reach the level of Mexico, it would grow 8.5x. Closer to home, Hong Kong’s bottled water is already 4x the level of China today. These statistics are one of the main reasons why industry insiders still believe that the bottled water market in China has “yet to awake”.

**!** China’s consumption of bottled water is a quarter of the US—the bottled water market in China has “yet to awake”

However for China to continue to lead and drive global growth, several questions need to be answered. Given limited water resources, can and should China allow its bottled water market to continue its rapid rise? If China’s bottled water growth did grow 8.5x, what would it mean for China and the rest of the world?

2013 Per Capita Bottled Water Consumption By Country (Unit: litre)



Source: China Water Risk based on International Bottled Water Association’s statistics



## China's packaged water production is already 55.6 million m<sup>3</sup> in 2012

So far we have been talking about consumption in China. However, the IBWA statistics only reflect a portion of packaged water in China. In reality, Chinese official statistics show that production of packaged water in 2012 was already at 55.6 million m<sup>3</sup>.<sup>28</sup> In comparison, IBWA has China's consumption at 39.5 million m<sup>3</sup> in 2013.

To provide perspective, the 55.6 million m<sup>3</sup> of packaged water can fill up nearly five and a half West Lakes.<sup>29</sup> Assuming bottled water production in China grows in tandem with consumption, growing 8.5x means that packaged water production could be around 473 million m<sup>3</sup> – this amount of water can fill almost 46.5 West Lakes.<sup>30</sup>

**!** 55.6 million m<sup>3</sup> of packaged water can fill up nearly five and a half West Lakes

Imagine the amount of plastic – an estimated 9.8 million m<sup>3</sup> of polyethylene terephthalate (PET) would be used to bottle this amount of water.<sup>31</sup> With this amount of plastic, we can form over eight Jinmao Towers made entirely out of plastic.<sup>32</sup>

Even growing 4x to Hong Kong's level of consumption, would bring China's bottled water to 217 million m<sup>3</sup> of production – that's water in bottles to fill over 21 West Lakes and plastic enough to make four plastic Jinmao Towers per year. Can China afford this year-on-year? And this doesn't even include the additional water and energy used in the production of bottled water!

**!** Growing 4x to Hong Kong's level of consumption would fill over 21 West Lakes and plastic enough to make four plastic Jinmao Towers per year – and this doesn't even include the additional water and energy used in the production of bottled water!

## Can China afford the luxury to grow 8.5x? Total water use can be up to 1.8 billion m<sup>3</sup>

China is fighting against time to protect its water resources. Our research has found out that bottled water might seem clean and safe, but under this façade is significant usage of water and energy. From the plastic waste to the pollution from transportation, many aspects contradict China's "War on Pollution" and promise to cap carbon emissions.



From the plastic waste to the pollution from transportation, many aspects contradict China's "War on Pollution"

Even the largest of beverage brands in China, including China Resources Beverage, Evergrande, Ganten, Master Kong, Nongfu Spring and Robust (due to the lack of corporate water strategies and corporate social responsibility) have failed to present any data on the water they used, making it difficult to analyze their impact on the water resources. How do Chinese bottlers fare against the rest of the world?

An IBWA study argues that the impact of bottled water on natural resources and the environment is very limited – 1 litre of bottled water requires in total 1.32 litres of water to produce. As the industry association, the IBWA is naturally expected to place the bottled water industry in the best light, but this is misleading. This has disregarded water footprints embedded in all aspects of production and supply from bottling and packaging to transportation and cold storage, and only considers "water used by the facility, including product water, and water used for facility processes (e.g. treatment, cleaning & maintenance)".<sup>33</sup>



Various studies show ranging benchmarks in water used in production

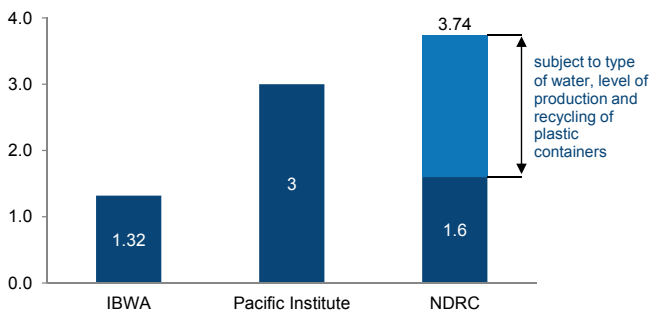


A series of studies from the Pacific Institute, a NGO based in the US, showed that 1 litre of bottled water requires in total 3 litres of water to produce. In addition, the total energy embedded in one bottle of water can be up to the equivalent of filling one quarter bottle with oil.<sup>34</sup>

These numbers from the American NGO are similar to the benchmarks set by the Chinese government. According to “Norm of water intake for beverage manufacture” (QB/T 2931-2008) issued by the NDRC, three Grades (I, II and III) of water intake are given, representing international advanced level, domestic advanced level and national average, respectively. Based on the standard, China Water Risk calculated that depending on the type of packaged water, level of production and recycling of plastic containers, the overall range can be around 1.6 – 3.74 m<sup>3</sup>/tonne as shown in the chart below.

**Various Benchmarks of Total Water Use to Produce One Litre of Bottled Water**

Unit: Litre



Source: China Water Risk based on International Bottled Water Association's and the Pacific Institute's studies as well as NDRC's 'Norm of Water Intake for Beverage Manufacture' (QB/T 2931-2008)



### China's official benchmark ranges from 1.6 – 3.74 m<sup>3</sup>/tonne

If the NDRC benchmarks (i.e. 1.6-3.74 m<sup>3</sup>/t) were used, in 2012, China's packaged water industry could have used in total 89-208 million m<sup>3</sup> of water. At the top end, this accounts for 2.4% of total municipal water use in the whole of China in 2012. This may seem small but it is up to 66% of the total urban water consumption of 667 cities that was used for cooking and drinking.<sup>35</sup>

If the market grows 8.5x to 473 million m<sup>3</sup>, we could see the bottled water industry suck up 757-1,768 million m<sup>3</sup> of water. It also means the bottled water industry will consume 2.4-5.5x of water than the whole urban population consumed for cooking and drinking in 2012; or 16% of the total freshwater withdrawal of the UK in 2012.<sup>36</sup>

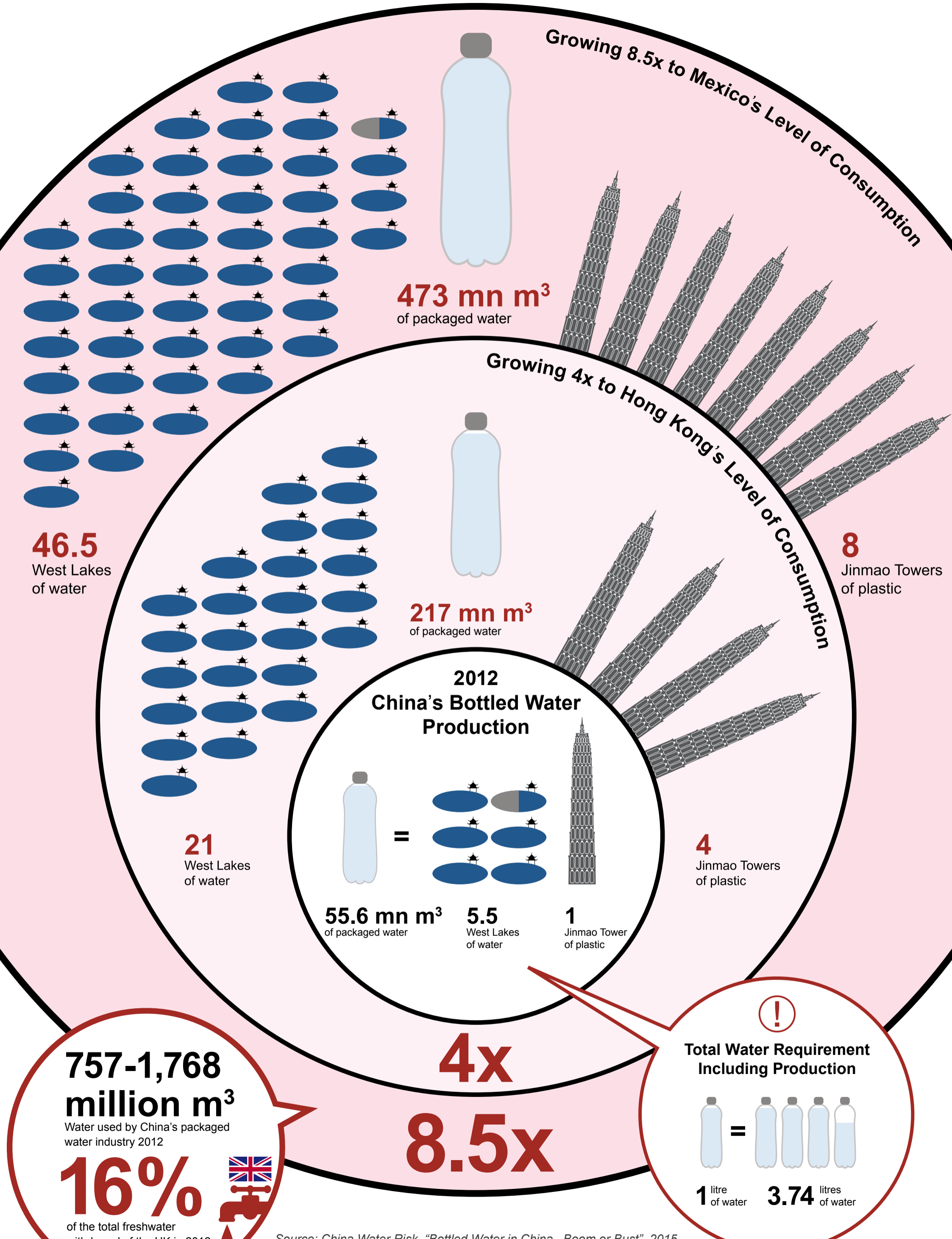
For a country that has an average per capita water resource that is roughly a quarter of the world average, producing bottled water is a luxury. The day that China has clean tap water, the water and energy intensive bottled water should no longer be necessary. That said, consumption patterns of developed countries show convenience as a strong selling point. However, China should not be compared to Europe or the US; its water risk exposure means it may not be able to afford to provide its people the luxury of 'convenience' much longer. *More in Chapter 2: "No Water, No Bottled Water Market – Physical Water Scarcity Risks"*.

If the phenomenon of bottled water continues, then bottled water brands and companies should take action to reduce water, energy and plastics consumption to help improve the overall quality of the environment. Indeed, if bottled water companies cannot bring change to their own production policies to meet key targets of China's new water policies (such as control water use and improve water use efficiencies), they should face harsh punishment and penalties. The government is already signalling that China needs to move towards “business unusual” and is setting policies accordingly. It is time for businesses to deliver that. *More in Chapter 2: "No Water, No Bottled Water Market - Regulatory Risks"*.



China cannot be compared to Europe or the US - for a country that has an average per capita water resource that is roughly a quarter of the world average, producing bottled water is a luxury

# CHINA'S BOTTLED WATER PRODUCTION IF PER CAPITA CONSUMPTION GREW TO THE SIZE OF HONG KONG & MEXICO



Source: China Water Risk, "Bottled Water in China—Boom or Bust", 2015





## The government is acting: Three Red Lines cap national & provincial growth

Aside from improving tap water, China has introduced water caps and quotas under the “Most Stringent Water Management System”.<sup>37</sup> Given the Three Red Lines policy and related policies and plans, will China have enough water resources to support the bottled water industry’s growth? Once the water resources tighten even further, will China choose to reduce private company water quotas, control export rates, prioritizing citizens first by protecting their basic needs? We believe so.



China will choose to reduce private company water quotas, control export rates, prioritizing citizens first by protecting their basic needs

Already, we see provinces acting. Jilin province, home to Changbaishan springs has halved its bottled water quotas in light of provincial water use quotas. It has introduced its own local policies to protect various water sources, such as the groundwater table, mineral water development and reformation. *More in Chapter 3: “Provincial Matters in Bottling Water”.*

Another front is the recent ‘Food Safety National Standard on Packaged Drinking Water’ (GB 19298-2014). Implemented on 24 May 2015, the new standard aims to control water products with misleading titles. *New labelling requirements and provincial action are discussed in detail in Chapter 2: “New Standards: no more muddy water”.*

If China were to continue with its “most stringent water management”, growth in the bottled water industry could well be curbed. Then not only will bottled water production face more regulation, but also the process of water withdrawal at source will be regulated to ensure

water protection. If so, how many of the 12,000 packaged water facilities<sup>38</sup> will be able to survive these new laws and regulations?



If China were to continue with its “most stringent water management”, growth in the bottled water industry could well be curbed

Those who predict and hope that the beverage industry will to continue to grow like it has for the past two decades may be in for a surprise. Water, or rather the lack of, means that the bottled water industry is at turning point. It’s time to take a closer look at water risk exposure – both in terms of physical scarcity and regulatory risk.



**NO WATER,  
NO BOTTLED WATER MARKET**



## CHAPTER 2: NO WATER, NO BOTTLED WATER MARKET

A key ingredient in bottled/carboy water is water. It would appear that ‘no water = no bottled water market’ is stating the obvious. Yet the packaged water market has flourished despite China’s limited water resources. With growing awareness of China’s water issues, the water risk exposure limiting future sector growth is two-fold: physical water scarcity and regulatory risk.

### PHYSICAL WATER SCARCITY RISKS

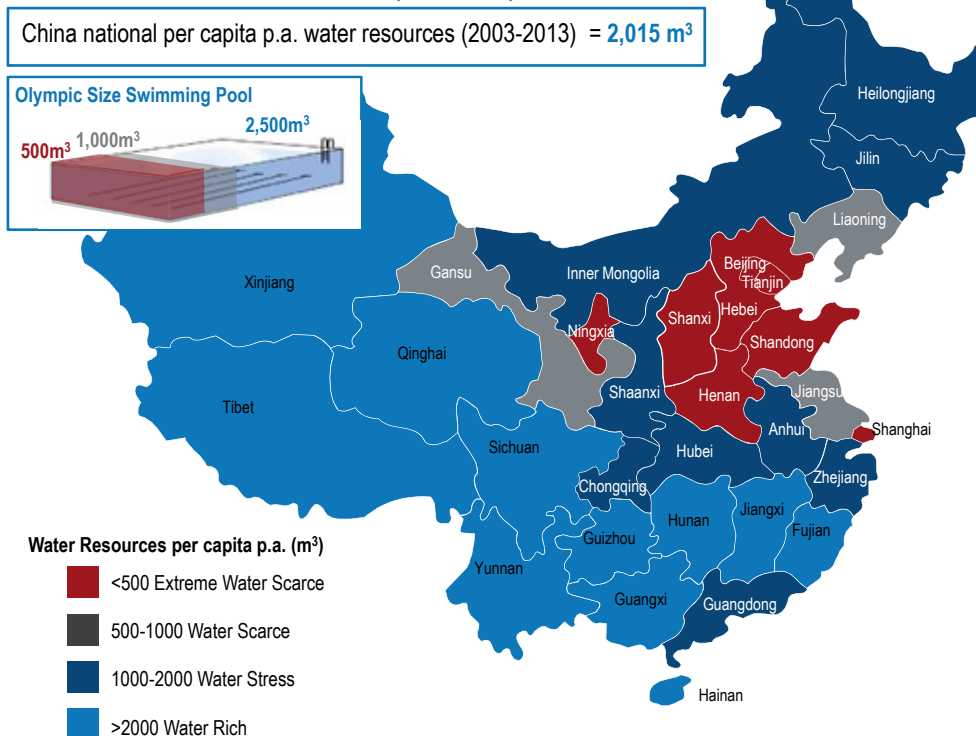
#### China is drier than you think

To understand the exposure of the bottled water industry to water scarcity, we must first understand the provincial water resources available in each province. Based on historic official statistics, there are 11 provinces and

regions in China with per capita water resources that fall below the World Bank’s Water Poverty Mark of 1000m<sup>3</sup>. These Dry 11 are water scarce – this means that the annual renewable water resources per person in these provinces amount to less than half the water in an Olympic size swimming pool as seen in the map below.

What’s worse, eight of the Dry 11, namely Beijing, Tianjin, Hebei, Ningxia, Shanxi, Henan, Hebei, Shanghai have less than 500m<sup>3</sup> of water resources per person per annum (represented by the red colour in the map below). With per capita water resources of less than a fifth of an Olympic size swimming pool, they face extreme water scarcity, making them comparable to desert regions of the Middle East such as Jordan or Oman.

#### PROVINCIAL WATER RESOURCES (2003-2013)



Source: China Water Risk (based on China Statistical Year Book, historical average water resources & trends by province 2003-2013). Dry 11 denoted by red and grey shaded provinces.

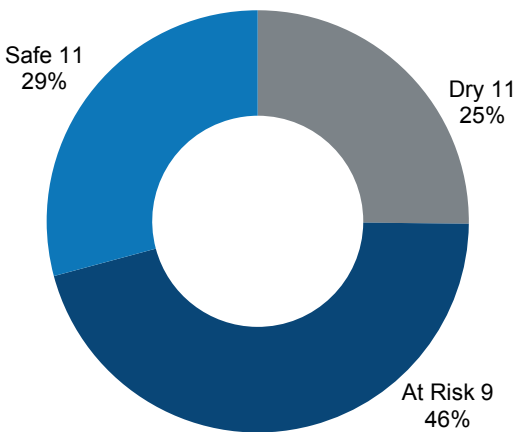


### 71% of packaged water production (bottle & carboy) lie in water scare & water stressed regions

Except for Ningxia, all the other Dry 11 have bottled/ carboy water production factories. This includes wealthy provinces such as Jiangsu, which suffered a water deficit of 226m<sup>3</sup>/pax/year in 2012<sup>39</sup>, as well as seven of the eight extreme water scarce provinces – Beijing, Tianjin, Hebei, Shanxi, Henan, Shandong and Shanghai.

If packaged water production in China was mapped against water availability, then according to the “Yearbook of Light Industry 2013”, 25% are located in the Dry 11; whereas 46% are located in the At Risk 9 in 2012 (see pie chart). This means that 71% of the total packaged water production is exposed to water scarcity or water stress.

### 2012 China’s Packaged Water Production = 55.6 mn m<sup>3</sup>

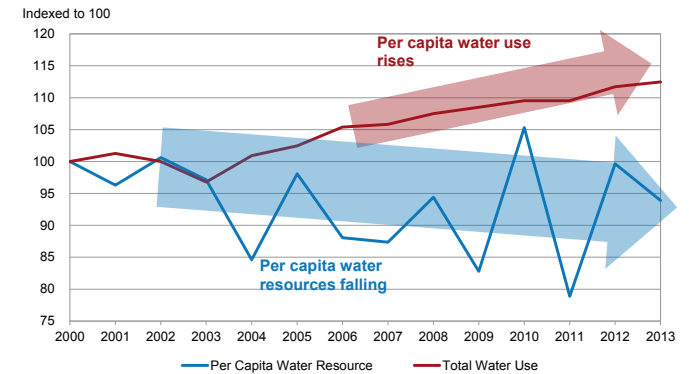


Source: China Water Risk based on NBSC statistics

### More droughts and floods point to a thirsty future

Already, the divergent trends of rising water use and falling water resources exacerbated by climate change point to a thirsty future. So, as demand for water resources rises, bottled water companies could also face falling water resources due to climate change and increased competition for water.

2000-2013: Falling Water Resources & Rising Water Use Per Capita



Source: China Water Risk analysis based on National Statistics Bureau of China various years

More extreme weather events will directly influence natural water distribution. In California, 38 million people are still suffering what is dubbed as the “biggest drought of the century”, threatening water security. Bottled water companies are being criticized by the inhabitants.



In California, which is suffering what is dubbed as the “biggest drought of the century”, bottled water companies are being criticized by the inhabitants



There are concerns in Southwest China that similar stories may arise. The Pan Yunnan-Guizhou Plateau (located in Southwest China) is famous for its abundant water resources and beautiful ecological environment. The region is amongst China's four main bottled mineral water production areas. However, since 2009, the region has been suffering from severe droughts. Running water security, food security and industrial production are thus under threat, causing widespread crop failures across the region.

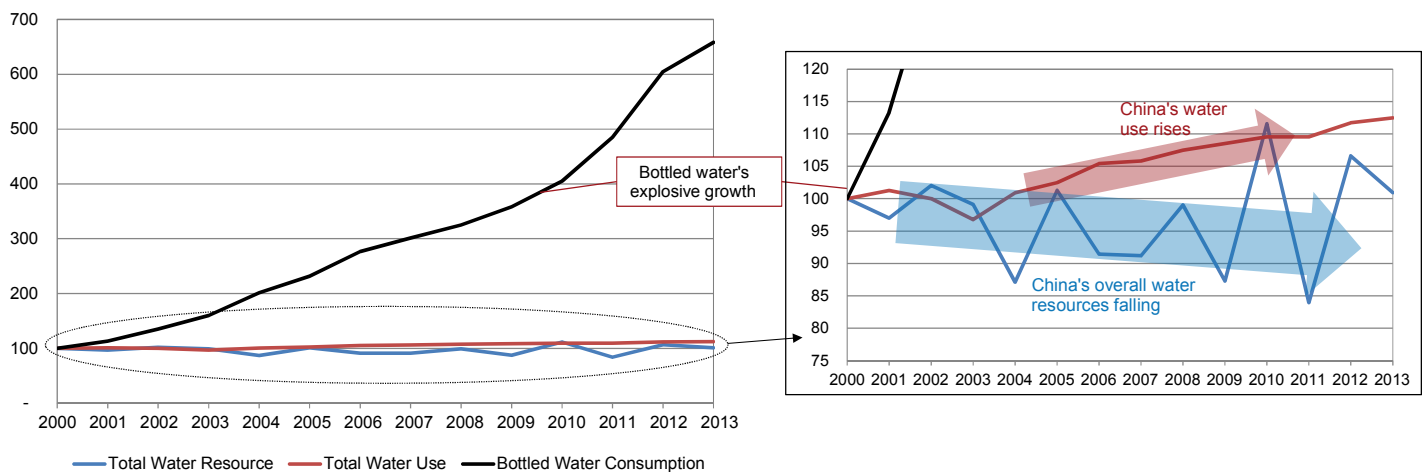
### ! Can bottled water sustain its explosive growth in a thirsty future?

Guangxi and Sichuan province, the third and fourth largest packaged water producing provinces, are also both suffering from drought. In July 2014, more than 100,000 people in Sichuan's Cangxi county were affected by drought, which also resulted in crop failure in over 5,000 mu (333 hectares) of farmland.<sup>40</sup>

Yet as shown in the chart below, bottled water consumption is growing at an explosive rate compared to total water use.

**Bottled Water's Explosive Growth vs. China's Water Use & Water Resources (2000-2013)**

Indexed to 100



Source: China Water Risk analysis based on National Statistics Bureau of China various years



## REGULATORY RISKS

### Government actions are multi-pronged

Currently, China does not have a concrete plan in regards to the development of the bottled water industry. However, since the 12FYP, the Chinese government has been setting policies to address water management, water pollution prevention and water safety. In April 2015, the new Water Ten Plan, was issued by China's State Council, forming the last 'red line' of the 'Three Red Line Policy' on managing water resources introduced in 2011 to control water use, water efficiencies and water pollution.



In April 2015, the new Water Ten Plan was issued by China's State Council - Beijing, Hebei and Tianjin as well as the Pearl River Delta and the Yangtze River Delta face stricter targets and tighter compliance deadlines

The Water Ten Plan reiterates holding the Three Red Lines and has far-reaching implications for the bottled water market. Points of note are:

#### 1. Controlling national and provincial water use by sector

- Provinces will have to set water use quotas across sectors and report on whether or not provincial water use quotas have been met in order to stay within the national water use quota of 670 billion m<sup>3</sup> by 2020.
- No new water use permits are to be issued in provinces which have already reached or exceeded their water use quotas.
- As such, water must be given the utmost importance and taken into account in the planning of city expansion, land use, residential housing and industrial production levels.

- Water intensive and water polluting regions such as Beijing, Hebei and Tianjin as well as the Pearl River Delta and the Yangtze River Delta face stricter targets and tighter compliance deadlines.

#### 2. Control and prevent groundwater use and pollution to protect precious groundwater resources

- China's extensive groundwater woes mean that groundwater control in both extraction and pollution are of utmost importance to ensuring water security, especially in Northern China.
- If groundwater is to be extracted from areas where there is risk of geological hazards such as subsidence, then geological surveys and risk assessments should be carried out.
- By 2017, areas where groundwater extraction will be banned will be identified and by 2020, all groundwater aquifers will be subject to strict control so as to avoid over-extraction and will be closely monitored and supervised by the government.
- The current water resource fee will be raised to reflect water scarcity. In particular, the water resource fee for groundwater should be higher than that for surface water.

#### 3. Ensure the safety of drinking water from the source to the tap

- Protecting watersheds and the wetland ecosystems through improved protection of water for forests and biodiversity as well as implementation of restoration procedures for damaged habitats.
- Aim to have 93% of the urban centralized drinking water sources to meet Grade I – III quality by 2020.
- Improve monitoring technology, environmental risk mitigation and damage control policies.



- All county level cities and larger to disclose drinking water sources, water works, outlets and tap water quality reports from 2018.
- Improve water source protection, water quality and monitoring for rural areas.

**!** All these regulations could adversely impact the bottled water industry and limit its growth

In addition to these, the government has also introduced new standards for the bottled water industry. All these regulations could adversely impact the bottled water industry and limit its growth.

### China's bottled water consumption is growing faster than China's water caps

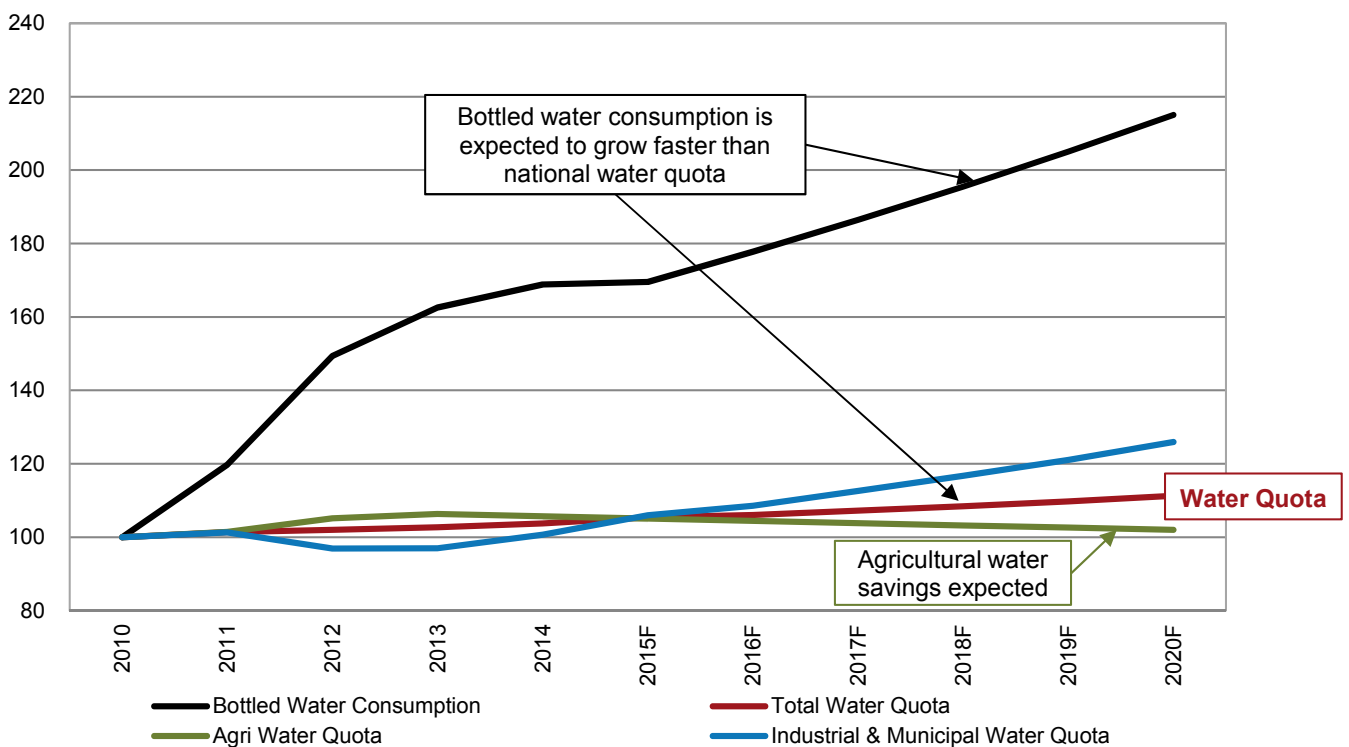
China's national water caps limit the country's water use to 670 billion m<sup>3</sup> by 2020 and 700 billion m<sup>3</sup> by 2030, according to the Three Red Lines policy. There are plans to achieve this through aggressive water savings from both the agricultural and industrial sectors, so that water can be freed up for rapid urbanization and economic development.

**!** Aggressive water savings from both the agricultural and industrial sectors freed up water for rapid urbanization and economic development

If China's per capita bottled water consumption reaches that of the global average by 2020, then bottled water consumption will grow faster than the national water quota (see chart below) .

### 2010-2020F Bottled Water Consumption Growing Faster than the National Water Quota

INDEXED TO 100



Source: China Water Risk estimates based on IBWA, NBSC and State Council



As can be seen from the graph, if China follows this path, its per capita bottled water consumption will grow at a CAGR of 4.3% during 2015-2020 compared with that of 1.1% for the total water quota. Is this fair?

Currently, most of the policies in China are aimed towards the reduction of water use in energy, textiles and agriculture. The ratio of industrial water use is still very low but it will continue to drive up total water use despite efforts being made in energy, textiles and agriculture with billions of investment. If the bottled water industry is allowed to continue its rapid growth and increase its water consumption, it would be unfair to other industries in water challenged provinces.

! Currently, most of the policies in China are aimed towards the reduction of water use

*Exposure by province is discussed later in Chapter 4: “Provincial Matters in Bottling Water”.*

### **New regulations ahead for groundwater may prevent mineral water extraction & raise fees**

Mineral water is protected under the Chinese law by both the MLR and the Ministry of Water Resources (MWR). Thanks to the new Water Ten Plan, the importance of mineral water and its protection is further cemented. This could see future restrictions in mineral water extraction such as the amount available for extraction, permits and licenses. More worrying for the bottled water industry, areas where groundwater extraction will be banned are yet to be identified by the government.

Tariffs are also an issue. Mineral water is a groundwater resource and as such is subject to a water resource fee and its extraction will be managed under the Three Red Lines Policy. The groundwater fee is typically higher than the surface water fee and a hike in tariffs is imminent. The

NDRC has set minimum provincial groundwater resource fees to be implemented by each province by the end of the 12 FYP. Beijing’s and Tianjin’s resource fee is 20x that of Shanghai and Anhui.<sup>41</sup> Several provinces have already raised their groundwater resource fees. Zhejiang did this in 2014.

Moreover, each province has different water resource fees and mineral water permit costs. This has resulted in different base costs in production across provinces. But bottled water is transported and sold across provinces allowing bottled water companies to arbitrage cost differences to maximize their profit margins. For example, according to the Tibet Department of Water Resource, Tibet’s mineral water resource fee is only RMB3/m<sup>3</sup> whereas that for other provinces ranges from RMB10m<sup>3</sup> to 50/m<sup>3</sup>.<sup>42</sup> Given imminent tariff hikes, some brands/companies may lose this competitive advantage unless they also raise the price of bottled water, or reduce the water use in their production.

! Given imminent tariff hikes, some brands/companies may lose this competitive advantage unless they also raise the price of bottled water, or reduce the water use in their production

In the past, the water resource fee did not apply to mineral water, according to the state commissions report concerning the issue of mineral water management. This has changed.<sup>43</sup> Furthermore, the Water Ten signals that water quotas for mineral water projects may be tightened. With stricter enforcement and rate hikes, production costs will likely surge, causing drastic changes for the bottled mineral water industry. Meanwhile, the quality of tap water should continue to improve removing the impetus to buy bottled water for health and safety reasons.





## Improving water sources and transparency may regain trust towards the tap, but is it enough?

Concerns over contaminated drinking water source are wide spread among researchers as well as the general public. As stated in “*China’s Long March to Safe Drinking Water*”, to achieve goals in drinking water safety, China must overcome huge challenges: to treat some of the world’s most polluted water sources to a level that complies with the current stringent drinking water quality standards.

Official data has shown significant improvement in drinking water source quality. In 2014, 96.2% of the water volume withdrawn from urban centralized drinking water sources was within the acceptable quality standard<sup>44</sup> - a significant rise from 90.6% in 2011.<sup>45</sup> According to the most recent MEP statistics published in July 2015, 534 out of the 558 surface centralized drinking water sources and 296 out of the 340 groundwater centralized drinking water sources met relevant standards during the first half of 2015. This means 92.4% of centralized drinking water sources met the standards.<sup>46</sup> Though not everyone is satisfied by this, it’s already very close to the 93% target set for 2020 in the Water Ten Plan for Grade I – III quality and above.

If water source and tap water quality were to up to standard by 2020, would the public trust tap water? Maybe, but it’s not only about quality. Let’s not forget that people can be influenced by advertisements. Along with regaining trust in tap water, more actions should be taken to regulate the bottled water market, as well as educate the public about the truth of bottled water – from the unfair growth to the heavy environmental footprint.



**More actions should be taken to regulate the bottled water market, as well as educate the public about the truth of bottled water**

The government has taken a first step towards transparency. As the Water Ten Plan highlighted, under the so-called “source-to-tap” water quality monitoring mechanism, every part of the water supply chain will be under close monitoring by local government and water suppliers. Not only will water quality and risk mitigation face timely tests, but information on water source quality, finished water and tap water will also be frequently disclosed to the public from 2018.

Ironically, as the government moves towards more transparency, bottled water brands are not. Hardly any brands disclose water quality statistics in China, let alone the type of water source – municipal water (public water) or natural mineral water. Will consumers continue to drink “mineralized water” when they realise it’s just purified water sourced from the tap and not “natural mineral water”?



**Ironically, as the government moves towards more transparency, bottled water brands are not. Hardly any brands disclose water quality statistics in China, let alone the type of water source**

Let’s face it - It’s all about the art of labelling. This is also where the government is coming out ahead by including labelling in the new standard.



## New Standards: no more muddy water

China is currently undergoing reform and is setting new industrial water standards across various sectors. In the past, standards for the bottled water sector in China were a mess – they lacked consistency. Some were even outdated; others were contradictory. As we have stated, neither bottled mineral water nor other packaged water were regulated like tap water, allowing them to proliferate without stringent regulation.

China's State Food and Drug Administration (SFDA) database has certified records of at least 12,000 bottled or carboy drinking water facilities. Of these, 7,622 were producing "purified drinking water", 4,721 "other drinking water" whilst 871 were bottling 'mineral water'.<sup>47</sup> However, until recently they did not have to specify source on their product labels and could label them as they wish, with names such as 'ice spring', 'glacier water' and so on.

Enter the 'Food Safety National Standard on Packaged Drinking Water' (GB 19298-2014). This new national standard is now in force as of 24 May 2015. Aside from setting limits for physio-chemical and microbiological indicators for packaged water, it also seeks to clarify bottled water labelling.

**The 'Food Safety National Standard on Packaged Drinking Water' sets limits for physio-chemical and microbiological indicators for packaged water, it also seeks to clarify bottled water labelling**

The new standard does not apply to 'natural mineral water', which is regulated separately by another national standard. The new standard classifies packaged water into two categories:

- 'Purified water': packaged water, which is sourced from the public supply system and purified through measures such as distillation, electro dialysis, ion exchange, reverse osmosis and so on; and
- 'Other types of packaged water': includes two types:
  - packaged water - sourced from non-public supply, either surface water or groundwater, and processed with simple treatment measures such as anaerobic, aerobic, filtration, ozonation or ultraviolet disinfection, etc., without changing basic physio-chemical characteristics of the water; or
  - packaged water - sourced from public supply and may contain a certain amount of food additives (but sugar, sweeteners, flavours and fragrances or other food ingredients are not allowed) after treatment.


As such, names such as 'distilled water', 'oxygen rich water', 'vitamin water' and 'deep sea water' will no longer be allowed and will be classified as 'other types of packaged water'. Furthermore, the standard will require bottled water to label any chemicals or food additives used for flavouring. The new standard for packaged drinking water aims to address the issue of false marketing. However, the enforcement of these labelling policies will only come into force on 1 January 2016.

**Misleading health information such as 'distilled water', 'oxygen rich water', 'vitamin water' and 'deep sea water' will no longer be allowed**



Although such misleading health information was previously highlighted by the former Ministry of Health, it has taken the government a long time to act. Better late than never. Hopefully, going forward, since this policy is now a part of a national standard, companies will have to comply. Indeed, some brands have already made changes to their labels. It is expected that the bottled water industry will be better regulated with more transparency in the near future.

What is clear from the above multi-pronged government actions, is the future direction of China. President Xi Jinping has already stated his desire for an “Ecological Civilization”. In this regard, China has been strengthening policies on forests and natural protection zones. Moreover, China has made commitments regarding climate change meaning it must act to protect its glaciers. Bottled water companies bottling at source in these glacial regions and natural protection zones surely contradict such policies. Indeed, some provincial policies are contradictory. We expect the government to move to re-align such mismatched national and provincial policies in the near future. The impacts of such actions are explored in the provincial case studies in the next chapter.

 China has made commitments regarding climate change meaning it must act to protect its glaciers. Bottled water companies bottling at source in these glacial regions and natural protection zones surely contradict such policies



# PROVINCIAL MATTERS IN BOTTLING WATER



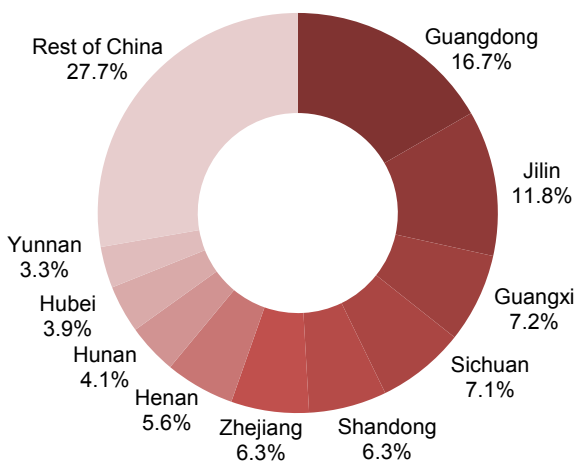
## CHAPTER 3: PROVINCIAL MATTERS IN BOTTLING WATER

Similarly, provincial policies are contradictory. We expect the government to move to re-align such mismatched national and provincial policies in the near future. But first, let's have an overview of bottled water production by province.

### MISMATCHED NATIONAL & PROVINCIAL POLICIES IF REALIGNED COULD TRIGGER CHANGES

The chart shows the latest available official statistics for the Top 10 Packaged Water Producing Provinces. The Top 10 account for 72% of packaged water production; six of the Top 10 packaged water provinces are either water scarce or water stressed.

2012 China's Packaged Water Production = 55.6 mn m<sup>3</sup>



Source: China Water Risk based on NBSC statistics

Guangdong, Jilin, Zhejiang and Hubei (placed 1<sup>st</sup>, 2<sup>nd</sup>, =5<sup>th</sup> and 9<sup>th</sup> respectively) with just under 40% of packaged water production are amongst the 'At Risk 9' and are water stressed. Although their water availability is better than that of the Dry 11, their respective per capita annual renewable water resource still cannot fill an Olympic sized swimming pool. *More on China's water availability in Chapter 2: "No Water, No Bottled Water Market"*.

In the above four provinces, major competitive bottled water brands are bottling there; with household brands such as Nongfu Spring, Wahaha, C'estbon (China Resources), Ganten Baisuishan, Evergrande, Master Kang and Robust all competing for market share.



Shandong and Henan can be compared with the desert regions of Jordan or Oman, but yet they account for 12% of China's packaged water production

Shandong and Henan are also in the Top 10 (placed =5<sup>th</sup> and 7<sup>th</sup> respectively). These two provinces are amongst the Dry 11 and face extreme water scarcity. Even if the per capita annual renewable water resources of these two provinces were combined, it would only amount to slightly over one fifth of the water in an Olympic sized swimming pool. Their lack of water can be compared with the desert regions of Jordan or Oman, but yet they account for 12% of China's packaged water production. China's earliest mineral water brand, 'Laoshan bottled mineral water', originates from Shandong.



To recap, China's water sources are facing a double whammy: (1) water resources are falling and (2) rising pollution further exacerbates water scarcity. Given this, the Chinese government promised that the upcoming 13FYP will step up enforcement and protection of all water sources to further improve aquatic biodiversity.

Trade-offs loom in the not-so-distant future – will China choose to protect the beverage sector by allocating clean surface water to them, or will the government choose to improve its waterworks for the benefit of the public to ensure basic drinking water needs? Such decisions are especially pressing in water scarce provinces. Separately, should packaged water industries be allowed to grow in extreme water scarce provinces? Should glacial water not be tapped and extracting mineral water in natural protection zones be banned in favour of watershed conservation?

**!** Trade-offs loom in the not-so-distant future – perhaps it is time to reassess provincial water development

Perhaps it is time to reassess provincial water development – below are three broad areas where national and provincial policies are mismatched. If these were to be realigned, the long-term future of bottled water may no longer be rosy.

## BOTTLING IN THE PARCHED NORTH CHINA PLAIN

### Can the parched North China Plain sustain 20% of China's packaged water production?

To recap, the Dry 11 produces a quarter of China's bottled and packaged water. Sitting within the Dry 11 is China's agricultural heartland, the North China Plain where over-extraction of groundwater resources has caused serious damage to groundwater tables and pollution is rampant. Joint studies from China Centres for Disease Control and Prevention and Chinese Academy of Sciences have confirmed the correlation of water pollution and the emergence of cancer villages in the Huaihe River basin – the river flows across Henan, Anhui and Shandong.<sup>48</sup> Separately, a study conducted by the China Geological Survey in 2009 claimed that the natural damage caused by ground subsidence from over-extraction of groundwater led to a total direct and indirect loss of RMB330.4 billion.<sup>49</sup>

**!** The parched North China Plain is heavily polluted with cancer villages and is experiencing subsidence, yet it produces 20% of China's packed water

Yet, in the North China Plain, there are still beverage companies extracting groundwater for packaged water production. Indeed as of 2012, 11 million m<sup>3</sup> of bottled water or 20% of China's production came from the four provinces and Beijing and Tianjin that primarily make up the North China Plain. Even though water saving targets has been set, provincial governments show no signs of scaling back bottled water production.



## Why does Shandong & Henan which receive water from the South have a 12% share?

Shandong and Henan are not known for their abundance of water resources, nor good water quality, yet they account for a 12% share of national bottled water production. Both Shandong and Henan are provinces in the water scarce North China Plain. Their large agricultural production cements their position as two of the most important farming provinces in China; official statistics rank them as No.1 and No.2 respectively by agricultural output value today.

The latest available official data shows Henan running a water deficit with per capital water use at 1.13x its annual renewable water resources, whereas Shandong uses close to 75% of its limited annual renewable water resources in 2013.<sup>50</sup>

**! Because both face extreme water scarcity, Henan and Shandong are the recipients of water from the Eastern and Middle Routes of the South-to-North Water Diversion Project. Is this fair?**

Because both face extreme water scarcity, Henan and Shandong are the recipients of water from the Eastern and Middle Routes of the South-to-North Water Diversion Project (SNWDP). Therefore on one hand, they receive water from this RMB258.2 billion (spent so far) mega-project<sup>51</sup> which is justified as the cost to quench the thirst of China's two of the most water scarce yet largest farming provinces. But on the other hand, they bottle this precious resource only to then transport water across the country in the form of bottled water. Is this fair? More importantly, is this the best use of resources when both the SNWDP and the production and transportation of bottled water are energy and resource intensive?

If the government chooses to support the development of the bottled water industry, can the bottled water industry get more water quotas from already limited industry water use quotas? Or do they have to get water use quotas from agriculture water savings through water trading?

China Water Risk's earlier analysis has shown that agricultural water savings potential may be difficult for Henan – especially in the face of drought. In its 2015 report *“Towards a Water & Energy Secure China”*, Henan saw a rise in irrigation water demand despite achieving irrigation savings as a result of improving irrigation efficiencies. This was because more irrigation water was needed to ensure food security in times of drought. Be it agricultural water savings or trading of water use permits, it will not be easy for a province that contributes 5.1% to China's total GDP, 57.7 million tonnes of grain production and 94.36 million population with an urbanization rate of 45.2% in 2014.<sup>52</sup>

## Should all bottling factories in the Dry 11 be top-of-the-line?

Surely bottled water companies operating in water scarce regions should operate at the highest standards in terms of water efficiency. Indeed, this is the case for Swire Coca-Cola Beverages Zhengzhou Ltd. (a joint venture company of Swire Group and Coca-Cola) operating an award-winning plant in Zhengzhou, the capital of Henan Province.<sup>53</sup>

This plant, established in 1996, is not only the Swire Beverages' most water efficient plant, but also Coca Cola's most efficient plant globally.<sup>54</sup> As a “zero water discharge” bottling plant, the Zhengzhou plant is said to feed its treated waste water, 200 million litres per year, to Lianhu Park, an artificial lake in Zhengzhou.<sup>55</sup> Should all bottlers, especially those located in the Dry 11 (be they local or foreign), follow Swire Beverage's lead?



Swire Coca-Cola Beverages operates an award-winning plant in Zhengzhou, Henan.

! Should all brands operating in water scarce regions follow the most water efficient technologies and practices?

Aside from the Zhengzhou plant in Henan, Swire Beverages as one of the major bottlers for Coca-Cola in mainland China, also has plants in other provinces that are either water scarce and/or water stressed.<sup>56</sup> Clearly the plants are there for a reason – these provinces are among the top per capita consumption provinces of Coca Cola in mainland China. Swire Beverage reports that an average of 1.77 litre of water is consumed to produce 1 litre of beverage products across all their plants.<sup>57</sup> This is lower than Pacific Institute's study but higher than the NDRC's lower limit for mineral water. However, it should be noted that Swire Beverage's number is the rate for mixed beverage, not for bottled water alone.

There is clearly room for improvement. Should all brands operating in water scarce regions follow the most water efficient technologies and practices? Every effort counts in the face of explosive growth. Should the government make higher water use efficiency rates mandatory in the Dry 11 like it did for mine utilization rates in the Water-for-Coal Plan? National and provincial action on this front remains to be seen.

## JILIN PROVINCE & THE CHANGBAISHAN REGION – AN EVER-LASTING SOURCE OF MINERAL WATER?

### Jilin halves its unrealistic bottled water expansion plans

Data from the Jilin provincial government shows that the Changbaishan region alone has a combined total mineral water production capacity of over 100 million m<sup>3</sup> that has either been built, undergoing construction or is planned. Assuming that everyone drinks 2 litres of water per day, this mineral water production capacity could support around 137 million people, which is equivalent to the population of Japan or of the UK and France combined.

In March 2015, Jilin province introduced 'The Protection and Development Plan of Mineral Water in Changbaishan Region'. The plan drew a "red line" for mineral water exploitation by the bottled water industry. The "red line" is now a cap of 50 million m<sup>3</sup> of mineral water bottling capacity by 2020 with a maximum withdrawal from a single spring of 70%. This new plan is in reaction to the bottled water industry boom in the region and is an attempt to put a stop to the explosive expansion by slashing half of the originally planned capacity. In addition to the new "red line" cap, the project approval process will also be tightened.

! The "red line" is now a cap of 50 million m<sup>3</sup> of mineral water bottling capacity by 2020 with a maximum withdrawal from a single spring of 70%

The plan came out after listed groups like Evergrande promised to throw billions to invest mega bottling projects in Changbaishan. For Evergrande alone, it planned to build up a total bottling capacity of 40 million m<sup>3</sup> in Chinan District of Changbaishan.<sup>58</sup>





The risks to companies are clear. With the scale-back in the Changbaishan region expansion plan, some mega-projects have already been deemed impractical and the predicted number of bottling plants has been cut drastically. Evergrande now expects the 8 planned plants in the Changbaishan region to produce around 17.7 million m<sup>3</sup>; a 56% decrease.<sup>59</sup>

**The risks to companies are clear. Evergrande now expects the 8 planned plants in the Changbaishan region to produce around 17.7 million m<sup>3</sup>; a 56% decrease**

### But is this enough? Can Jilin balance watershed protection and economic development?

It is still a long way to go to reach the revised production capacity target of 50 million m<sup>3</sup>. In 2013, provincial data shows that mineral water capacity in Changbaishan Region was 4.26 million m<sup>3</sup> with annual production at 1.28 million m<sup>3</sup>.<sup>60</sup>

**Jilin officials however, still harbor concerns. They state the aggressive development might have “unpredictable outcomes” and “sections of the spring may completely dry out”**

Jilin officials however, still harbor concerns. They state the aggressive development might have “unpredictable outcomes” and “sections of the spring may completely dry out”. If the government fails to control the proliferation of new bottling plants and ensure sustainable extraction through proper monitoring, environmental damage may be immense and could spill over to impact other industries in the future.

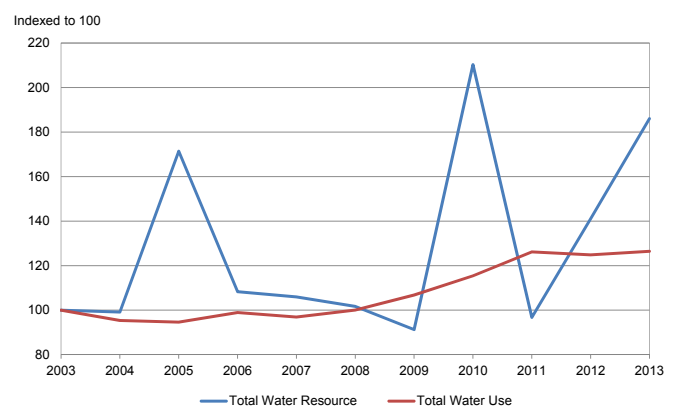
Also, it is currently not clear how the maximum of 70% of water from a single spring has been set, nor if this level is sustainable. But even more worrying, is that government officials have voiced their concerns that some bottled water companies have illegally built pipes into the core protection zones of the Changbaishan National Nature Reserve. Can Jilin (amongst others) successfully balance watershed protection and economic development?

This may be increasingly difficult as demand for water rises in the future. The planned growth in the Changbaishan region appears to be in line with anticipated economic development of the province. But does Jilin have enough water to accommodate the expansive bottled water industry and economic development at the same time?

As a traditional industrial province, Jilin is undergoing industrial transformation and upgrading as well as rapid urbanization causing water use to rise. As shown in the chart below, Jilin’s water use has been steadily rising over the last decade while water resources fluctuate. From 2003 to 2013, Jilin’s total water use has grown by 26%.

**During the last decade, Jilin used on average close to 30% of its renewable water resources per year, compared to the national average of 22% for China for the same time period**

2003-2013: Jilin’s Total Water Resources vs Total Water Use



Source: China Water Risk analysis based on National Statistics Bureau of China various years



During the last decade, Jilin used on average close to 30% of its renewable water resources per year, compared to the national average of 22% for China for the same time period. By 2013, although Jilin's urbanization ratio on par with that of China's nationally at 54%, its water usage was 478m<sup>3</sup>/pax/year, higher than China's national water use at 456m<sup>3</sup>/pax/year.<sup>61</sup>

Furthermore, Jilin is amongst the Northeastern provinces earmarked for large-scale agricultural expansion by the central government; agriculture is a large user of water. So despite relatively abundant water resources, risks still remain in managing water for economic development for Jilin.

### Exporting bottled water: Why export limited water to Japan and Korea?

Why is China which has limited water resources, exporting some of its best quality water? Some international brands operating in China, are bottling solely to export their mineral water products. By 2013, China exported 87 million litres of bottled mineral water, twice the volume of bottled mineral water that it imported.<sup>62</sup> In that same year, China surpassed France to account for 55.2% of imported mineral water in the South Korean market.<sup>63</sup>



**China surpassed France to account for 55.2% of imported mineral water in the South Korean market in 2013**

Exports of Chinese mineral water will continue to grow due to a push from both the national & provincial government and bottled water companies. Jilin, for example, aims to export 10% of its total mineral water production overseas by 2020.



**Jilin aims to export 10% of its total mineral water production overseas by 2020**

What's worse is the low price of this scarce high-quality resource. The export of 87 million litres of water in 2013 only fetched China around USD15 million. Imports for the same year of around 36 million litres on the other hand cost USD20 million.<sup>64</sup>

This means in reality, the export price of bottled water is only about 30% of that of the import price for the same product. The low price of China's exported bottled water is due to the relatively low cost of withdrawing water and production stages in China in comparison to Northeast Asia, Europe, and other major producing countries.

However, if China continues to export bottled water in such vast volumes at such low prices, the country will not only face exacerbated water security issues but also may be accused of "product dumping" according to World Trade Organisation principles. Not only will this induce more water stress, but also economic risks.

Jim Hall, the director of Environmental Change Institute at the University of Oxford, warned that *"If China continues to ship its precious water resources in water scarce regions, then it's a market failure because the value of these water resources are not fully reflected"*.



Jim Hall,  
Director of Environmental Change Institute  
at the University of Oxford

*"If China continues to ship its precious water resources in water scarce regions, then it's a market failure because the value of these water resources are not fully reflected."*



## GLACIAL & SPRING WATER: BOTTLING UPSTREAM AT THE HEADWATERS OF ASIA'S MAJOR RIVERS

### Premium bottled water from the Qinghai-Tibetan Plateau & Tianshan Mountains

Water in Tibet is abundant. It is therefore cheaper – around RMB3/m<sup>3</sup> for commercial groundwater resources<sup>65</sup>, which is 6% to 30% that of other provinces. Water bottled upstream amongst snow-capped peaks is also perceived as pure, demanding a premium. This bottle-cheap-water and sell-at-premium model has led to an influx of companies.



**Bottle-cheap-water and sell-at-premium model has led to an influx of companies**

The Qinghai-Tibetan Plateau has become a hotspot for bottling:

- **9000 Years** (九千年) – is a product of Dagu Glacier Spring Water Ltd. Related to the listed China Water Group Inc., bottles water from Dagu Glacier situation at 5,100m in Aba, Sichuan at the southeast edge of Qinghai-Tibetan Plateau
- **Ejoy365 Zhuoma Spring** (易捷·卓玛泉西藏天然冰川水) – is the newest offering from the recently established (August 2014) joint venture between Sinopec and Tibetan Plateau Natural Water Ltd. It bottles water from the Zhuoma Spring of the Nyainqêntanglha Mountains
- **Jingdu Natural Glacier Water & Natural Gas Soda Water** (瀚°天然冰川活水和天然含气苏打水) – is sourced from the glacial meltwater in the hinterlands of Sanjiangyuan in Qinghai Province since 2011

- **Kunlunshan Mountain Glacier Water** (昆仑山雪山矿泉水) - is the premium bottled water product of the JDB Group. Since 2007, it has been bottling at an altitude of 6,000m from the Yuzhufeng Peaks(玉珠峰) of the Kunlun Mountain
- **Qomolangma Glacier Water** (珠峰冰川矿泉水) - is the only bottler at Qomolangma so far. At a distance of 80km from Everest Base Camp, it bottles spring water from the experimental zone of the Qomolangma National Nature Reserve
- **Tibet 5100** (5100西藏冰川矿泉水) – is the flagship product of Tibet 5100 Water Resources Holdings Ltd. and amongst the most famous bottled water brands that source from Tibet. The company bottles from springs of the Nyainqêntanglha Mountains at an altitude of 5,100m

Elsewhere, outside of the Qinghai-Tibetan Plateau, more bottling activities are happening in Xinjiang:

- **Gelaixue Glacier Water** (格莱雪冰川水) - Gelaixue Glacier Water Ltd. actually bottles glacial meltwater from the glacier tongue of the “No.1 Glacier at Tianshan Mountain” (4,480m high)
- **Pamirs Ancient Glacier Water** (帕米尔远古冰川矿泉水) – close to Tajikistan, Pamir Heaven Spring Co Ltd. has been bottling spring water at the foot of the Ata Peaks (7,509m high) since 2003

This appears to be just the start - more are rushing in.



## Tibet's bottled water production capacity is expected to soar 52x

More companies are rushing in on the back of official encouragement. Back in November 2014, Ministry of Industry and Information Technology's (MIIT) Minister Miao Yu revealed MIIT's support on expanding the bottled water industry in Tibet.<sup>66</sup> In fact, MIIT has been working with the local authorities to draft the 'Tibet Natural Water Industry Development Plan'.

**!** On 29 July 2015, local authorities published two opinion-soliciting drafts to accelerate Tibet's Natural Drinking Water Industry

On 29 July 2015, the local authorities published two opinion-soliciting drafts – 'Tibet Natural Water Industry Development Plan' and 'The Tibet Autonomous Region People's Government on Accelerating the Development of Natural Drinking Water Industry'.

The president of the autonomous region's government once again reiterated the target set in late 2014 – to build a 5 million m<sup>3</sup> production capacity to bring in revenues of RMB40 billion within the next three to five years.<sup>67</sup> Tibet's total packaged water production in 2013 was only 95,720m<sup>3</sup>, implying increased production capacity of over 52x.<sup>68</sup>

According to the development strategy, the bottled mineral water market in Tibet should be a "making a breakthrough in mid-range (products/brands), while expanding in both the high-end and low-end (products/brands)". Similar to Jilin, Tibet has also signalled that the local government would promote the export of bottled water. This planned 52x growth could come at a cost to the fragile upper watershed.

## Would bottling glacial meltwater affect China & Asia's "water tank"? Is it worth it?

In search of cleaner sources of water, China has been developing upstream regions into the Qinghai-Tibetan plateau, which are not only ecologically fragile but home to national parks and the source of major transboundary rivers.

The Qinghai-Tibetan Plateau is not only important for China's water landscape but also Southeast Asia and South Asia. Known as "Asia's Water Tower" or "Asia's Water Tank", many major rivers originate from this plateau. Among them are the Yangtze River and the Yellow River, the two major watersheds and economic belts of China. Transboundary rivers Lancang River (upper Mekong), the Nu River (Salween) and the Yarlung Zangbu River (Brahmaputra) also hail from this region. Millions of people depend on these rivers.

**!** Many major rivers originate from this plateau – millions of people depend on these rivers

As highlighted in our recent report "*Towards A Water & Energy Secure China: Tough Choice Ahead in Power Expansion with Limited Water Resources*", China is already facing tough choices in choosing the right type of power. Coal-fired power could add to glacial melt and exacerbate water scarcity while "greener" hydropower on transboundary rivers, although better for climate change, could raise geopolitical tensions. These tough choices to balance climate, water and energy and the need to protect watersheds to ensure water security are well recognised by China's leadership. Yet local policies appear to be misaligned.



Tough choices to balance climate, water and energy and the need to protect watersheds to ensure water security are well recognised by China's leadership. Yet local policies appear to be misaligned

Would a 52x growth in bottling plants come with new plastic bottle manufacturing plants and related petrochemical plants? All these heavily polluting industries were singled out in the Water Ten Plan. How would they impact/pollute this pristine watershed? Can we ensure that explosive expansion of bottled water in Tibet will not upset the delicate balance of these fragile upper watersheds?



Already the glaciers in the Qinghai-Tibetan Plateau have shrunk 15% over the last three decades. The stakes are high—is this growth worth it?

Already the glaciers in the Qinghai-Tibetan Plateau have shrunk 15% over the last three decades.<sup>69</sup> The stakes are high—is this growth worth it? Surely there are alternative ways to develop the economy of the region? Furthermore, bottling mineral water at the foot of high-altitude glaciers bears a much higher cost as to technologies and transportation from source-to-market. The carbon emissions of the latter should also not be ignored. The reality shows this upper watershed should be protected for long term prosperity and not exploited for short term development.

# WHY BOTTLE WATER IN THESE AREAS ?

71% of Packaged Water Production in China Lie in Water Scarce & Water Stressed Regions



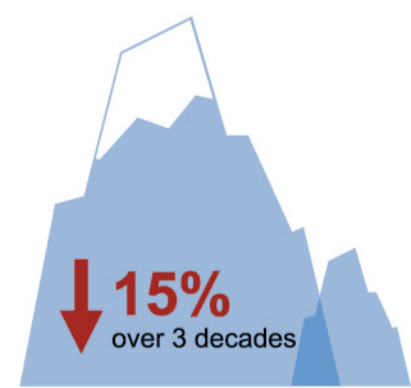
2012 China's Packaged Water Production = 55.6mn m<sup>3</sup>

## Qinghai-Tibetan Plateau

Ecologically fragile: home to national forests & Asia's watertank, source of major transboundary rivers

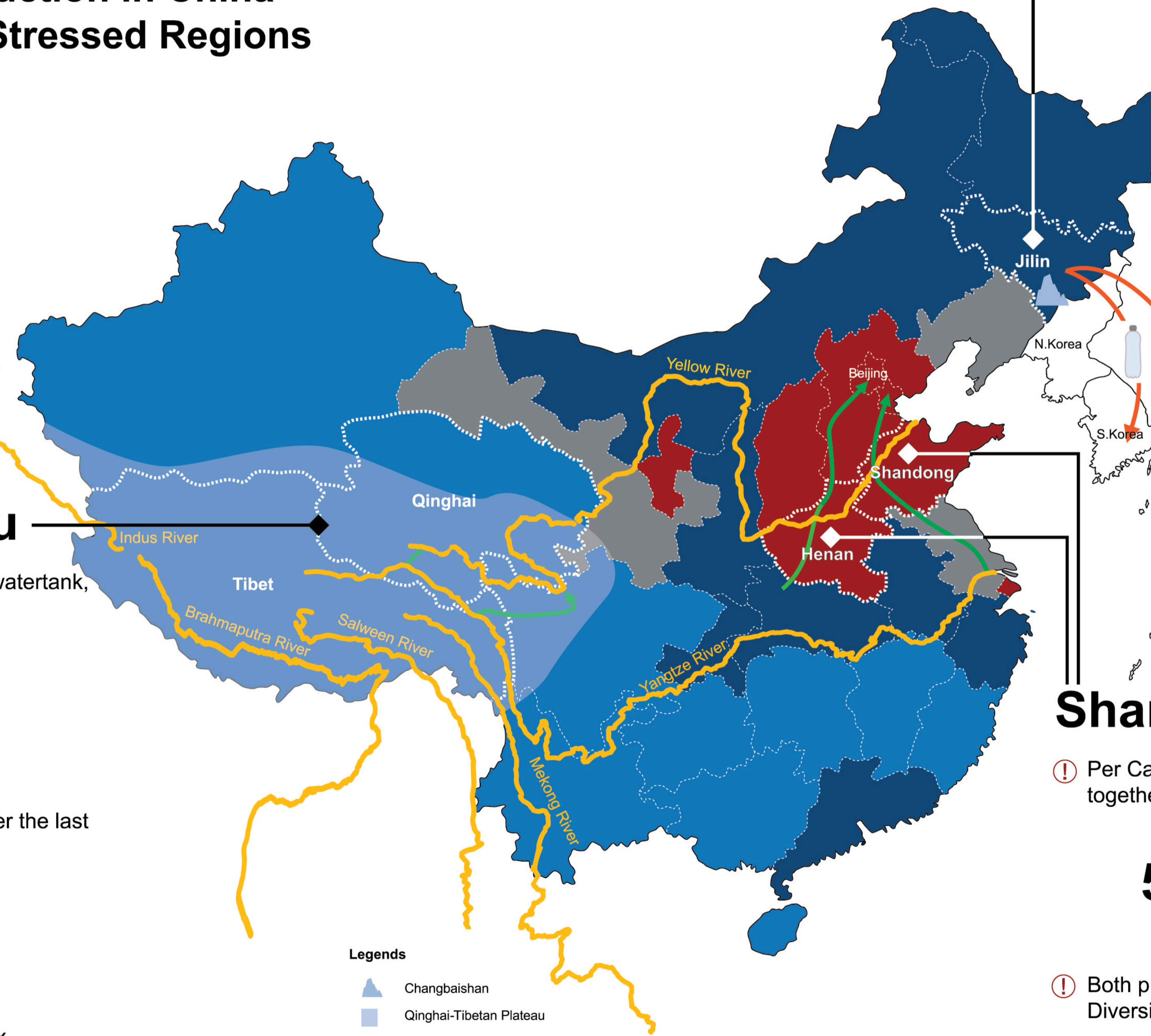


Qinghai-Tibetan Plateau glaciers have shrunk 15% over the last three decades



Tibet's bottled water production is expected to soar 52x

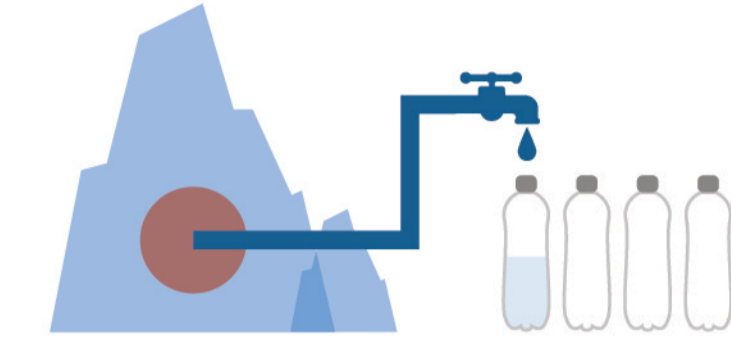
from 95,720m<sup>3</sup> to 5mn m<sup>3</sup> =



- Legends
- ▲ Changbaishan
  - Qinghai-Tibetan Plateau
  - Rivers
  - South-to-North Water Diversion Project Routes
  - Extreme Water Scarce
  - Water Scarce
  - Water Stress
  - Water Rich
  - Exportation of Bottled Water to South Korea & Japan

## Jilin

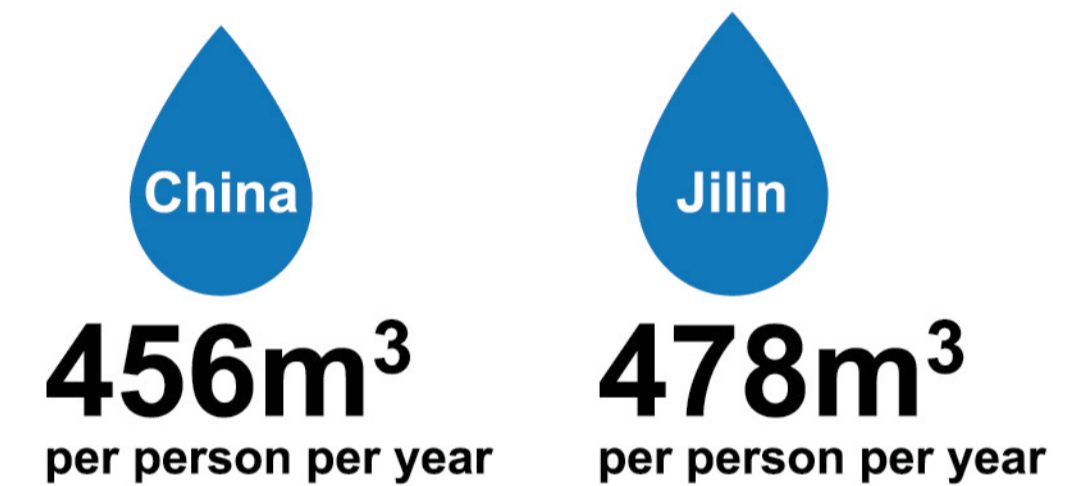
Some bottled water companies have infiltrated its pipes into the core protection zones of the Changbaishan National Nature Reserve



Unrealistic bottled water expansion plans, even halved from the target of 100mn m<sup>3</sup>, a target of 50mn m<sup>3</sup> is still questionable

100mn m<sup>3</sup> ↓ 50mn m<sup>3</sup>

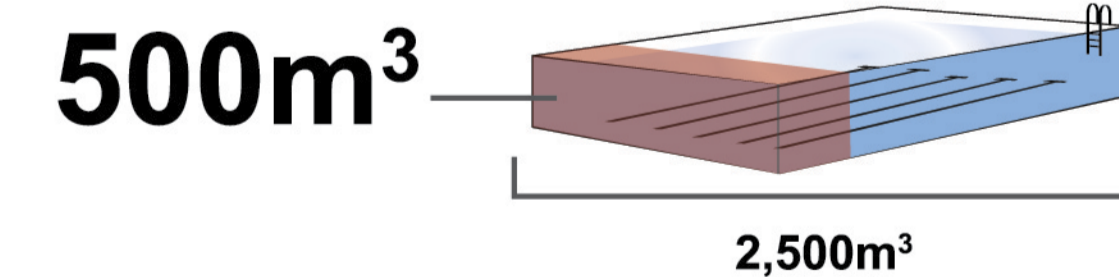
Jilin's water usage is higher than China's national water usage



Jilin aims to export 10% of its total mineral water production overseas by 2020

## Shangdong & Henan

Per Capita Annual Renewable Water Resources of both provinces together are only less than a fifth of an Olympic size swimming pool



Both provinces are recipients of water from the South-to-North Water Diversion Project

12% of China's bottled market production

# TOP TEN

Packaged Water Producing Provinces

1	Guangdong	16.7%
2	Jilin	11.8%
3	Guangxi	7.2%
4	Sichuan	7.1%
5	Shandong	6.3%
6	Zhejiang	6.3%
7	Henan	5.6%
8	Hunan	4.1%
9	Hubei	3.9%
10	Yunnan	3.3%



**IN NEED  
OF A BOTTLED WATER REVOLUTION**



## CHAPTER 4: IN NEED OF A BOTTLED WATER REVOLUTION

### Rethinking bottled water policy to address national & provincial mismatches

It appears that the government is acting. But much like tap water, bottled water is also under the jurisdiction of multiple government departments. The result is muddled, overlapping and ineffective actions from each department. More needs to be done if national and provincial mismatches are to be re-aligned to allow for more sustainable growth of the industry. Essentially, the government needs to rethink its bottled water policies.

For the past two decades, beverage companies have underpaid for some of China's best quality water as the sources they come from are exempt from environmental protection fees and ecological taxes. Meanwhile, companies that use tap water have benefited from heavy government investment into public water works. As a result of this investment, the quality of the water in their products has improved at no additional cost to the bottlers.

This could all change in the 13FYP as every province will be required to submit a water consumption target. It remains to be seen whether the industry will face tighter water caps.

**!** This could all change in the 13FYP as every province will be required to submit a water consumption target. It remains to be seen whether the industry will face tighter water caps

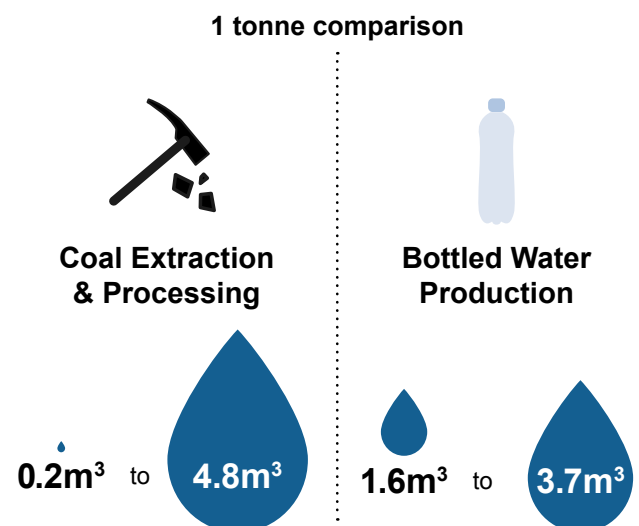
To encourage water savings, the government could apply the same principles in the Water-for-Coal Plan to bottled water. The Water-for-Coal Plan requires coal-fired power

plants and coal mines operating in water scarce regions to be held to a higher standard in terms of water efficiencies; dry cooling instead of water cooling is even recommended for new coal-fired plants built in water scarce regions. In light of groundwater woes in the dry North, asking bottlers to adhere to stricter standards in water scarce regions where a fifth of China's packaged water is produced appears to be the obvious choice.

**!** The government could apply the same principles in the Water-for-Coal Plan, coal-fired power plants and coal mines operating in water scarce regions are held to a higher standard, to bottled water

In a tonne-to-tonne comparison, coal requires 0.2m<sup>3</sup> to 4.8m<sup>3</sup> of water to extract and process<sup>70</sup>; whereas one tonne of bottled water requires 1.6m<sup>3</sup> to 3.7m<sup>3</sup>.<sup>71</sup>

### Water Use: Coal vs Bottled Water



Source: "Towards A Water & Energy Secure China: Tough Choices Ahead in Power Expansion with Limited Water Resources", China Water Risk & NDRC 'Norm of Water Intake For Beverage Manufacturing(QB/T2931-2008)', 1 July 2008





Higher tariffs should also be applied, especially with regards to bottling groundwater. In 2012 there were 831 companies bottling mineral water, which was sourced from groundwater.<sup>72</sup> The impact of these should be studied before further mineral water licences are given out. Also the maximum extraction limit of a spring should be re-examined to ensure there is no over-extraction.

**! China has varied plans to solve the nation's water challenges but it's clear that it lacks concrete ways to control the bottled water industry**

In Jilin, data from local government showed that over 200 companies (above the designated size) bottled 18.7 million m<sup>3</sup> of mineral water in 2013.<sup>73</sup> Jilin bottled water companies are allowed to extract a maximum of 70% of the volume from a single spring but it is unclear if this is sustainable, making it difficult to gage the impact to ecosystems and upper watersheds.

China has varied plans to solve the nation's water challenges but it's clear that it lacks concrete ways to control the bottled water industry which is a significant polluter and consumer of resources in China.

### **Where are the water bottling brands? Risks have moved beyond CSR**

China's bottled water industry has gone through explosive growth over the past 20 years. Thanks to this, the Chairman of Wahaha has featured twice in Forbes as China's richest man. So where are corporates on the stewardship of water?

Wahaha, one of China's large bottled water companies, disclosed in its 2012 CSR report its wastewater treatment quantity and pollution emission reductions as well as annual water and energy savings. However, it did not

disclose any information related to the total amount of water used. This makes it difficult to assess the actual efficiency of their plants, leaving consumers and the government in the dark.

**! No information related to the total amount of water used is disclosed – it is difficult to assess the actual efficiency of their plants, leaving consumers and the government in the dark**

There is also lack of disclosure relative to water quality, be it of the source or the product. Analysis of the major Chinese beverage company's websites showed that none disclosed results of water quality tests. The same was found for international brands with operations in China like Nestlé, which only had promises of quality on its China website.<sup>74</sup> Yet, in the US, Nestlé discloses water quality tests for all of its products.<sup>75</sup>

**! Nestlé only had promises of quality on its China website. Yet, in the US, Nestlé discloses water quality tests for all of its products**

And the ambiguity continues. Under the current law, only beverages that are found to "cause health impacts", "serious damage" or even "death after consumption" are recalled, otherwise it is up to the discretion of the supplier whether to take action or not.<sup>76</sup> Therefore, even if some bottled water products are found to have quality issues they can remain in circulation.

The industry's corporate social responsibility actions do not match the size or economic value of the industry. Only international brands operating in China have environmental targets. Nestlé has vowed to reduce its water footprint by 25%. Reduction targets are all well and good, but risks have moved beyond being efficient and saving water. This should be done at a minimum.



As seen in Chapter 2: “No Water, No Bottled Water Market”, physical and regulatory risks are real. Brands, be they foreign or Chinese need to look beyond CSR at the shifting waterscape and adjust their corporate water strategies accordingly to mitigate rising water risks. Targets (like Nestlé’s) need to be longer term; the proposed 25% water footprint reduction will likely be easily outweighed by projected growth. All need to find a new way forward as expansion of their industry could lead to more plastic waste, more energy, water pollution, over-extraction and disruption of Asia’s watersheds. Water scarcity and disappearing glaciers are issues that are not going away and will only worsen in the long run.



**Physical and regulatory risks are real.  
Brands, be they foreign or Chinese  
need to look beyond CSR**

Fed up with environmental pollution, Chinese consumer habits are also changing. “Green product manufacturers and brands, through consumer education and advertising can raise the awareness of consumers, and thereby shape their viewpoints. Green brands thus can transition from responding to emerging consumer needs, to helping shape those very needs. This is done through the formation of values”, says Craig Hart, co-author of “Corporate Strategy and Competitive Advantage in China’s War on Pollution – Pursuing China’s New Consumer” (June 2015). Companies that “go green” may find that they are rewarded for it.



**Fed up with environmental pollution,  
Chinese consumer habits  
are also changing**

**Consumers, big & small,  
can drive the bottled water revolution:  
SOEs lead the way?**

Consumers, big and small can drive change. However, in order to drive change consumers need to be informed, which isn’t easy given all the ambiguity in the industry from labelling to the water and energy required in production.

Maybe the first step needs to be more education and awareness building. A Civic Exchange survey of bottled water habits in Hong Kong, at least for small consumer found “One major gap is in awareness. Existing public education and school curriculum programmes appear to be relatively ineffective in reducing bottled water consumption.” We can start by addressing these gaps in education.



**First step needs to be more education  
and awareness building**

More education is also needed amongst big consumers, by which we mean corporates, state-owned enterprises (SOE) and so on. Big consumers can have a big impact and catalyse change quickly. One such ‘big consumer’ is the China Railway Corporation. It announced in July 2015, that it will no longer give away free bottled water on railways or in railway stations. Instead, drinking water facilities like kettles and drinking water dispensers will offer free drinking water for passengers (see box on the next page).



### WHEN DEMAND SHIFTS, PROFIT IS AT RISK. CAN TIBET 5100 SURVIVE?

On 28 July 2015, the *Tibet 5100* share fell 12.7% in the HK Stock Exchange after its largest customer China Railway Corporation (China Railway) announced it will no longer provide free mineral water to passengers on the high-speed train (China Railway High-speed, CRH). Tibet 5100, known for its glacier water sourced at the altitude of 5,100 meters in Tibet, is one of the top high-end bottled water brands in China. Since inception in 2011 to June 2015, the company has sold 600 million 330mL bottles of mineral water (200 million litres) to China Railway Corporation. The revenue is enough to build 1.3x "Bird's Nest" (China's Olympic Stadium).

After an eight-year honeymoon, China Railway failed to renew the contract which ended on 30 June 2015. Speculation had been simmering that the interruption of cooperation is in line with China's crackdown on corruption in railway system, but it can be a sign of shifting demand. Shanghai railway's media response was that most high-speed railway stations and trains will be equipped with drinking water facilities, instead of giving out free bottled mineral water. Shanghai railway stations will provide drinking water through public facilities such as drinking water dispensers.

Though Tibet 5100 later explained in an announcement, that China Railway only comprised 13% of its total revenue in 2014, this is still a material loss for the company. China Railway has been Tibet 5100's single largest client since its establishment. In peak years, 9 out of 10 bottles of Tibet 5100 were sold to China Railway during 2008 to 2010. Can Tibet 5100 survive without these sales? Tibet 5100 said yes, but let's wait and see. What happens if other customers also start thinking like China Railway.

Source: Various Xinhua News reports about Tibet 5100 in late July 2015: [http://news.xinhuanet.com/fortune/2015-07/28/c\\_128067980.htm](http://news.xinhuanet.com/fortune/2015-07/28/c_128067980.htm); [http://news.xinhuanet.com/yuqing/2015-07/28/c\\_128066063.htm](http://news.xinhuanet.com/yuqing/2015-07/28/c_128066063.htm)

Another big consumer that can make significant strides towards driving change is employers. Water consumption at the office is a big part of overall consumption. Many offices either have bottled or carboy water and no alternatives. The Civic Exchange survey showed just that, *"Among the 7 per cent of respondents who drink only or mostly bottled water, the second-most commonly given reason is a lack of other options. These respondents often said that they drank bottled water supplied by their employers as there was no potable tap water available at their workplace. This implies that a substantial number of these heavy users can be persuaded to switch to tap water if it were available at their workplace."*



**Employers can make a change.**  
Water consumption at the office  
is a big part of overall carboy consumption

Bottled water companies, with their large advertising budgets, will continue their widespread campaigns but this doesn't mean change can't happen. In the US for example, campaigns and protests by people have been successful. The sale of bottled water is banned in public facilities in some US cities, including parks. The government can also be a change driver. The cities of New York and San Francisco in the US successfully rolled out anti-bottled water campaigns that encouraged people back to the tap.



**New York and San Francisco successfully rolled out anti-bottled water campaigns**

With clear goals and by shining the spotlight on issues, a bottled water revolution can happen. In China, SOEs can lead the way in fostering a "no more plastic bottled water" culture.




**With clear goals China's state-owned enterprises can lead the way in fostering a "no more plastic bottled water" culture**



## A bottled water revolution means opportunity and out-of-the-box thinking

It's not all negative for bottlers. Brands need to adapt and find new opportunities. But this may need some out-of-the-box thinking. There are opportunities for new business streams, such as collaborating with big consumers to provide embedded water treatment facilities in workplace, libraries, parks, public buildings and even households.

Let's imagine what would happen if bottled water brands were to produce their water product but without the plastic bottle. Consumers wanting convenience and willing to pay for higher quality water could bring a refillable bottle to convenience stores and pay to fill it up, with purified water from water dispensers of the brand of choice. No extra water, energy or plastic will be wasted to make the bottle or in the bottling or distribution process; plus there is the bonus of less plastic waste.

 **Let's imagine what would happen if bottled water brands were to produce their water product but without the plastic bottle**


Rural regions in China are another such opportunity as they are relatively untapped and have big potential for water works development. In rural areas, 20% of water comes from a local source that is not connected to the centralised water supply. These households in rural areas rely on their simple individual water purifiers to treat drinking water. Will portable water purifiers or treatment systems for households or communities be the next market? Brands need to shift with the times.

## China cannot afford to waste water or add one Jinmao Tower of plastic waste every year

As discussed in Chapter 1: "The Rise of Bottled Water", China's packaged water production can fill nearly 5.5 West Lakes. If water used in production was included, then total water use by the industry is estimated to fill around 20 West Lakes and the plastics used for bottling can fill up to one Jinmao Tower.

Bottled water production in China is growing and if it reached the level of Hong Kong, close to 80 West Lakes of water and 4 Jinmao Towers of plastic would be needed.<sup>77</sup> Can China sustain even one additional Jinmao Tower of plastic year-on-year let alone four without proper plastics waste collection and recycling? *More on plastics in "The Rise of Plastic Walled Cities"*.

Solid waste management is already a big headache for China. With no sound established rubbish classification mechanism or deposit refund schemes for recyclable packaging materials, China is besieged by garbage. Without efficient waste source reduction, all rubbish that fails to be picked up by scavengers is sent to landfills or incineration plants.

 **Solid waste management is already a big headache for China**

Due to the low standards or lack of regulation, protests against landfills and incineration plants have spread throughout China. In July 2015, armed local police had to accompany garbage trucks to drive into Beijing Liulitun Landfill due to the local community's protest against the polluting landfill. In Wuhan, protest against environmental health impacts of an illegal waste incineration plant led to serious conflict in March 2014.<sup>78</sup>



China has reached a tipping point. Clearly, it cannot afford more environmental degradation. This is why the central government has implemented the Three Red Line Policy. If the path forward is the pursuit of an 'ecological civilisation', then we need to consider whether we can continue to support a dirty and thirsty industry like bottled water.

! China cannot afford more environmental degradation. Can we continue to support a dirty and thirsty industry like bottled water?

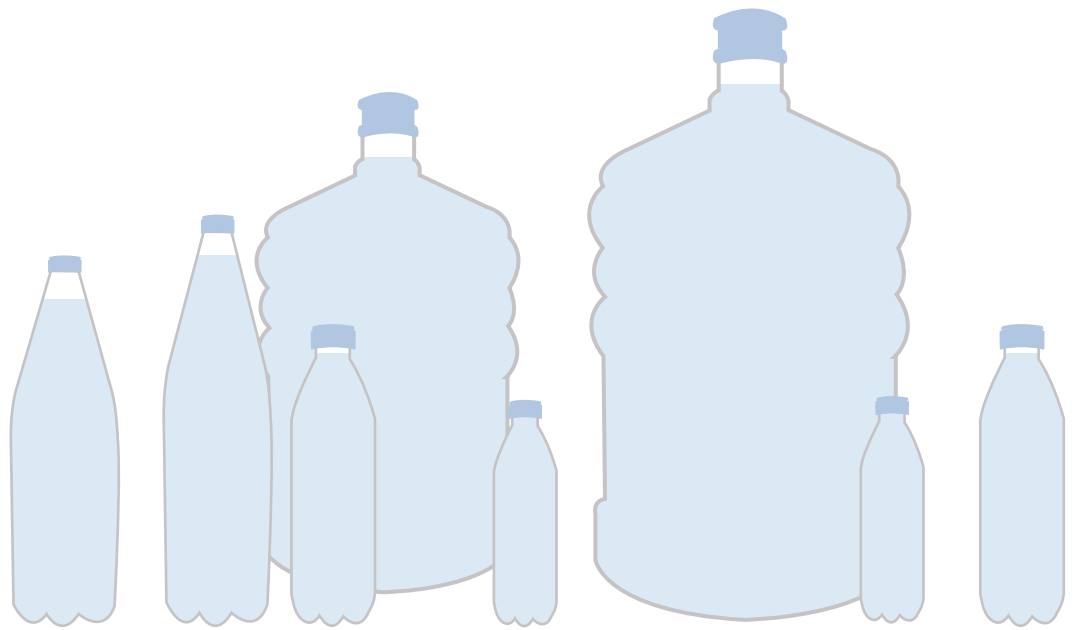
At the same time, we need to re-align our contradicting demands. On one hand we demand a clean environment with no PX/petrochemical/plastics plant in our backyard and on the other, we continue buying bottled water. We also say we care about our watersheds, want to protect our ecosystems and care about stemming climate change but then we drink premium glacial water.

! We need to re-align our contradicting demands

It is time for government, corporates and individuals to rethink bottled water. We can all start by knowing what's behind the bottle and drinking responsibly.

*Start with "8 Things You Should Know About Bottled Water in China"*

# 8



## THINGS YOU SHOULD KNOW ABOUT BOTTLED WATER IN CHINA



## 8 THINGS YOU SHOULD KNOW ABOUT BOTTLED WATER IN CHINA

### 1. Bottled doesn't necessarily mean better quality water

Bottled water is often assumed to be and advertised as clean, safe and healthy. But this may not necessarily be the case, as seen by some bottled water products failing to meet regular quality checks by the government. The National Food and Drug Administration's food safety inspection for the first quarter of 2015 revealed that 400 out of 407 beverage samples that failed to meet standards were bottled or carboy water. Over a dozen types of germs, mould, residual chlorine and other worrisome indicators were found.<sup>79</sup> This isn't a new trend. In 2012 quality checks in Hunan Province showed that 60% of sampled bottled water products failed to pass national standards and similar tests in Henan province reported 37.5%.<sup>80</sup>

Generally, consumers tend to trust big brand names but this too doesn't necessarily mean better quality. Robust, Wahaha, C'estbon and Nestlé (all renowned brands in China) have all previously featured in the 'blacklist' of non-quality compliant products. In September 2014 in Beijing, C'estbon's bottled water was found to contain bacteria 1,450 times of the allowed limit and Wahaha's product was found to contain over 8 times of the limit.<sup>81</sup>

In addition to quality there have been issues with the validity of labelling. Some bottled water labelled as "mineral water" has been found to not actually contain the relevant minerals and failed to pass tests of relevant physical indicators<sup>82</sup>, so in fact is not mineral water.

Moreover, consumers often find it difficult to decipher between 'natural mineral water', 'spring water' and 'mineralized water', and get confused by new products

such as 'oxygen rich water' from Wahaha or 'water for babies' from Nongfu Spring. The new 'Food Safety National Standard on Packaged Drinking Water' (GB 19298-2014) implemented on 24 May 2015 aims to address this labelling issue. This means that bottlers can no longer freely name products and can only choose from one of the following two categories - 'purified water' or 'other water'. This is expected to be enforced from 1 January, 2016. The standard also sets limits on physicochemical and microbiological indicators. Mineral water has a separate standard. *More in Chapter 2: "No Water, No Bottled Water Market - New Standards: No More Muddy Water"*.

### 2. Bottling factories are not properly regulated leaving you exposed

The boom of bottled water in China has resulted in the emergence of 'fake water'. 'Fake water' refers to bottled water or carboy water produced by unauthorized or unregulated companies that source water from illegal wells or use tap water without proper treatment. 'Fake water' often poses health risks, as the water is not sufficiently treated.

Moreover, those companies often reuse old carboys or use poor quality carboy containers. Shockingly, 'Beijing Evening News' reported that out of 650,000 carboys of water consumed every day, 100,000 were produced by unauthorized small factories. These 100,000 were often sold with fake labels of big brands.<sup>83</sup>

However, even for regulated beverage companies there is no obligation to reveal detailed information of their water sources. It is also not mandatory to publish results from



factory tests. This leads to information asymmetry, where consumers believe that bottled water is clean but really it could just be from the tap. Further health risks can come from the insufficient removal of chemicals from the water source, such as environmental hormones, antibiotics and other drug remnants (studies show to be coursing through China's waterways). *More on what the government has been and is doing to safeguard drinking water quality and supply in Chapter 2: "No Water, No Bottled Water Market – Regulatory Risks".*

Furthermore, those illegal bottlers tend to use poor quality recycled plastic containers (bottle or carboy) which may not meet the grade of food and safety standards. Drinking water from such containers could pose health risks.

### 3. Bottled water is very expensive compared to tap water

Assuming an average person drinks 2 litres/day and if all the water drunk came from carboys then your annual spending would be at least RMB800 or RMB1,500 for bottled water.<sup>64</sup> Thus for a typical family (3 members), the cost of drinking water would range from RMB2,400 to RMB4,500 per year. However, if you purchase premium bottled water which sources water from glaciers or volcanic springs, the cost could be 5-10 times more.

In comparison, according to the National Bureau of Statistics, the average income per capita for urban residents in China as of the first half of 2015 is only RMB10,931. This means you are spending around 7% or 14% of your income on carboy or bottled water respectively; let alone the premium for bottled water.

What if you drank from the tap? In Beijing, this would be around RMB3.5 per person per year. In other words, practically nothing compared to bottled water. Why would

you spend thousands of yuan on something that you could get almost for free? And why spend money when there is no guarantee of quality or that you're not actually drinking tap water?

Although in some cities the current quality of tap water is not fully secured, there may be some options in between that are less expensive: such as a household water filtration system or carrying a water bottle so that you could fill water from public water filling stations? By doing this, you will not only save money, but also reduce the large water, energy and plastics footprints associated with producing bottled water.

### 4. One bottle of bottled water = up to almost three additional bottles of water + ¼ bottle of oil

Behind the façade of cleanliness, purity and nature, comes the heavy burden of bottled water with high water and carbon footprints. Though researchers around the world differ on the footprint intensities, one clear message is that bottled water comes at a high cost and not just in dollars.

The International Bottled Water Association (IBWA) provides a low estimate based on data from its seven North American members and one industry peer: to produce one litre of bottled water, it would require an average of only 0.32 litres of extra water - that means in total 1.32 litres of water. However, this only considers "water used by the facility, including product water, and water used for facility processes (e.g. treatment, cleaning & maintenance)".

The National Development and Reform Commission (NDRC) of China also provides industry benchmarks of total water withdrawal for bottled water production in its 'Norm of Water Intake for Beverage Manufacture' (QB/T 2931-2008), which has been in force since 1 July 2008.





Subject to the type of packaged water, level of production and recycling of plastic containers, the overall range can be around 1.6 – 3.74 m<sup>3</sup>/t. For energy consumption, Ministry of Industry and Information Technology (MIIT) standard ‘Norm of comprehensive energy consumption for beverage manufacture’ (QB/T 4069-2010), which came into force on 1 March 2011, gives a range from 0.002-0.018 kg standard coal equivalent per 1 litre of bottled water. This is equivalent to 0.01-0.15kWh of electricity.<sup>85</sup> The range has taken into account multiple facts which are based on whether the plastic bottles are produced by the bottlers and whether there is a recycling scheme. However, the values only include the energy consumption during the manufacturing of bottled water.

The Pacific Institute’s study estimated that, for every bottle of water produced, twice as much extra water is used in the production process. This means, producing 1 litre of bottled water, requires in total 3 litres of water. In addition, the energy requirement for producing one bottle is up to a quarter of the bottle filled with crude oil equivalent. More specifically, according to Gleick and Cooley (2009)<sup>86</sup>, producing one litre of bottled water requires 5.6-10.2 MJ of energy. This is equivalent to 1.56-2.83 kWh of electricity.<sup>87</sup> Transportation and plastic manufacturing account for a total 96% of energy consumption with the remaining 4% from water treatment, bottling and cooling.

Therefore, for water consumption, we use NDRC’s benchmark; while, for energy consumption, to get a fuller picture, we opt for the research done by Peter Gleick from the Pacific Institute.

## 5. Water use by the bottled water industry can fill more than 20 west lakes

We looked up the company websites of some household bottled water brands including Wahaha, Nongfu Spring, Master Kong, Uni-President, Evergrande, Robust and Nestlé. Unfortunately, no water use data is disclosed by any of these companies. Moreover, there is also no research, at least that we can find, on this topic. In 2012 China produced in total 55.6 million m<sup>3</sup> of packaged water. Based on the IBWA benchmark, 73 million m<sup>3</sup><sup>88</sup> of water was used to produce this, whereas the Pacific Institute’s benchmark gives us an estimate of 167 million m<sup>3</sup> of water.<sup>89</sup> If we use the estimate from the NDRC norm (i.e. 1.6-3.74 m<sup>3</sup>/t), in 2012, China’s packaged water industry could have used in total 89 - 208 million m<sup>3</sup> of water in production. The volume of the famous West Lake is about 10.2 million m<sup>3</sup>, which means that the water used in packaged water production in 2012 could fill up over 20 West Lakes.

Assuming urban residents use about 2%<sup>90</sup> of supplied water for drinking and cooking, then the amount of tap water used for drinking and cooking in 2012 would be around 316 million m<sup>3</sup>.<sup>91</sup> In other words, the water used by the bottled water industry based on the estimate from the NDRC’s norm (i.e. 89 - 208 million m<sup>3</sup>) would be 28% to 66% of the amount of tap water used for drinking and cooking.

As stated previously, it is not mandatory for beverage companies to disclose their water sources or their water use. Without such information, it is difficult to know how much water is being withdrawn and from what source. During the 12<sup>th</sup> Five Year Plan (12FYP) (2011-2015), the government is expected to spend RMB700 billion to protect freshwater supplies from source-to-tap, improve and upgrade water supply networks and raise tap water



quality. With such huge government investment, would it be fair for some bottled water companies to bottle from the tap and then sell to the public at a much higher price than tap water? *More in Chapter 1: “Can China afford the luxury to grow 8.5x? Total water use can be up to 1.8 billion m<sup>3</sup>”.*

## 6. Bottled water industry energy consumption = annual electricity generated by the Three Gorges Dam

Compared to water consumption, energy consumption is often neglected. However, the production of plastics, withdrawing water from the source, processing, bottling, packaging, sealing, transportation and cooling all require energy.

Based on the Pacific Institute’s study, we calculated the energy consumption (entire life cycle from production, transportation to cold storage) of the Chinese bottled water industry in 2012 to be 87-158TWh of electricity. This is equivalent to 88% to 161% of the total electricity generated by the Three Gorges Dam in 2012 (98.1TWh<sup>92</sup>). This was about 0.3% - 0.5% of China’s primary energy consumption in 2012.<sup>93</sup> This is comparable to the US: Gleick and Cooley (2009) estimated that the energy input required for the bottled water production in 2007 was equivalent to a third of a percent of total US primary energy consumption.

These amounts are significant. For example, China has an energy savings target of 702TWh of electricity by 2020.<sup>94</sup> If China was to improve public water supply and make tap water fit for drinking, the demand for bottled water might fall. Assuming no more bottled water would be produced, 12% - 22% of the energy saving target could be achieved. Note here that this is based on the latest available official packaged water production data in 2012; the 2014 share could be much larger.

Bottled water’s energy consumption also has other environmental impacts. Of all the processes in bottled water’s production and supply chain, transportation is one of the most energy intensive. This is because the main fuel for bottled water transportation (either by land or by sea) is fossil fuel – a major source of air pollution. China’s Ministry of Environmental Protection (MEP) has confirmed vehicle exhaust as the primary source for high levels of atmospheric particulate matters (i.e. PM2.5) in cities like Beijing, Guangzhou and Shenzhen.<sup>95</sup>

If the bottled water market continues to expand, the associated energy consumption will also increase. See *more in Chapter 1: “Kaching \$\$\$! China’s bottled water market can be 8.5x larger” in the report.*

## 7. Bottled water industry uses one Jinmao Tower of plastics a year

According to the Pacific Institute, producing one tonne of bottled water would require about 28.8 kg of plastics, mostly Polyethylene terephthalate (PET).<sup>96</sup> Similarly, as told by a Jilin Development and Reform Commission official, to produce 1 tonne of bottled water packaged in 660 mL bottles, around 28.5 kg of PET or Polypropylene (PP) plastic is needed - only for the body of the bottle, not including labels or the bottle cap.

Due to the lack of information, actual plastic consumption for bottled water is unknown. We did a rough estimation based on these two estimates, which resulted in about 1.6 million tonnes of plastics required to produce bottled water in 2012. In short, approximately 1.6 million tonnes of plastic materials (if not recycled) ended up as waste in 2012. All this plastic waste could almost fill up the famous Jinmao Tower (420m tall) in Shanghai.



The question is then, how much of that 1.6 million tonnes of plastics was recycled or reused? It remains unknown as there is no such data available. We only know that as little as 23% of all plastics was recycled in 2013, according to National Development and Reform Commission (NDRC) statistics. In China, there is a common misconception that plastic bottles are not wasted because scavengers collect them and sell them for money. However, this is not always true. Bottles are still flowing to landfills or incineration plants. In fact, according to NDRC's statistics, China's recycling rate has been decreasing over the last five years<sup>97</sup>, most likely due to the falling oil price, which reduces the incentive to recycle plastic waste.

The reality is that many bottles, although labelled as "recyclable", end up in landfills or waste incineration plants, and some unfortunately in forests, farmlands, rivers, lakes and the sea. Even for those bottles that are picked up by scavengers, many likely go to small illegal recycling factories that do not necessarily meet industrial standards, which then raises even more pollution issues.

So, when you next think about buying a bottle of water think twice. Where do you want that bottle to end up? See more in Chapter 1: ***"It's not just concern over quality, convenience matters"*** in the report.

#### **WARNING! – WATER, ENERGY & PLASTIC CONSUMPTION UNDERESTIMATED**

The 55.6 million m<sup>3</sup> of packaged water production in 2012 was only from 506 packaged water companies included the statistical yearbook. However, there are up to 12,000 facilities in China with valid licences to produce packaged water. So the actual production could be greater. Of the up to 12,000 packaged water facilities, not everyone has adopted advanced technologies. In fact, many of them are small and medium sized companies located in county level cities, so it is likely overambitious to apply the same benchmarks as the US. Therefore, the real figures of water, energy and plastic consumption could be much higher than our estimates.

If China's bottled water market was to continue its rapid development and reach the level of Brazil, China would need three times the amount of current water use, and to reach Mexico, eight and a half times. Even if bottled water companies improved their water and energy management, it's clear that water and energy consumption by the industry is going to go up. What would this mean for China's limited water resources and its path towards a water and energy secure future.



## 8. Bottled water threatens China's groundwater and Asia's glacial watersheds

China's groundwater, glaciers, rivers and watersheds are all under threat. In the meantime, China's bottled water market continues to grow and companies make more and more money. The industry has invaded national nature conservation zones<sup>98</sup> and national forest parks<sup>99</sup> including the Changbaishan region (the Ever White Mountains) in Jilin province, and in Xinjiang, luxury bottled water brand "Pamir" is bottling water from Muztag Ata (the second highest of the mountains which form the northern edge of the Tibetan Plateau).<sup>100</sup>

Such commercial activities also impact local communities. Residents living near the source of water bottled brand "Yunnan Spring" have complained that lakes and wells are drying up and that they have to look for alternate drinking water sources, according to Globalization Monitor.<sup>101</sup>

Is it ethical to prosper by taking water from the headwaters of Asia's waterways which feed downstream countries including India, Bangladesh, Myanmar, Laos, Thailand, Cambodia and Vietnam? With glaciers in the Qinghai-Tibetan Plateau shrinking 15% over the last three decades,<sup>102</sup> the stakes are high. Development surrounding the glacier areas will have regional watershed implications and global climate ramifications. As the upstream riparian, China no doubt needs to play a central role to ensure regional water security.

Hopefully these 8 reasons have made you think twice about your next bottle of water.

See *Chapter 4: "In Need of a Bottled Water Revolution"* in the report for our views on this and how high the stakes really are.

# 8

# THINGS YOU SHOULD KNOW ABOUT BOTTLED WATER IN CHINA

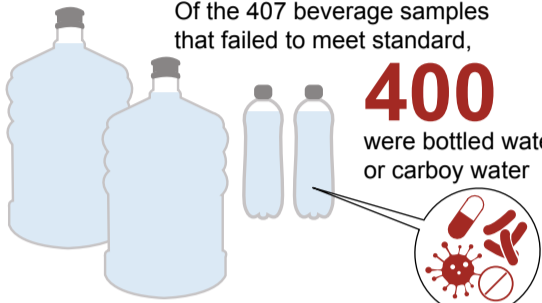
1

## Questionable Quality

Of the 407 beverage samples that failed to meet standard,

**400**

were bottled water or carboy water



Bottled water can contain environmental hormones, antibiotics, other drug remnants & bacteria

2

## Not Regulated



**1 in 6** carboys consumed daily have fake labels

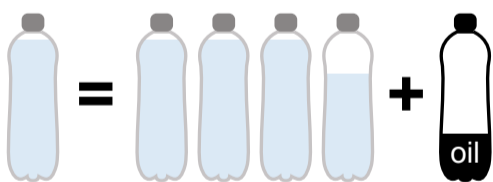
No obligation to reveal detailed information of their water sources or results from factory quality tests

Labelling of packaged drinking water as "purified water" or "other water" only required from 1 Jan 2016

4

## Resource Intensive to Produce

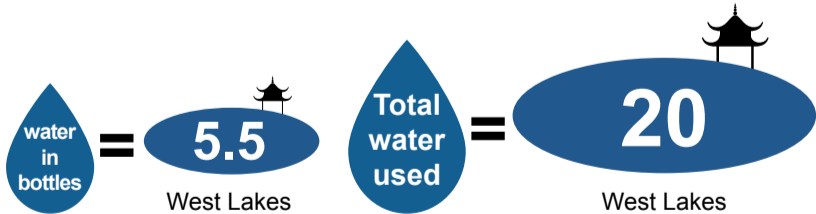
Production of 1 bottle of water



**1** bottle of water = **3.74** bottles of water + **1/4** bottle of oil

5

## Water Use

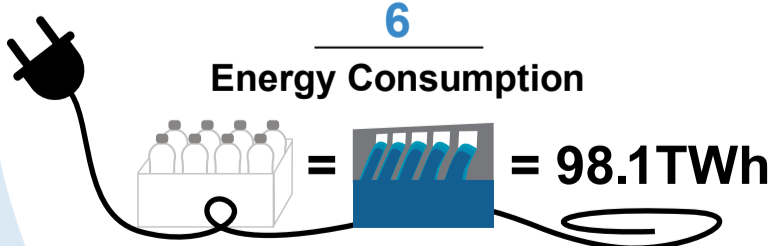


Water packaged in 2012 can fill 5.5 West Lakes

Total water used in production can fill 20 West Lakes

6

## Energy Consumption



Energy used in packaged water production in 2012 is comparable to the annual electricity generated by the Three Gorges Dam at 98.1TWh

3

## More Expensive



**RMB1,500/year**

Average bottled water cost per person



**RMB3.5/year**

Average tap water cost per person

7

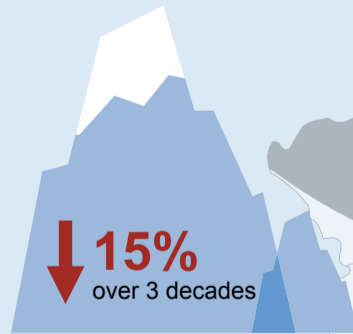
## Plastic Usage

**Almost 1 Jinmao Tower**

Plastic used in packaging is enough to fill up almost 1 Jinmao Tower

8

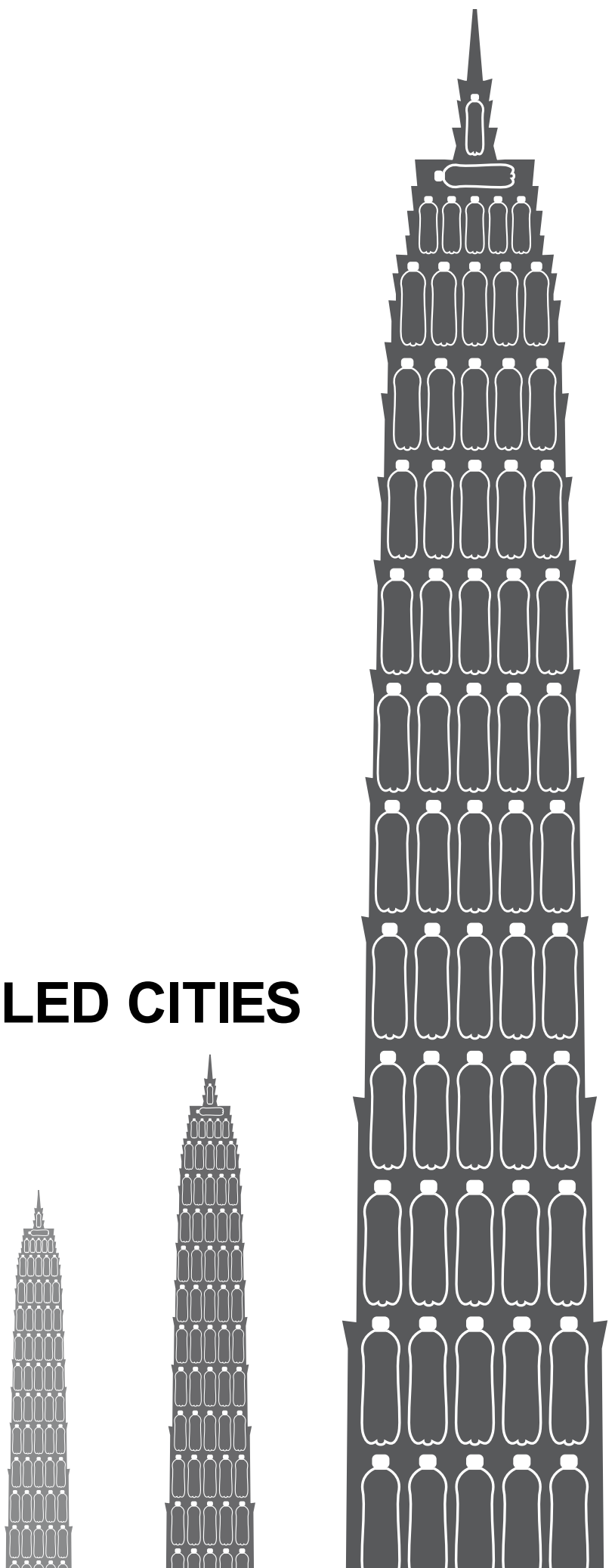
## Threatens Water Resources & Environment



- ⚠ Bottled water threatens China's groundwater and Asia's glacial watersheds
- ⚠ Bottling in protected areas
- ⚠ Qinghai-Tibet Plateau glaciers have shrunk 15% over the last three decades

Sources: The First Food Safety Survey Results of 2015 (2015年第一期食品安全监督抽检信息), SFDA, 2015; 'Food Safety National Standard on Packaged Drinking Water' (GB 19298-2014); '40% of Beijing carboy water stations operate illegally' (北京桶装水站被曝四成不正规 每日10万桶假水被消费), Beijing Evening News, 8 April 2015; calculated based on the sale price of Nestle packaged water products. RMB23 for 18.9L carboy purified water - [http://www.nestle-waters.cn/product/North\\_product02.aspx](http://www.nestle-waters.cn/product/North_product02.aspx), NDRC benchmark: 'Norm of Water Intake for Beverage Manufacture' (QB/T 2931-2008); Pacific Institute & Gleick, P. H. and Cooley H. S. 2009 - Energy implications of bottled water. Environ. Res. Lett. 4 (2009) 014009, China Water Risk 2012 estimates based on: previously cited NDRC and Pacific Institute benchmarks, [http://www.gov.cn/jrzq/2013-01/08/content\\_2307651.htm](http://www.gov.cn/jrzq/2013-01/08/content_2307651.htm), Pacific Institute - Bottled Water and Energy Fact Sheet - February 2007, and the internal volume of the Jinmao Tower (420m) in Shanghai is roughly 1.19 million m<sup>3</sup> based on various news sources; Jilin Development and Reform Commission official. According to the official website, 'Nongfu Spring Premium Water source, named Moya Spring, located in the Lushuihe National Forest Park'; See 'the introduction of water source' at <http://www.cnpamirs.com/ch/info.php?id=1&zid=2&en=c>; 'Qinghai - Tibet Plateau glaciers shrink 15% in 30 years', Xinhua News English, 22 May 2014

# THE RISE OF PLASTIC WALLED CITIES





## THE RISE OF PLASTIC WALLED CITIES

For the consumer, the life of a bottle of water ends once the water inside has been consumed, leaving an empty plastic shell that is considered waste. Such waste has been a significant contributor to the phenomenon known as “waste walled cities” in China, which refers to cities surrounded by waste. But it’s not just the end of a bottle’s life that is an environmental issue, but also its birth. The production of a plastic bottle requires energy, usually in the form of petroleum chemicals. The costs from plastic water bottles are clearly being felt in China.

### Unregulated & ineffective plastic recycling in China

As we estimated in “*8 Things You Should Know About Bottled Water in China*”, in 2012, producing bottled water in China would have used about 1.6 million tonnes of plastics. The question is then, how much of that 1.6 million was recycled? Again, no such data is available. Experts from the recycling industry and environment NGOs like the Nature University told us that for the most optimistic estimation, up to 90% of plastic bottles are recycled. This is much higher than China’s recycling rate of all plastic waste in 2013, which was only 23%, according to NDRC statistics.<sup>103</sup>

Many recycled plastics do not meet the grade of food and safety standards. Some NGOs have previously reported small plastic recycling factories in coastal areas that have caused serious water and air pollution



Of the 90% of plastic bottles recycled the portion sent to regulate recycling channels is unknown. Regardless, due to limits on financing and technologies, many recycled plastics do not meet the grade of food and safety

standards. Therefore, the recycled plastic can usually only be used by textiles and other industrial markets. As for the illegally recycled plastics, the situation is likely worse. Some NGOs have previously reported small plastic recycling factories in coastal areas that have caused serious water and air pollution.

### Dumping of plastic water bottles is exacerbating China’s “Waste Walled Cities” & damaging ecosystems

For the plastic water bottles that are not recycled, they usually end up in landfills or being incinerated, or illegally dumped into waterways or environmental areas and end up as permanent (long-term) solid waste. It is this dumping in landfills that has grown this “waste walled cities”. In some cities, poor landfill management threatens soil and groundwater safety, with pollutants and chemicals leaching from the waste. As for waste incineration, there has been much public opposition, known as the “Not-In-My-Back-Yard” (NIMBY) movement.

The waste issue is not restricted to land, and has also become an issue for seas. An “island” of more than 400 million tonnes of plastic waste (2 times of the size of Texas) has been discovered between Hawaii and the west coast of the US; it is killing aquatic life and birds in the area. The United Nations Environment Programme (UNEP) has predicted that the cost of this damage to the oceanic ecosystem exceeds USD13 billion per annum.<sup>104</sup>



An “island” of more than 400 million tonnes of plastic waste (2 times of the size of Texas) has been discovered between Hawaii and the west coast of the US



China's issues with plastics are much more complicated than Europe or America's. On one hand, China has never been able to establish an official and effective waste recycling system and on the other hand, not many brands in China are practicing the "extended producer responsibility".<sup>105</sup> International brands like Nestlé are also lacking in this regard in China; they have plastic recycling and reduction practices in Europe and the US but not in China.

**! China's issues with plastics are much more complicated than Europe or America's**

### **Glass bottles worse than plastic**

Glass recycling is being done by some Chinese brands including Nongfu Spring and Laoshan Mineral Water. Glass bottles are to target high-end consumers. The CEO of Nongfu Spring, Zhong Shanshan, commented during a media interview, "*On the negotiation table of the Premier, there should be glass bottled water.*"<sup>106</sup> However, under China's current recycling system, glass bottles are even worse than plastic bottles. This is because individual waste collectors and recycling dealers do not recycle glass bottles. This is due to the lack of incentives. Moreover, there is also no deposit system or recycling system from the bottled water companies. Thus, consumers have no choice but simply throw away the glass bottle. In addition, the extra fragility and weight compared to plastic bottles mean transportation demands are greater.

**! No deposit system or recycling system from the bottled water companies. Thus, consumers have no choice but simply throw away the glass bottle**

### **A plastic future ever after for China?**

Unfortunately, not all consumers understand the correlation between their consumption and the "waste walled cities", or the floating "plastic island" between Hawaii and the west coast of the US. According Civic Exchange (a think tank based in Hong Kong), over 80% of the respondents in a survey they conducted believe that plastic waste is a serious issue, however only 15% expressed a great deal of personal concern about it. In other words, in their survey, caring about plastic waste had no clear relationship with whether or not respondents drank bottled water.<sup>107</sup> This attitude means that most consumers will continue their current purchasing behaviour of bottled water.<sup>108</sup>

Chan Li Wen, waste management researcher of the NGO Nature's University, is concerned with China's plastic issue. This is compounded by the dropping price of oil, which is resulting in significantly fewer recycling benefits and thus impetus for scavengers, corporates or people to recycle. Additionally, both the government and corporates have no effective policies to promote plastic waste or waste recycling. This could lead to more PET materials being produced from petrochemicals to satisfy the demand for bottled water and concurrently fewer and fewer plastics are being recycled back into the system.

**! Both the government and corporates have no effective policies to promote plastic waste or waste recycling**

As long as the bottled water industry grows, consumers don't change their consumption behaviours and the government and companies don't implement recycling policies, China's plastic challenge will continue to grow along with water scarcity.





## ABBREVIATIONS

12 <sup>th</sup> FYP	12 Five Year Plan (2011-2015)
13 <sup>th</sup> FYP	13 Five Year Plan (2016-2020)
CPC	National People's Congress
CPPCC	Chinese People's Political Consultative Conference
FMCG	Fast Moving Consumer Goods
IBWA	International Bottled Water Association
MEP	Ministry of Environmental Protection
MIIT	Ministry of Industry and Information Technology
MLR	Ministry of Land and Resources
MOHURD	Ministry of Housing and Urban-Rural Development
MWR	Ministry of Water Resources
NDRC	National Development and Reform Commission
NIMBY	"Not-In-My-Back-Yard" movement
PET	Polyethylene terephthalate
PP	Polypropylene
SFDA	State Food and Drug Administration
SNWDP	South-to-North Water Diversion Project
SOE	State-owned enterprise
UNEP	United Nations Environment Programme



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30. According to the West Lake Museum, the overall volume of West Lake is 10.19 million m<sup>3</sup>
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