TORONTO STAR

ON ON4 V2

TONY BURMAN ON AFRICA'S PAIN

Nigeria filled its capital with tanks and soldiers for the World Economic Forum. So why can't it protect its schoolgirls? WD3

5.9

Terrorism's dirty secret: It sells, WD8

WORLD WEEKLY

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Chinese economic growth over the last few decades is unlike anything the world has ever seen. The legacy of the boom is unspeakable damage — polluted rivers, fouled land, dangerous air quality.

Inside and online are a series of videos and stories about the generation that has inherited the waste, and the few who are openly and aggressively trying to help their country avoid environmental disaster.

They are China's generation green

WD4-7 and thestar.com/chinagreen

Multimedia series by the UBC School of Journalism's International Reporting Program, with the Toronto Star

ON ON4

China's generation green

About the project

In September 2013, a team of 10 journalism students enrolled in the International Reporting Program at UBC's Graduate School of Journalism began collaborating with seven Chinese journalism students from Shantou University in Guangdong province on China's Generation Green. (Star reporters Raveena Aulakh and Kate Allen contributed with supporting stories.)

China's Generation Green focuses on the young people trying to make a difference to their environment. Five student reporting teams worked across China to tell their stories through a mix of words, sound, video, photos and graphics.

See the full project at **thestar.com/chinagreen**

This stream in Beijing was polluted after an oil pipeline to a factory burst.

AFP/GETTY IMAGES

China wakes up to its water crisis

More than 70 per cent of China's rivers and lakes are polluted and almost half may contain water that is unfit for human consumption or contact

RAVEENA AULAKH
ENVIRONMENT REPORTER

One day in late February last year, Ma Jun's home phone started ringing and didn't stop.

The director of the Institute of Public and Environmental Affairs in Beijing had yet to have breakfast, so he ignored it. When he finally answered, the news was momentous.

The Chinese government had admitted for the first time that decades of reckless pollution had spawned a string of "cancer villages."

These are communities near chemical, pharmaceutical or power plants with unusually high death rates. Environmentalists, NGOs and academics had long argued that contaminated water, which villagers rely on for drinking, cooking and washing, was the prime suspect.

The cancer villages — there are an estimated 450 across China — were identified in the late '90s but the government had never acknowledged them. Until now. The belated recognition appeared in the environment ministry's five-year plan for tackling pollution.

Ma, a well-known environmental activist, couldn't believe it.

The document said: "In recent years, toxic and hazardous chemical pollution has caused many environmental disasters, cutting off drinking water supplies, and even leading to severe health and social problems such as 'cancer villages.'"

This, says Ma, was the government's first step in solving the "big problem" of water pollution.

"If I give you data about (water) pollution in China, you will be shocked," he says. It is worse than what people know, believe or have read about.

"But I have hope that this (the water situation) will turn around in the next few years."

☆ ☆ ☆

More than 70 per cent of China's rivers and lakes are polluted, government reports have said, and almost half may contain water that is unfit for human consumption or contact.

And China's more than 4,700 underground water-quality testing stations show that nearly three-fifths of all water supplies are "relatively bad" or worse.

Early last year, Jin Zengmin, an eyeglass entrepreneur from eastern China, announced he would give $32,000 to the chief of the local environmental protection department to swim in a nearby river for 20 minutes. Jin's offer, made on social media, went viral. Not surprisingly, the chief declined.

How did it get this bad?

During the past few decades, China has gone from an impoverished farming-reliant country to the "factory of the world." For the most part, industries have been unregulated: the widespread dumping of toxic chemicals and industrial waste has poisoned rivers, lakes and groundwater.

The Yellow and Yangtze, two of China's major rivers, traverse the country's industrial belts as they flow from west to east: they are among the most polluted rivers in the world.

By the time they reach coastal cities, their waters require extensive treatment before being potable.

Jennifer Turner, the director of the China Environment Forum with the Wilson Center, a think-tank in Washington D.C., says the country has a water crisis.

"Having said that, you have to keep in mind that every year for the past 40, China's GDP has grown 10 per cent," she adds. "It doesn't mean water had to pay this kind of price, but it has happened."

Turner wrote her dissertation on water management in China in 1995.

She says the water quality has remained at a "steady awful level for the past decade." A lot of current efforts maintain that level, "not let it get worse."

Water plants are now treating as much as 70 per cent of water, but agriculture runoffs and contamination from industries — such as chemical spills and deliberate dumps — are getting worse.

Agriculture runoffs are the No. 1 cause of contamination, says Turner.

The other big problem is that China simply doesn't have enough water, says Charles Jia, a professor at the University of Toronto.

China has about 7 per cent of the world's fresh water but sustains more than 20 per cent of the population. (By comparison, the Great Lakes contain 21 per cent of the world's fresh water supply.)

Large-scale industrialization has overwhelmed scarce supplies and drinking water has become the biggest casualty, says Jia.

"The one thing (China) has failed at miserably," says Ma Jun, "is keeping up with demand for clean water."

☆ ☆ ☆

China is the world's largest grain producer. It has also become the world's largest producer and consumer of fertilizers and pesticides, according to China's Journal of Arid Land.

Its fields are a bigger source of water contamination than factory effluent, the Chinese government said in its first pollution census in 2010.

More than half of China's water pollution comes from fertilizers, pesticides and livestock waste that is carried into lakes, rivers, wetlands, coastal waters and underground aquifers by rainfall and snowmelt.

(Pig and poultry farms have also rapidly developed; in 2002, the total livestock waste was more than four times greater than the production of industrial organic pollutants.)

A lot of fertilizer and pesticides are fakes in China and thus largely ineffective, says Turner, which is one reason why farmers overuse them. "It is a hard sector to regulate because it cannot be traced back to one source, like pollution from a factory can be."

Fertilizer runoff wrecks the soil, too, in the long run.

Recently, a team from Greenpeace East Asia's Detox campaign spotted a black plume of waste water, the size of 50 Olympic swimming pools, on the sea's surface near the city of Shishi, a big centre for children's clothing manufacturing. Greenpeace found that the plume came from a waste-water treatment plant that treats 19 of the city's textile dyeing plants.

Tests showed it contained many hazardous chemicals.

"Every day that the industry continues dumping hazardous waste water, the problem is escalating," says Ilze Smit, a Greenpeace researcher in Amsterdam. "This kind of pollution doesn't disappear but it takes decades to clean up and will cost the society billions of dollars."

Adding to China's list of water problems is desertification.

The process by which land turns desert-like is not restricted to Africa, where the Sahara is stealthily expanding southward by about 48 square kilometres a year.

The root causes are climate change and poor soil conservation, which degrade the soil. Simply put, the overuse of chemical fertilizers, failure to rotate crops and irresponsible irrigation robs the soil of its nutrients. Eventually, the land gives away to sand.

According to China's State Forestry Administration, more than 27 per cent of the country suffers from desertification, with Inner Mongolia, in northern China, being among the worst. Desertification has hit 18 provinces and impacts more than 400 million people.

While China loses arable land, the government is reclaiming land, too. Loess Plateau, in central and northern China, for example, covers more than 620,000 square kilometres and is highly susceptible to erosion because it is very silty.

It is believed that many centuries ago the plateau was fertile and easy to farm, but deforestation and overgrazing turned it into a desert. One Chinese government study called it "the most severely eroded area in China and even the world."

About 20 years ago, the government began planting millions of trees, constructing terraces and small-scale dams. It also banned grazing from some areas.

Since then, large parts of Loess Plateau have been reclaimed.

☆ ☆ ☆

According to 2012 statistics from the Ministry of Supervision, water pollution accidents in China have risen to more than 1,700 annually — almost five accidents every day.

(The environmental protection ministry reported more than 1,200 environmental accidents in 2004 alone, most related to chemicals flowing into rivers, lakes and ground water.)

Experts believe the accidents are vastly under-reported.

Can China find a permanent solution to its water troubles?

George Arhonditsis, an associate professor in the department of geography at the University of Toronto, says Chinese experts grasp the scale of the problem.

"Over the past 10 years, there has been significant improvement in understanding of problems and how to alleviate water problems," he says.

Since the early '90s, the government has enacted or amended at least one environmental law every year.

Central and provincial governments have cleaned up water bodies and recycled water in homes, industries, even in fields. They pay or subsidize local government and business initiatives, such as adding biogas equipment in pig farms and spreading the residue on fields as a more natural alternative to synthetic fertilizers.

There are strict penalties for breaking environmental laws.

In one of the biggest announcements to date, the ministry of environmental protection announced in February a $320-billion (U.S.) plan to tackle water pollution.

Ma Jun says the Chinese are no longer satisfied with economic prosperity at the cost of environmental damage.

"They want the basic, which is clean water," he says, adding that protests, unthinkable until a few years ago, now happen regularly. "People are not happy . . . they want more."

Class-action cases over water pollution are going to regional courts — putting them beyond the reach of local officials.

Turner points out that protests, particularly on the east coast, have led local governments to increasingly move dirty industries farther inland.

Recognizing the scope of the problem has led to some improvement, she says, "but there are still a lot of institutional barriers to implementing the policies."

There is also more political space for some NGOs, such as Ma Jun's IPE, which has been expanding its water pollution map and other activities to promote transparency around water pollution.

"It is another sign that the government is indeed hungry for solutions to the water-pollution challenge."

HUO MINHAO PHOTO

LEIF ZAPF-GILJE PHOTO

The water brothers: Huo Minhao and Huo Minjie

LEIF ZAPF-GILJE AND MIKE WALLBERG
UBC INTERNATIONAL REPORTING PROGRAM

SHENQUI, CHINA—They had grown up along the banks of the poisoned Huai River and escaped to white-collar jobs, but it took only one phone call to bring brothers Huo Minjie and Huo Minhao home.

Their father, a tireless defender of China's storied Huai river and a spur in the side of polluting industries, had been beaten up. Badly.

Both sons quit their jobs. "I knew that if I decided to come back, I would likely have to lead a very poor life," said Minjie. "I struggled with it but my father was doing some amazing things . . . (So) I decided to start working for the cause with my brother."

Minjie is in charge of the effort to get drinkable water to the villages hardest hit by the pollution, while elder brother Minhao oversees pollution monitoring.

Government studies have shown a correlation between dependence on the river water and an increased risk of cancer. So they have built water filtration systems in 20 villages and continue to build more.

Many factories continue to pollute illegally, but progress has been made.

Even the factory once considered the Huai's worst polluter, which their father was investigating when he was beaten, has installed elaborate waste-water filtration systems.

AURORA TEJEIDA PHOTO

Managing the middle-class dream: Peggy Liu

AURORA TEJEIDA
UBC INTERNATIONAL REPORTING PROGRAM

SHANGHAI, CHINA—Peggy Liu has never had to endure a beating from Chinese officials, surveillance from local police or living in the forest to raise awareness about China's endangered animals. She grew up in the U.S., went to MIT and lives in a luxury highrise in Shanghai. But just like poor kids in major Chinese cities, her children have to wear face masks when they play soccer.

"You know, our skies are grey. Our rivers are sometimes red; sometimes our tap water is yellow," says Liu.

Six years ago, she gave up her job as a venture capitalist and founded a not-for-profit called the Joint U.S.-China Co-operation on Clean Energy that is working to ensure future generations in China will have a livable environment. "China wants to go green," she says.

She has been working with China's leaders to change how government officials, businesses and the public interact with their environment. Her most pressing challenge is to alter the aspirations of China's middle class, which numbers 500 million, by creating a culture of sustainable consumption.

But Liu is in a fight against time; China's middle class is expected to rise to 800 million in the next 10 years and consumption is on the rise.

"The fact is, this will not happen overnight. This is a 20-, 30-year-long green march we're on."

> CONSUMING PASSIONS

20
Millions of new cars sold in China in 2013, nearly twice the U.S. figure

65
Millions of outbound air passengers; 100 million expected by 2020

1
China's rank for total wine consumption by 2015

30%
Growth in smartphone sales expected this year in what is already the world's largest smartphone market

Sources: CNBC, Wall Street Journal, DisplaySearch Blog

JIMMY THOMSON PHOTO

The food campaigner: Wu Heng

JIMMY THOMSON
UBC INTERNATIONAL REPORTING PROGRAM

SHANGHAI, CHINA—Wu Heng already knew there were problems with China's food safety when he discovered that the "beef" he had been eating for months was actually pork deliberately contaminated with carcinogens.

But the graduate student didn't know where to turn for reliable information about the country's food scandals. So he created a website, Throw it Out the Window, which crashed the first day, overwhelmed with traffic.

The website marked the start of a food safety crusade. Three years later, Wu, 28, is publishing a book and is the country's most prominent voice for consumers.

He says the problem has morphed from an issue of greedy food producers adulterating their products to a dangerous environmental catastrophe. "The environment is getting worse. Air pollution, water pollution, soil pollution: all these environmental issues become one issue for unsafe food."

> LOST FARMLAND

3.3
Million hectares of arable land that is too polluted to farm

20
Millions of hectares polluted enough to contaminate the food grown on it

17.5%
Portion of the country's arable land those two figures represent

Sources: FAO, Nature, New York Times

PETER KLEIN PHOTO

The nature filmmaker: Qian Li

UMBREEN BUTT
UBC INTERNATIONAL REPORTING PROGRAM

BAIMA SNOW MOUNTAIN RESERVE, CHINA—In sunshine and snow, Qian's Li's team of wildlife filmmakers trek through the alpine forests of southwest China, in pursuit of the Yunnan snub-nosed monkey. Their work pays little and the living conditions are tough. But these young conservationists are in a race with time: China's remaining wilderness is being razed in the name of economic development, and 1,000 species face extinction.

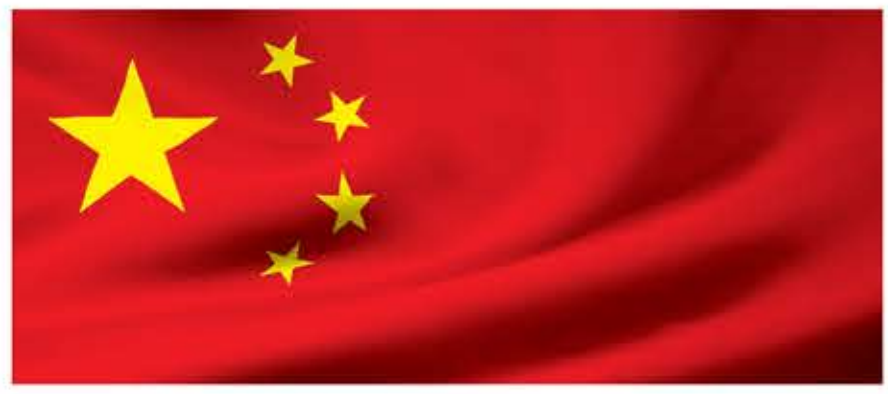
"My parents think I'm weird and wild," admits Qian. "They are traditional and don't want girls to do field work, but I'm really interested in it."

Qian and her colleagues want to raise public awareness about species protection by documenting and sharing the stories of China's favourite monkey.

Twenty years ago, the Yunnan snub-nosed monkey shocked and excited the Chinese public when its photograph first appeared. The image provoked a national outcry for conservation. The unexpected success of this campaign helped build China's environmental movement, and inspired many like Qian.

Having studied in the U.K., Qian and her team were exposed to new ideas of environmental stewardship. Now, they want to plant the same seeds of environmentalism in the next generation.

China's generation green



CHINAFOTOPRESS/ GETTY IMAGES

Children are especially vulnerable to the effects of air pollution because their lungs aren't fully developed.

Families flee as China's air sickens their children

BRITNEY DENNISON AND EMMA SMITH
UBC INTERNATIONAL REPORTING PROGRAM

BEIJING—Feng Cheng, 44, moved to Beijing 15 years ago from his hometown in the north. He runs his own business teaching expats about Chinese culture.

"We're living pretty (well) here in Beijing, with my career, my business, everything, and my two kids. It seems perfect," he said.

But living here is making his youngest child sick.

Sean, a once-chubby 2-year-old, has been in and out of the hospital every couple of months. He has had fevers, bronchitis and pneumonia. Feng blames the air pollution.

In Beijing, air pollution is up to 40 times higher than World Health Organization standards for safety. Some researchers say it is shaving 5.5 years off the average person's life. Children are most vulnerable; their lungs are still developing and any damage could be permanent.

Feng said his family often lives for weeks under smoggy skies. "I worry about them because they are so young," Feng said. "That's why so many Chinese … try their best to emigrate to other countries, I think, including me."

Feng applied for a visa to the United States in February. He will leave his business and his parents behind. He can afford to move. But it isn't that simple for other families.

BRITNEY DENNISON AND EMMA SMITH PHOTO

Feng Cheng and his son Sean at their home in Beijing.

On the outskirts of Beijing, away from the highrise apartments that Feng calls home, there is a narrow alleyway choked with smog. This is where Zhuangyou and Mei Deng live, in their cellphone shop.

They moved to Beijing five years ago so their 6-year-old son Zhide could get a better education. But living here is making him sick.

"Last time he got a fever I didn't sleep all night," said Zhuangyou, 34. "I put a cold towel on his forehead and I changed the towel every two or three minutes. It was impossible for me to fall asleep."

Since moving to Beijing from southern China, they have doubled their income.

But Mei, 26, said the air in her hometown is better. She wants to move back. "He's always saying he's a little bit dizzy," she said of Zhide. "I think it might have something to do with the air. The two years he was back home he was never sick."

In the last six years, only 25 days in Beijing ranked as "good" days, according to the U.S. air quality index.

Families are struggling to cope with the polluted air. The well-off spend up to $1,500 on home air filters and outfit their children in pollution masks.

But Feng said his son pulls off the mask.

"That's why we say that the only solution is that we leave the country," Feng said. "I feel sad for the country, for the government. But what can you do?"

It will take Feng more than a year to find out if his visa is accepted. So he waits for his chance to leave.

He waits for those rare days when the wind carries away the smog. And as he waits, Sean gets sicker.

KATELYN VERSTRATEN PHOTO

DAVID RUMMEL PHOTO

At left, a worker at the Anlong village organic farm in Sichuan province. Far left: safe food campaigner Ming Jiu Li.

Hungry for safe food, China turns to organics

KATELYN VERSTRATEN
UBC INTERNATIONAL REPORTING PROGRAM

ANLONG VILLAGE, CHINA—"Healthy and safe foods should be a basic human right," says Ming Jiu Li, 25. "A large criticism that's levied against organic foods is that they are consumed by elites. We want to challenge that it's not available for a large number of people."

Ming, who graduated with an environmental engineering degree, left a high-paying job in the city and now works for a non-governmental organization in Sichuan province (the Chengdu Urban Rivers Association, or CURA) that connects organic farmers from Anlong village with city customers.

Organic produce from Anlong offers an affordable alternative for a country desperate for safe food. It also supports the farmers, allowing them to stay on their land as the pressures of urbanization force millions into cities.

"You have urbanization and all these new developments," says Ming. "These new condominiums and apartments are built on once-fertile farmland. Who is going to be feeding us? Now, we are a net importer of food, where once we used to be a net exporter."

CURA arrived in Anlong village in 2005, aiming to reduce the amount of agrochemicals running into the nearby Funan River. The following year, it introduced the idea of chemical-free farming to the 3,000 villagers.

Farmer Cheng Wang was one of the first who signed up.

The chemicals that Cheng formerly used aggravated his mother's rheumatism. Even still, he struggled to make a living as a farmer and considered moving to the city.

"When (CURA) came to introduce organic farming, I had a good willing heart to do it," said Cheng. "I felt it would be very hard to leave this land behind."

Twice a week, Cheng drives 40 kilometres to Chengdu, a city of 14 million in Sichuan province, to deliver his vegetables. He is one of nine farmers from Anlong village who provide produce to about 200 families searching for a safe alternative to chemically grown produce.

In a country where organic labels can be easily forged, as they were in a series of 2011 scandals, official certification does not carry the same weight as in western countries. To keep the cost of his vegetables low, Cheng has not applied for official organic certification.

China consumes more agrochemicals than any other country in the world. "Some farmers, they really apply excess pesticides to vegetables," Cheng says. "Most customers prefer the vegetables with pretty, good looks. Ironically, the ugly vegetables are relatively healthy to eat because they are produced organically."

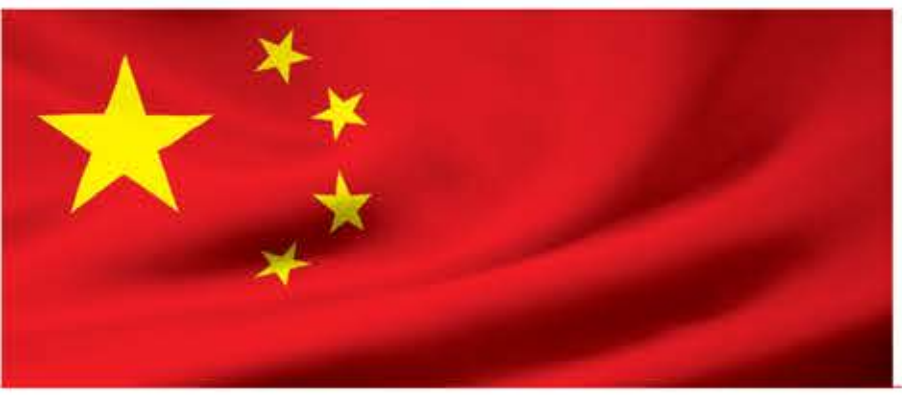
Delivery days are gruelling — 13 hours of driving starting at 3 a.m. When he first began delivering in 2006, he didn't have a driver's licence. He carried bags of vegetables on the bus to his customers' homes.

After paying expenses, Cheng earns around $12,000 a year. It is enough to allow him to keep his land, and he is protecting his family from the chemicals he once used.

"We are different from big food producers. We cannot earn so much," says Cheng. "But it's enough to support my family."

As for Ming, he believes organic farming could eventually be the answer to both China's food safety and security crisis — even it takes a while.

"Why not?" he says. "Anything is possible."



China's generation green

AFP/GETTY IMAGES

Chinese officials are trying to deal with traffic, a vital component of urbanization.

China's city of environmental hope

RAVEENA AULAKH
ENVIRONMENT REPORTER

Air pollution? Check. Poor trash management? Check. Water pollution, deforestation? Check, check.

While China has a mountain to climb when it comes to pollution, there are positive stories, too.

Zhongshan city, for instance.

Situated in the southern province of Guangdong, in the Pearl River delta, Zhongshan is surrounded by forest, its roads lined with trees, its heritage buildings still intact. It has a complex garbage disposal system and centralized sewage facilities. In 1998, it was declared the National Model City in Environment Protection. In 2011, it got the title of National Eco-City.

One of the impressive things about Zhongshan — population 1.3 million — is that it has given the same priority to environmental protection as to economic and social development, says Elaine Wang of the Asia Institute for Sustainable Communities, headquartered in Vermont.

"It has been good . . . and smart about urbanization," says Wang. "It has tried to do things right; (it) hasn't always succeeded, but it has tried."

Urbanization is relatively new in China. In 1950, about 13 per cent of Chinese people lived in cities. By 2010, that jumped to more than 45 per cent. The figure is projected to reach 60 per cent by 2030.

Twenty-five of the world's largest 100 cities are now in China, whose population is 1.3 billion.

How do you get urbanization right in that context?

For starters, keep schools, jobs and homes closer together. "It would help if they didn't have to drive a lot," says Wang.

She points to big cities in Latin America and Asia, where commuting takes hours. "Imagine what these people, some with PhDs, could do if they didn't have to spend so much time commuting."

Even more vital is citizen engagement, so there is "communication between those who live and work there and the governments that manage it. A sustainable community is not a static state, doesn't look a certain way, but is one where different sectors and people connect."

This is happening in Zhongshan.

Two women from Xiaolan town, in Zhongshan city, contacted the institute saying they wanted to do something for the city and the environment.

They founded an NGO and worked with a half-dozen factories to significantly cut energy use and carbon emissions.

Zhongshan developed more slowly than other cities its size, says Tien Shen, a researcher with the Shanghai Municipal Engineering Design Institute, who grew up in the city in the 1990s. "It has weighed the pros and cons of decisions that impact urbanization, made investments that are important."

The city invested almost $400 million in three garbage disposal facilities, with a daily capacity of 3,100 tonnes. That is a lot of money for a city the size of Zhongshan but "it will grow and it requires this infrastructure."

Zhongshan also has a huge expat population, said Shen. "These people have lived all over the world and (they) have brought back ideas on how to care more for the environment."

The way that Chinese cities dealt with urbanization in the '80s and '90s has drastically changed, said Dan Ondrack, a University of Toronto professor emeritus.

"Take this example of planting trees, it is small but means a lot," said Ondrack. Governments have learned that planting trees and gardens curbs pollution and improves the landscape, he said.

Governments at all levels in China are also trying to deal with traffic, a vital component of urbanization, said Ondrack. "In Shanghai, they decided to put an airport expressway and it was done in three years. You have to understand that federal policies could be very strong (in China) but they don't necessarily translate to provincial or regional governments. But at the federal level, China understands what it has to do to make its cities livable."

Back to Zhongshan, Wang says it's a city that is "definitely trying to get ahead in thinking what will make this place more interconnected, more livable and a better urban area. That is not universal in China or even in the world."

> "It has weighed the pros and cons of decisions that impact urbanization, made investments that are important."
>
> **TIEN SHEN**
> A RESEARCHER WITH THE SHANGHAI MUNICIPAL ENGINEERING DESIGN INSTITUTE ON ZHONGSHAN

FREDERIC J. BROWN/AFP/GETTY IMAGES FILE PHOTO

The city of Zhongshan has made environmental protection a priority.

The legal activist: Chen Liwen

ALLISON GRINER AND CARLOS TELLO PHOTO

AFP/GETTY IMAGES

ALLISON GRINER AND CARLOS TELLO
UBC INTERNATIONAL REPORTING PROGRAM

BEIJING—Two years ago, tired of excuses, Chen Liwen filed her first lawsuit. The target? The Guangzhou Environmental Protection Bureau, which refused to release information about the amount of toxins being spewed from its incinerator.

Chen, 31, was used to receiving evasive answers from China's environmental agencies.

If she got answers at all. Chen became frustrated by the secrecy.

"We want to know the truth," says Chen. "That is why we sued the Guangzhou Environmental Protection Bureau. We tried to push them to reply actively and do what they should do."

The law was on her side. A court ultimately ruled that the Guangzhou bureau had acted illegally. Even so, Chen encounters problems accessing the information.

Incinerators have boomed in popularity, an answer to China's overflowing landfills amid the ever-growing consumer appetite.

But emissions from incinerators can be notoriously toxic, and Chen wants to know how the burning is affecting her country's environment.

Chen speculates that incinerators are politically expedient.

"In cities like Beijing, Shanghai or Guangzhou, they don't have goals. They just want to have the waste disappear before your eyes. This is the problem," she says.

> EXPANDING WASTE-LINE

500
Illegal dump sites ringing Beijing documented in "Beijing Besieged by Waste"

520,000
Tonnes of waste produced in China each day in the mid-2000s

1,400,000
Tonnes of daily waste projected for 2025

30%
Waste incineration target for 2015

5%
Portion of Canada's waste that is incinerated

Source: World Bank