AFFIRMATIVE RESEARCH

HEALTH AND POLLUTION: AIR

But while China met its interim target of 35 micrograms, (air pollution) remains far above the 5-microgram limit recommended by the World Health Organization (WHO). Some parts of the industrial north still have smog levels close to 200 micrograms, especially in the winter.

Beijing needs to revise national air pollution standards and improve legal protections for human health, the task force commissioned by China's national pollution research programme said on Friday.

-American Geophysical Union (Union of scientists who study the physical world)
Despite Improvements, China's Air Quality Remains Unsafe, June 24, 2022

Fine particulate matter (PM2.5) and ozone exposure are major public health problems in China. Although useful, atmospheric models used to analyze these and other air quality concerns over the years are expensive to run, limiting how often researchers can use them.
Published in *GeoHealth*, new results from Conibear et al worked around this limitation by training machine learning algorithms to find associations between the inputs and outputs of atmospheric models. The researchers then used the algorithms to analyze emission levels and the origins of those emissions from 2010 to 2020.
They found that efforts to reduce PM2.5 emissions are working in China. Average PM2.5 levels across the country have dropped from their peak of 52.8 micrograms per cubic meter (mg/m3) in 2012 to 33.5 mg/m3 in 2020. The change brings PM2.5 levels from about 10 times above the World Health Organization's (WHO) guideline to about seven times the guideline. The authors discovered that the biggest drops in PM2.5 generation occurred in the industrial and residential sectors. Improvements in transportation, agriculture, and power generation also played small roles.
Although PM2.5 levels appear to have reached a peak in 2012 and then declined—a trend supported by on-the-ground observations—the situation with ozone is a bit more complicated. The researchers' models suggest that ozone levels have dropped since 2015, but on-the-ground measurements show a sharp increase. This discrepancy may be the result of imperfections in simulations, according to the authors.
Overall, the researchers estimate that the drop in PM2.5 prevented 187,800 premature deaths in 2020, or 9% of the deaths attributable to PM2.5 exposure. Reducing PM2.5 levels to 25 mg/m3, which the WHO recommends as an interim goal for countries trying to reach the recommended annual mean of 5 mg/m3, would require a further 80% drop in industrial and residential emissions below 2020 levels. The authors predict that such a drop would prevent another 440,800 premature deaths per years

-The Lancet (premiere medical journal)
The effect of air pollution on death, disease burden, and life expectancy across China and its provinces 1990-2017, August 17, 2020

The average annual population-weighted PM2·5 exposure in China was 52·7 µg/m3 (95% uncertainty interval [UI] 41·0–62·8) in 2017, which is 9% lower than in 1990 (57·8 µg/m3, 45·0–67·0). **We estimated that 1·24 million (95% UI 1·08–1·40) deaths in China were attributable to air pollution in 2017**, including 851 660 (712 002–990 271) from ambient PM2·5 pollution, 271 089 (209 882–346 561) from household air pollution from solid fuels, and 178 187 (67 650–286 229) from ambient ozone pollution. The age-standardised DALY rate attributable to air pollution was 1513·1 per 100 000 in China in 2017, and was higher in males (1839·8 per 100 000) than in females (1198·3 per 100 000). The age-standardised death rate attributable to air pollution decreased by 60·6% (55·7–63·7) for China overall between 1990 and 2017, driven by an 85·4% (83·2–87·3) decline in household air pollution and a 12·0% (1·4–22·1) decline in ambient PM2·5 pollution. 40·0% of DALYs for COPD were attributable to air pollution, as were 35·6% of DALYs for lower respiratory infections, 26·1% for diabetes, 25·8% for lung cancer, 19·5% for ischaemic heart disease, and 12·8% for stroke. **We estimated that if the air pollution level in China was below the minimum causing health loss, the average life expectancy would have been 1·25 years greater.** The DALY rate per 100 000 attributable to air pollution varied across provinces, ranging from 482·3 (371·1–604·1) in Hong Kong to 1725·6 (720·4–2653·1) in Xinjiang for ambient pollution, and from 18·7 (9·1–34·0) in Shanghai to 1804·5 (1339·5–2270·1) in Tibet for household pollution. Although the overall mortality attributable to air pollution decreased in China between 1990 and 2017, 12 provinces showed an increasing trend during the past 27 years.

The levels of pollution experienced in China, especially PM2.5 particulates, are many times higher than the allowed safe levels. On most days, air quality index ranks at above 150 in Chinese cities such as Beijing, with extremely smoggy days being as much as 10 times higher than WHO recommended safe levels.
The WHO has classified particulate matter as a carcinogenic. PM2.5, being a lot smaller than PM10, will penetrate past the bronchi into the alveoli (the air exchange region in the lungs) and over time, **can cause lung cancer_ up to 36% more increase for every 10 micrograms/m3.**
Other documented **complications of particulate matter and ozone exposure include cardiovascular complications, birth defects and premature deaths.**

-Health and Safety in Shanghai (a guide to foreigners living in China)/China smog guide

AIR QUALITY LIFE INDEX® (An academic research institute) | The 2008 Olympics to the 2022 Olympics China's Fight to Win its War Against Pollution, Feb 2022

While China has met its national air quality standard, **pollution levels as of 2020 were still six times greater than the World Health Organization (WHO) guideline. T**

Front. Public Health, 28 March 2022
Sec. Environmental health and Exposome
https://doi.org/10.3389/fpubh.2022.861157
This article is part of the Research Topic
The Built Environment and Public Health: New Insights
View all 43 Articles

The Impact of Environmental Pollution and Economic Growth on Public Health: Evidence From China

 Xiaochun Zhao1, Mei Jiang1 and  Wei Zhang2*

A comprehensive understanding of the impact of economic growth and environmental pollution on public health is crucial to the sustainable development of public health. In this paper, an individual fixed effect model is used to analyze the impact of environmental pollution and economic growth on public health, based on the panel data of 30 provinces in China from 2007 to 2018. The research finds that: First, the health status of China's four regions is not only affected by economic growth and environmental pollution, but also affected by the per capita disposable income and urbanization rate. Second, there is a long-term balanced relationship between China's economic growth, environmental pollution and public health. Third, environmental pollution harms children's health and significantly increases the perinatal mortality, while economic growth helps to reduce the perinatal mortality. Fourth, environmental pollution plays a regulatory role between economic growth and public health. Fifth, there are significant regional differences in the impact of environmental pollution and economic growth on public health. Among them, the degree of harm caused by sulfur dioxide emissions on mortality in northeastern China is significantly higher than that of the eastern China, eastern China is higher than that of the western China, and western China is higher than that of the central China. Finally, in order to reduce the adverse consequences of environmental pollution on public health in the process of economic development, this study puts forward relevant policy suggestions.

HEALTH AND POLLUTION: WATER

-Pollution exacerbates China's water scarcity and its regional inequality; Nature (Science Journal) , Ting Ma, et al, January 2020

North China often suffers from water scarcity from both insufficient water quantity and inadequate quality throughout the year, whereas South China is subject to seasonal water scarcity mainly due to water quality degradation

-The Safety of Drinking Water in China: Current Status and Future Prospects
China Center for Disease Control Weekly, December 12, 2020, Editorial

Surveillance data from the National Health Commission of China show that the reported **number of incident cases of national notifiable infectious diseases in 2018 was 7.8 million, including 18.9% water-borne diseases (*4*). Fluorosis due to drinking water and arsenic poisoning still threaten Chinese residents' health.** According to 2018 China's Health Statistics Yearbook, there were 77,292 villages with fluorosis due to drinking water nationwide, which represents 2.1% of all villages in China. Although the number of drinking water arsenic poisoning patients has declined since 2011, **China still had 2,667 villages with drinking water arsenic poisonings by the end of 2018, with an exposed population of 1.6 million (*4*).**

Villages with high-relative prevalence of cancer in the Huai River Basin are a major health issue, drawing huge public and media concern in recent years. Among the 14 counties in key areas of the basin, cancer deaths were found to be at low or normal historical levels in 1970s according to total cancer mortality and its changes over the last 30 years. However, presently, cancer mortality is high. For example, Yingdong District in Anhui Province, Shenqiu County in Henan Province, and cities in Hubei Province experienced significant increases in cancer mortality over the past 30 years with rates as high as 9.27, 7.14, and 2.71 times the national average, respectively (*8*). In 2013, a book named Atlas of the Huai River Basin Water Environment and Digestive Cancer Mortality (*9*) was published**. A review of variation in trends in the causes of death in the Huai River Basin over the past 30 years showed that the areas having the most polluted water for the longest time were precisely the areas with the highest increase in digestive-system cancer deaths. The increase of mortality was several times than that of the national average increase for the respective cancers. Spatial analysis shows a high level of correlation between the seriously polluted areas and areas with high mortality from cancer (*9*).**

-Genevieve Donnellon-May, September 07, 2022, **The Diplomat**

Forecasts project that by 2030, China's water demand will surpass 800 billion cubic meters. However, China's supply is severely undermined by worsening interlinked factors of water scarcity, urbanization, population growth, pollution, and competing water demands.

EFFECTS OF GLOBAL WARMING ON CHINA:

Council of Foreign Relations

China's Fight Against Climate Change and Environmental DegradationWRITTEN BY

Lindsay Maizland *May 19, 2021 2:20 pm (EST)*

Like the rest of the world, China will increasingly suffer over the next few decades from the effects of climate change, which include sea-level rise, stronger storms, and more intense heat waves. China's average temperature and sea levels have risen faster than the global average, according to a 2020 report from China's National Climate Center.

Some of China's coastal cities, such as Shanghai, could be submerged if the global average temperature continues to rise. An estimated forty-three million people in China live on land that could be underwater by the end of the century if the global average temperature rises by 2°C.

Additionally, experts predict that China will experience more frequent extreme weather events, such as heavy rainfall. Every year, natural disasters kill hundreds of Chinese people and destroy millions of acres of crops. As temperatures rise, China's glaciers will continue to melt at an alarming rate, which will likely lead to more devastating floods. Extreme heat events and droughts will also become more common.

What My Family and I Saw When We Were Trapped in China's Heat Wave
Sept. 9, 2022 **By Matthew Bossons New York Times**
SHANGHAI — Last month, I traveled with my wife and 5-year-old daughter from our home here to southwestern China for a family camping trip.
Our destination was a region of Sichuan Province where clear rivers tumble down from the Himalayas through steep valleys before watering fertile lowlands that help feed a country with the world's largest population. My daughter, Evelyn, learned to swim only just last year, and we looked forward to plunging into cool, scenic mountain swimming holes.
Instead, we ran a gantlet of climate change effects caused by China's historic heat wave this summer — ravaged landscapes, paralyzed cities and populations pushed to extremes.
It had been a year of global climate alarm even before China began heating up in July. Millions of people in the United States, Europe, South Asia and elsewhere have been enduring extreme temperatures. Even famously cool and damp England roasted this summer during a hot spell that scientists say was worsened by climate change.

But the heat wave that baked China for weeks was startling in its scale, duration and intensity. Through July and August, it shattered temperature records, dried up rivers, withered crops, sparked wildfires and caused deaths from heatstroke. It may have been the most severe heat wave ever recorded.

And it laid bare frightening realities about how humanity is expected to adapt.
With temperatures as high as 113 degrees Fahrenheit, electricity usage soared as hundreds of millions of Chinese switched on air-conditioners. But where was that power supposed to come from? Severe drought had dried up the rivers on which the country depends for much of its clean hydroelectricity, crippling output.

This forced China, which pumps more greenhouse gases into the atmosphere than any other nation, to double down on carbon-belching coal to make up the power shortfall. The heat wave had created a vicious cycle that, if replicated across the globe during future extreme weather events, will deeply complicate efforts to combat some of the worst effects of climate change.

In Sichuan, the majestic, raging mountain rivers that we had anticipated were no more: The hot, dry weather had reduced them to a trickle, and the deep swimming holes that we had picked out on the internet barely had enough water to reach my knees. Our hopes of gathering around a campfire each night were dashed by a ban imposed to limit wildfire risks in the bone-dry landscape.

Driving back out of the relative cool of the mountains, we were hit by the full force of the heat wave. Vast stretches of the country's central, southern and southwestern lowlands sweltered

Climate Change Could Worsen Supply Chain Turmoil

A drought that has crippled economic activity in southwestern China hints at the kind of disruption that climate change could wreak on global supply chains.

By Ana Swanson and Keith Bradsher, New York Times, Sept 8, 2022

Chinese factories were shuttered again in late August, a frequent occurrence in a country that has imposed intermittent lockdowns to fight the coronavirus. But this time, the culprit was not the pandemic. Instead, a record-setting drought crippled economic activity across southwestern China, freezing international supply chains for automobiles, electronics and other goods that have been routinely disrupted over the past three years.

Such interruptions could soon become more frequent for companies that source parts and products from around the world as climate change, and the extreme weather events that accompany it, continue to disrupt the global delivery system for goods in highly unpredictable ways, economists and trade experts warn.

Much remains unknown about how the world's rapid warming will affect agriculture, economic activity and trade in the coming decades. But one clear trend is that natural disasters like droughts, hurricanes and wildfires are becoming more frequent and unfolding in more locations. In addition to the toll of human injury and death, these disasters are likely to wreak sporadic havoc on global supply chains, exacerbating the shortages, delayed deliveries and higher prices that have frustrated businesses and consumers.

Climate change has come for the world's largest greenhouse gas emitter

China's catastrophic summer shows its climate adaptation plans still have a long way to go.

By Muizz Akhtar@muizz_akhtarMuizz.Akhtar@voxmedia.com Sep 29, 2022, 8:00am EDT Vox N

China just finished one of its most disastrous summers on record, with record-breaking heat, dro and wildfires leading to water shortages even into the fall. More than 900 million people — or abo percent of China's population — faced brutal heat waves alone, highlighting how much further nation has to go to protect itself against worsening climate-related disasters.

As weather historian Maximiliano Herrera told New Scientist magazine last month while the heat w were ongoing, "There is nothing in world climatic history which is even minimally comparable is happening in China." In at least 17 provinces, more than 240 cities saw temperatures exceedi degrees Fahrenheit. (Normally, a metropolis like Chongqing, at the center of this heat wave in southwestern China, only sees temperatures as high as 92°F.) China's largest river and freshwate

mostly dried up, reaching record-low water levels due to drought, all while wildfires raged. As i United States, while some places baked, others flooded.

All this is taking place as China, the world's largest current emitter of greenhouse gases, has pos itself as a leader on mitigating climate change. With President Xi Jinping committing to net zero emissions by 2060, China is already investing heavily into clean energy domestically and plans to financing coal-fired power plants abroad.

However, while China has increasingly focused on carbon mitigation efforts over the last deca country is just beginning to seriously tackle the equally difficult question of adapting to the ef climate change. China's complex geography and large landmass spanning various types of clim zones have always made it vulnerable to extreme weather events like droughts and floods. Du worsening factor of climate change, Beijing will need to step up its game to future-proof the co As the latest Intergovernmental Panel on Climate Change reports emphasize, both mitigation and adaptation work is key to reducing vulnerability to climate change — and China still has a long ahead of it.

"The climate story is a China story"

As Jeremy Wallace, a professor at Cornell University focusing on the effects of Chinese politics climate and cities, told me, "The climate story is a China story." China's rapid industrialization recent rise to becoming the second largest global economy was mostly fueled by coal. As a res China was responsible for 27 percent of global greenhouse emissions by 2019, the most in the wo greater than every country in the Organization for Economic Cooperation and Development (O and European Union combined. That carbon-heavy energy load helped drive prosperity and hi poverty reduction, but there was a steep environmental cost for China, too, including major air a pollution, desertification, ecological devastation, and the rise of extreme weather events.

Mounting concern and political pressure, mostly internal and to a lesser extent international, forc Beijing to act. Over the last two decades, the Chinese government passed domestic climate legislation, and made commitments to the international community, most notably when it sign 2015 Paris agreement.

Scott Moore, director of China programs and strategic initiatives at the University of Pennsylva me that the Chinese government acknowledged opportunity and risk, with the latter especially a big role in climate policymaking. "Of the world's large economies, China is probably the sing exposed to climate risk," he said.

The first factor is that many major cities, like Shanghai or Tianjin, are located in low-lying coas river valley areas that are vulnerable to flooding. Second, glacier melt from China's portion of Tibetan plateau is increasing floods downstream. And finally, China's highly urbanized landscape, a concentration of population and infrastructure that comes with that, makes China more vulnerable disasters like floods.

There's self-interest, too. The Chinese government also saw a huge opportunity in investing in global clean energy market, which today is worth trillions of dollars. "China is the world's largest inv developer, deployer, and manufacturer of clean energy across the board," said Michael Davidso professor of global policy and engineering at the University of California San Diego. China inve $380 billion in renewable energy in 2021 alone, accounting for almost half of new renewable en capacity worldwide. Because of entrepreneurship and large government subsidies, the country out an enormous domestic network of wind and solar plants, and become the global leader on vehicles.

are reflected in the very air that people living in China breathe, with the air quality in cities like markedly improving over the past decade. "It's hard to say that they're lagging" on tackling clim change, Davidson told me, and indeed, a recent report by Carbon Brief found China's carbon em have seen their longest decline in a decade.

On the adaptation side, despite the severity of the current floods, far fewer people are dying toda floods in China than they used to. Floods are a historic problem in China, but because the Chines government invested in flood control over the past two decades, the risk of death isn't as high used to be, Moore told me, when the worst floods could kill people in the millions. The flood ada measures included the construction of large dams and reservoirs, but also the improvement o warning systems and emergency management strategies such as evacuation.

The dam projects came with sizable environmental and human costs, ironically, including the des of wetlands that may have otherwise absorbed floodwater. Floods in recent years have also ca effectiveness of megaprojects like the Three Gorges Dam, the largest hydroelectric project eve created, into question. The central government recently acknowledged the unintended side effe its climate adaptation strategy, finally passing a wetlands protection law last year to not only con but restore wetlands. China is also increasingly embracing nature-based solutions like "sponge retrofitting and designing cities to better absorb floodwaters, which could help reduce the sev future floods.

Beyond its carbon mitigation efforts, the Chinese government also released an updated climate adaptation plan in June to better prepare the country by 2035. Its aims include improving early systems for extreme weather, shoring up food security, and boosting conservation efforts both and along the coast. Notably, the plan is a follow-up to a 2013 adaptation plan that heralded Ch "war on pollution" and led to China decreasing as much air pollution in seven years as the US did three decades. This new plan will hopefully be similarly ambitious, because it aims to have a nationwide climate impact and risk assessment system by 2035. This would ensure major infrastru projects consider potential environmental consequences, like the aforementioned dams used control flooding and generate hydropower.

Still, for whatever progress China has made toward mitigating climate change, its adaptation strategies may not be enough to meet the current moment. The consequences of climate chan coming faster than most governments, policymakers, and even scientists anticipated. "The reali facing now is that the carbon emissions that are already in the atmosphere are baked in for a p time," said Jonas Nahm, professor of energy, resources, and environment at Johns Hopkins Sc Advanced International Studies. "Things are going to get worse before they get better, even if everything to meet the Paris agreement models."

The realities of the baked-in effects of climate change were in full view in Sichuan, the southw province at the center of this summer's heat wave and drought. Hydropower systems there fac serious electricity shortfall due to reservoirs and rivers drying up. "For all of this sort of anticipat planning, China's also scrambling to try to figure out how to respond to this in the same way t Europeans are with all these rivers running dry," Nahm told me.

While hydropower makes up 16 percent of China's total power production (almost equal to its c renewable energy sources combined), it's more than 80 percent of Sichuan's power production, a fact, it usually has so much excess hydropower that it delivers a third of what it produces to the r the country. However, drought affected Sichuan's hydropower generation, and because it coul curb its power sharing with other provinces, rolling blackouts had to be implemented to preve

grid from being overwhelmed by demand. Even as the drought eases, there are worries that Sichu other parts of China will face power shortages in the winter.

"You've seen over the last several years that some of the existing infrastructure just isn't prep said Nahm. A key example of this is the South-North Water Transfer Project, the largest water div project in history, and perhaps even the most expensive infrastructure ever built, period. Built the past two decades, the project aimed to bring water from water-abundant southern China to water-scarce northern China, which, despite containing around half the country's population, about 20 percent of the country's total water supply.

But at best, the South-North Water Transfer Project has served as a Band-Aid to buy the governme time, and has done little to solve the issue of water scarcity. More damning, it has actually wors the issue of water pollution. As Jennifer Turner, director of the Wilson Center's China Environm Forum, told me, water pollution doesn't make the headlines like air pollution, but is probably C biggest environmental problem. And the water pollution problem is so bad that it actually exac China's water scarcity problem. The resources that went into this megaproject could have gone flashy solutions like better collection of rainwater and water recycling. Ultimately, Turner said, the Chinese government has to address both the short and long term if it wants to fix its water prob

China's infrastructure issues go beyond just its water projects, however. Wallace, the Cornell professor, said China may also need to fundamentally rethink how it builds urban areas. As in Chinese cities have a tendency toward sprawl that is more polluting and carbon-intensive. "Once build the city," Wallace said, "it's really hard to go back, right?" There is some research to sugg sprawling cities have to deal with more extreme heat events than do more compactly designed

In the meantime, UC San Diego's Davidson told me, there are still things China could do to pro provinces like Sichuan from extreme weather in the future. For one, the central government co ensure that it has a more unified power system that can better respond to energy shocks, such a spike in demand for air conditioning when it's boiling hot.

Another is better urban design: More efficient air conditioning, better insulation, planning, and centers can help Chinese cities better cope when there's a heat wave. China could also improv monitoring systems for extreme weather, support the agriculture sector, reevaluate current infrastructure projects, and bolster reforestation and flood control efforts to not only control f but also prepare for future drought scenarios.

With the advent of its new 2035 climate adaptation plan, which will implement a road map to bol China's risk assessment and its "climate-sensitive sectors," it appears the Chinese governme looking to implement many of these policies. But this will require upending what Nahm descri me as the economic and engineering approach that China has largely taken to its infrastructur this point, green or otherwise. Rather than building dams or water diversion systems, China w to double down on nature-based solutions.

At an environmental conference in Beijing, Ge Le, director of the climate change and energy pro the Nature Conservancy in China, pointed to recent reforestation efforts in China and trying to in more greenery into cities, like the aforementioned sponge cities, as positive examples for Chi expand on. She also brought up the oyster reef restoration projects in Alabama, which aim to stri balance between ecological restoration, climate adaptation (as reefs function as seawalls), and commercial benefit for the communities that harvest oysters.

To some observers, China's catastrophic summer may appear to be an indictment of Beijing n having done enough to meet the current climatic moment. But the truth is that China has done mitigate the effects of climate change, as well as adapt to its effects. And while the Chinese

government could certainly do more, the unveiling of the 2035 adaptation plan makes it clear t there is a lot more to come. The problem facing Beijing, then, is the same faced by Washingto Brussels, and elsewhere: Climate change is already here, and things are going to get worse b they get better. China, like the rest of the world, is going to have to buckle in and work harder ever.

Chna its Yangtze River dolphin. Climate change is coming for other species next **By Heather Chen, CNN Updated 12:01 AM EDT, Sun September 18, 2022**

They called it the “Goddess of the Yangtze” – a creature so rare that it was believed to bring fortune and protection to local fishermen and all those lucky enough to spot it.

But overfishing and human activity drove it to the brink of extinction and it hasn’t been seen in decades.

“The baiji, or Yangtze River dolphin, was this unique and beautiful creature – there was nothing quite like it,” said Samuel Turvey, a British zoologist and conservationist who spent more than two decades in China trying to track the animal down.

“It was around for tens of millions of years and was in its own mammal family. There are other river dolphins in the world but this one was very different, so unrelated to anything else,” Turvey said. “Its demise was more than just another species tragedy – it was a huge loss of river diversity in terms of how unique it was and left huge holes in the ecosystem.”

Experts have expressed grave concern that other rare native Yangtze animal and plant species are likely to suffer a similar fate to the baiji river dolphin as

worsening climate change and extreme weather conditions take their toll on Asia's longest river.

China has been grappling with its worst heat wave on record and the Yangtze, the third longest river in the world, is drying up.

With rainfall below average since July, its water levels have plunged to record lows of 50% of their normal levels for this time of year, exposing cracked river beds and even revealing submerged islands.

The drought has already had a devastating effect on China's most important river, which stretches an estimated 6,300 kilometers (3,900 miles) from the Tibetan plateau to the East China Sea near Shanghai and provides water, food, transport and hydroelectric power to more than 400 million people.

The human impact has been enormous. Factories were shut to preserve electricity and water supplies for tens of thousands of people have been affected.

Less talked about, experts say, is the environmental impact that climate change and associated extreme weather events have had on the hundreds of protected and threatened wildlife and plant species living in and around the river.

"The Yangtze is one of the world's most ecologically critical rivers for biodiversity and freshwater ecosystems – and we are still discovering new species yearly," said conservation ecologist Hua Fangyuan, an assistant professor from Peking University.

Over the years conservationists and scientists have identified and documented hundreds of wild animal and plant species native to the Yangtze.

Among them are the Yangtze finless porpoise which, similar to the baiji, faces extinction due to human activity and habitat loss, and critically endangered reptiles like the Chinese alligator and Yangtze giant softshell turtle – believed to be the largest living species of freshwater turtle in the world.

Experts have also noticed a drastic decline of many native freshwater species of fish, like the now extinct Chinese paddlefish and sturgeon.

At high risk is the Chinese giant salamander, one of the largest amphibians in the world. Wild populations have crashed, Turvey the zoologist said, and the species is “now on the verge of extinction.”

“Although they are a protected species, Chinese giant salamanders are under greater threat from climate change – increasing global temperatures and droughts will definitely do it no good when it is already extremely vulnerable,” Turvey said.

“They have for a long time faced threats like poaching, habitat loss and pollution but when you add climate change into the mix, their chances of survival become drastically thin,” he added.“They can only live within freshwater environments and lower water levels would inevitably place greater pressure on their numbers across China.”

Nature conservation groups like the World Wildlife Fund (WWF) say the Yangtze’s plight is a major concern not only for the Chinese people and government, but also for the wider international community.

“Rivers around the world, from Europe to the United States, have declined to historically low flow levels that are negatively impacting ecosystems,” said its lead scientist Jeff Opperman.

“Reduced river flow and warmer waters in the Yangtze are a threat to freshwater species and increase pressure on already critically endangered animals like the remaining Yangtze finless porpoises and Chinese alligators left in the wild. Lower river levels also impact the health of (nearby) lakes and wetlands, which are vital to millions of migratory birds along the East Asian Flyway.”

Hua, the conservation ecologist, said more public awareness and greater efforts were needed to help China’s shrinking great river. “Humans depend on nature for survival, period. This is a lesson for any civilization,” she said.

“The Yangtze is the longest river in China and (all of) Asia and has long been a cradle of civilization. Despite severe conservation threats and losses over the years, there is still much biodiversity to conserve in and along the Yangtze.”

Few would deny the importance and symbolism of the Yangtze. But experts say unless action is taken – and soon – more species will follow the fate of the baiji and Chinese paddlefish.

Turvey, the British zoologist, warned against the sort of complacency that allowed the baiji to disappear.

“The Yangtze was a jewel in Asia’s crown. There is still so much biodiversity to fight for and we must not give up hope for saving species like giant salamanders, river reptiles and others,” Turvey said.“If there’s anything we can learn from the death of the Yangtze

River dolphin, it's that extinction is forever and we can't afford to take it lightly."

Cows, crops and climate change: China's meat producing industry needs to change, Kaylee Chang, Yale Environment Review, May 28, 2019

Consuming meat in China is a symbol of a better life. Up until the early 1990s, people in China were only allowed to eat meat during the Lunar New Year–the most important holiday of the year. In 1982, the average Chinese person consumed 13 kilograms of meat per year. At this point, the central government controlled the country's supply of meat. A decade later, government restrictions on meat production were lifted, increasing meat consumption by almost five times. In 2016, it reached 63 kilograms per year and this number is expected to rise.

A new study published in *Science* by Zhaohai Bai and his colleagues examined China's growing meat industry between 1980 and 2010, including its driving forces, impacts, and consequences. Dr. Bai and his team fleshed out two contrasting scenarios for 2050. In the first scenario, a business-as-usual model, China continues its growth and manages its livestock in the way it currently does. In the second scenario, the researchers consider a new transition that emphasizes improved livestock feed production and quality, better manure management, and strategic livestock zoning.

The first scenario shows that if domestic feed production does not improve, by 2050, China will need to import 97 to 100 percent of current global corn and soybean production to feed its livestock. **Producing crops domestically using current agricultural practices will almost double greenhouse gas emissions, from 520 tera-grams (10^{12}) of CO^2 equivalence in 2010 to 805 tera-grams of CO^2 forty years later. Manure recycling will continue to decrease, and the use of synthetic fertilizer will increase. Between 1980 and 2010, manure and fertilizer runoff caused widespread water pollution of major lakes, rivers and coastal waters throughout China and will continue to do so in this scenario.**

In the second scenario, the environmentally preferred pathway, the location of livestock farms would be planned intentionally. Coupling of crop and livestock production will have increased crop yields. Cultivating feed near animal farms will allow for better nutrient management, where manure can be recycled back into croplands. An additional benefit would be that a large amount of fertilizer could be saved. Positioning livestock farms farther from water bodies would also mitigate water pollution. This environmentally beneficial scenario would put China on the path toward a more sustainable future.