WENHUA ZONGHENG

A Journal of Contemporary Chinese Thought

December 2024 | Vol. 2, No. 2

China's Ecological Transition

A collaboration between:

文化纵横

Dongsheng

tricontinental

Cover art created by Tricontinental: Institute for Social Research.

Ecological Transformation, Agriculture, and the Survival of Humanity

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The three articles in this issue of the international edition of *Wenhua Zongheng* (文化纵横) offer complementary views on issues that are fundamental to the survival of humanity: food production, agroecology, environmental restoration, and renewable energies. Committed to the causes of their people and of all humanity, the Chinese authors present readers with concrete experiences from the reality of their country.

Unfortunately, in the West, Chinese intellectual perspectives and debates on contemporary global realities are utterly ignored, even within leftist circles. By sharing the perspectives of our Chinese comrades, translated into different languages, I believe that this journal provides an invaluable service.

The global left is indebted to those who are seriously engaging in these crucial debates. Too few intellectuals are concerned with delving into such reflections. Generally, leftist parties remain trapped in slogans, clichés, and dogmas,

as Mao Zedong had warned. Meanwhile, the debate within universities – and most of society – is limited to diagnoses of problems, while avoiding a number of pressing issues and failing to analyse the capitalist movement towards exploiting natural resources for extraordinary profits. Such reckless processes lead to environmental crimes and climate change.

As early as the nineteenth century, Karl Marx observed how industrial capitalism could affect the environment. Rosa Luxemburg deepened this analysis, examining capital's interest in privately appropriating natural resources as part of its primitive accumulation. Later, Vladimir Lenin and Nikolai Bukharin argued that the imperialist phase of capitalism would inevitably lead to assaults on natural resources, driven by the need for raw materials to fuel factories and expand capitalist markets.

During the revolutionary processes in Russia, Eastern Europe, and China – and later, the people's revolutions in Cuba and Vietnam – environmental concerns were secondary, as these countries first needed to address the basic needs of the people through productive investments that generated economic progress and improved the wellbeing for their entire populations. As a result, by the 1970s, the global environmental agenda lacked a clear programme. Amid the Cold War, the United States – through its government and capitalists – pushed the so-called Green Revolution worldwide. This name stemmed from the ideological need to counter the 'red' people's revolutions that had occurred. Additionally, the US argued that adopting agrochemicals would lead to a revolution in agricultural productivity, ensuring food for all.

At the time, the United States was already hegemonic across much of the world with its cultural and media apparatus, and was easily able to persuade governments and countries to adopt its 'revolution' without critical examination. In 1970, the primary proponent of the Green Revolution and the adoption of agrochemicals, US wheat researcher Norman Borlaug, was awarded the Nobel Peace Prize.

Today, the Green Revolution can be critically analysed as a production model focused on large capital, seeking to expand its reach over vast agricultural regions. Under this model, these areas were turned into consumer markets for industrial inputs from US transnational companies, pushing them to buy hybrid seeds, agrochemicals, fertilisers, pesticides, and farming machinery. It was

based on monoculture and large-scale production, implemented indiscriminately without consideration of the environmental consequences. In some ways, this model also influenced countries building socialism.

Today, we are immersed in the most severe environmental crisis in human history. Climate change and its consequences – such as floods, hurricanes, droughts, and polar ice melt – endanger thousands of plant and animal species, destabilising nature across the planet. This situation affects the entire world, regardless of the actions of individual countries, as we all share a common home. There are perhaps no words more relevant to our dilemma than the warning Fidel Castro issued in a historic speech delivered at the Earth Summit in Rio de Janeiro in June 1992: 'An important biological species is in danger of disappearing due to the rapid, progressive destruction of its natural living conditions: the human being. We are now aware of this issue, though it is almost too late to prevent it'.

The articles in this issue of *Wenhua Zongheng* help readers understand how China has dealt with these problems over the past three decades. Ding Ling and Xu Zhun examine the contradictory impacts of the Green Revolution in China and argue that the country needs to undergo an ecological transformation to attain the vision of an 'ecological civilisation' promoted by the country's leaders. Meanwhile, Xiong Jie and Tings Chak examine the environmental restoration process, studying the case of Erhai Lake, one of many areas damaged during recent decades of rapid economic development and certain agricultural production models. Finally, Feng Kaidong and Chen Junting analyse the historical development of China's electric vehicle industry, an important component in the country's transition to a new energy economy that can also promote industrialisation processes in the Global South. Together, the scholars provide detailed testimonies about various aspects of the environmental question in China, across different regions of the country, and identify implications for the rest of the world, particularly for countries in the Global South.

It is urgent that people's organisations, peasant movements, leftist parties, and progressive governments worldwide embrace ecological transformation as central to development projects in our countries. We bear the responsibility of producing food in harmony with nature, protecting it for future generations, and mitigating the consequences of climate change. We have an obligation

to produce healthy food, without pesticides, for the entire population. To this end, it is necessary to adopt agroecology as a production model that opposes the capitalist model and its transnational corporations.

We must combat deforestation and related fires, pursuing massive, people-oriented reforestation programmes in both rural and urban areas, and planting native and fruit-bearing trees in every possible space. Concrete policies to protect springs, rivers, and freshwater lakes are also essential.

It is imperative to adopt public policies that defend the interests of the entire population and peasants. Developing agro-industrial systems in cooperatives on local scales will be necessary, ensuring the production of healthy food without chemical additives or ultra-processed ingredients that cause enormous health issues for the population.

Finally, I advocate for the creation of a list of proposals and concrete programmes that promote critical thinking and accumulate reflections, helping activists and their organisations to care about and adopt truly revolutionary programmes in this direction. The adoption of a production model based on agroecology and polyculture, rather than monoculture and its pesticides, is an urgent necessity to save the planet and is also a clearly anti-capitalist policy.

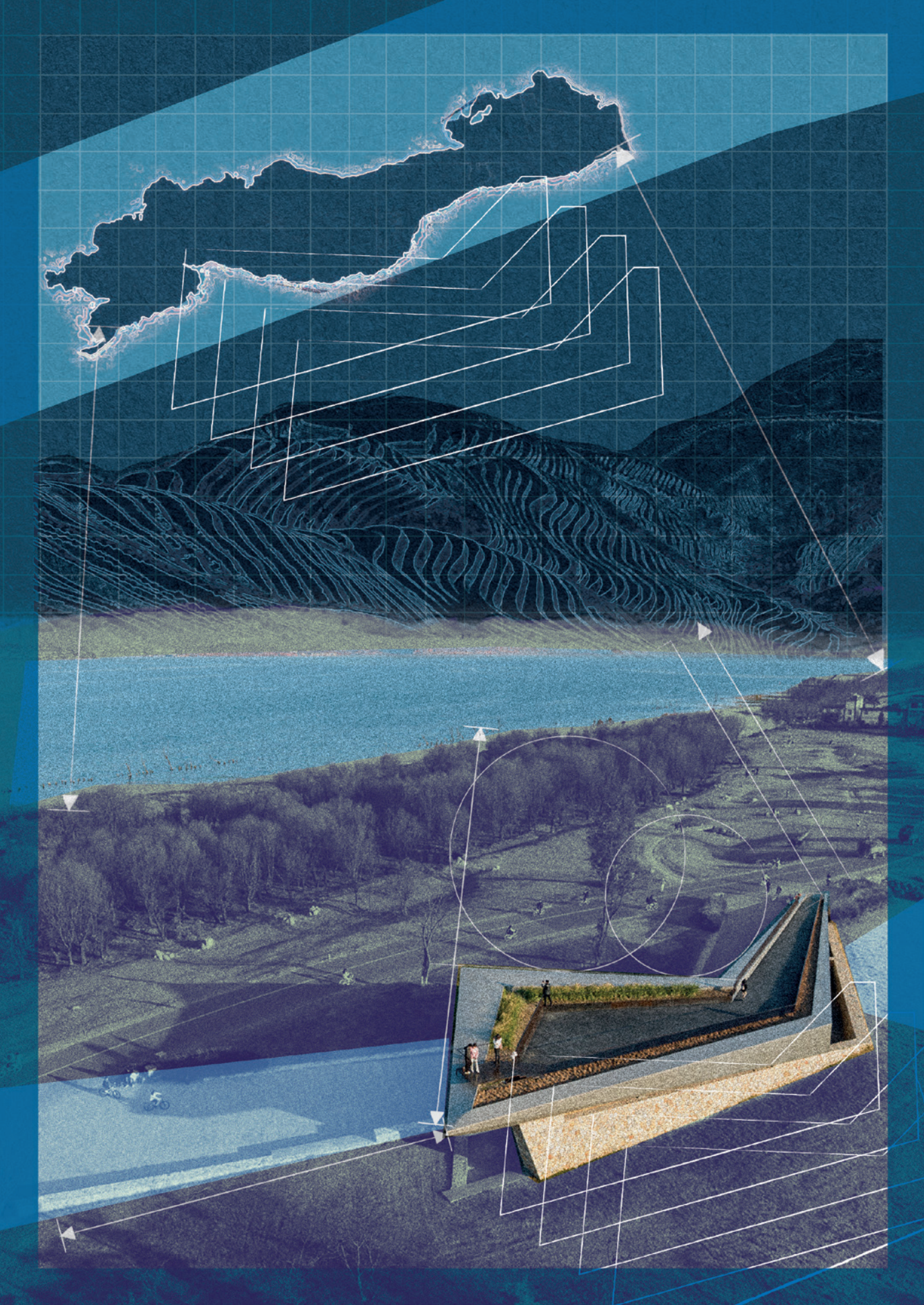
The capitalists do not want to abandon their Green Revolution programme. They will continue expanding their immense farms, practising monoculture, using genetically modified seeds, agrochemicals, and pesticides, with increasingly large machines that drive labour out of the countryside. When they speak of defending nature, they only propose forest carbon credits, converting oxygen into capital bonds that do not change the agrarian reality of our countries.

It is absurd to use existing forests as instruments of speculative capital, allowing capitalists to compete among themselves for the extraordinary income generated. This capitalist model does not produce food but only agricultural commodities – goods subject to speculation in the futures market and stock exchanges. This is not agriculture; it is merely the domination of capital over nature's assets.

Agriculture is the science and art of cultivating the land to produce, in harmony with nature, what humans need, especially the food that fuels life. Capital-

ists are destroying agriculture, and by doing so, they are jeopardising the future and the ability to produce food for the entire population. This generates profit but at the cost of exploiting workers and committing environmental crimes against nature.

I am certain that the reflections of our Chinese comrades will help deepen the debate in all people's and leftist organisations about this important challenge of our time.



Reviving Erhai Lake: A Socialist Approach to Balancing Human and Ecological Development

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On a clear morning in June 2023, we arrived in the city of Dali, located in China's southwestern province of Yunnan.[1] We travelled to the region as part of a research team to learn about the restoration of Erhai Lake, the lifeblood of the region, which had been severely polluted in recent decades. He Licheng, a local resident and farmer from nearby Gusheng Village, received us. Like other elders of the region, He Licheng recalled how, during his childhood in the 1970s and 1980s, the lake's waters were crystal-clear and its surface populated with *Ottelia acuminata*, small three-petal flowers known locally as *haicaihua*. This edible aquatic plant species is unique to southern China, renowned for its beauty, and also used by the Bai people, a local minority ethnic group, to make traditional dishes and in Chinese medicine to treat various ailments.[2] Because the plant is ex-

[1] This article refers to both Dali City and Dali Bai Autonomous Prefecture. These terms are not synonymous. Dali City is a county-level city within Dali Bai Autonomous Prefecture.

[2] The Bai people are one of 56 ethnic groups officially recognised by China, with a population of roughly 1.9 million people mainly concentrated in Yunnan province.

tremely sensitive to pollution, its presence or absence is considered a biological indicator of water quality in the region. Due to a combination of factors in the reform and opening up period – including economic development, population growth, changes in agricultural production, and increased tourism and migration – water quality within the Erhai basin steadily deteriorated, and the *haicaihua* disappeared for many years.

Looking back at the situation a decade ago, in 2013, Erhai Lake was experiencing large-scale outbreaks of blue-green algae, with the surface appearing as if it had been covered with a layer of green paint. The lake emitted a foul odour and, in some areas, the water quality was deemed unsuitable for human contact.[3] In addition to these ecological problems, after three decades of China's rapid economic growth, all 11 counties of the Dali Bai Autonomous Prefecture were still mired in poverty. Dali Prefecture, the capital of the ancient Nanzhou and Dali kingdoms, is one of the country's most ethnically diverse areas, with 52.7% of its people belonging to ethnic minority groups, predominantly the Bai people. However, this was one of the last regions in China to see the benefits of economic growth.

By the time we visited in 2022, Dali Prefecture had been fundamentally transformed. As part of the central government's targeted poverty alleviation campaign, launched in 2013 and completed in 2020, all 11 poverty-stricken counties in the prefecture, comprising 34 townships and 541 villages, were lifted out of extreme poverty.[4] In total, 413,100 people from Dali Prefecture exited extreme poverty in this campaign, part of the 98.99 million people to do so across the country. All reached the 'one income, two assurances, and three guarantees' standard of living, meaning that (i) their income exceeds a minimum level; (ii) they are assured food and clothing; and (iii) they are guaranteed basic medical services, safe housing with drinking water and electricity, and free education. Alongside the poverty alleviation campaign, intensive environ-

[3] China measures water quality using a six-tier classification system: Grades I, II, and III are considered 'good quality' and suitable for human consumption; Grades IV and V are considered 'poor quality', suitable for certain industrial, agricultural, and recreational uses but unsuitable for human consumption or contact; Grade V+ or 'below Grade V' is the lowest tier and considered unsuitable for any use.

[4] For more about the targeted poverty alleviation campaign, see Tricontinental: Institute for Social Research, *Serve the People: The Eradication of Extreme Poverty in China*, Studies in Socialist Construction no. 1, July 2021, https://thetricontinental.org/studies-1-socialist-construction/.

mental protection efforts led to a marked improvement in Erhai Lake's water quality, and the *haicaihua* flower began to bloom once again.

Based on our visits to Dali Prefecture, conversations with the local residents, leaders, and scientists, and a review of the existing literature, this article examines the dramatic changes that have taken place in Erhai Lake and Dali Prefecture in recent years. Looking first at the history of the lake and the factors behind its pollution and environmental degradation, the article then explores the initial environmental protection measures taken and the rise in science-based governance. This is followed by an examination of the impact of tourism-led economic growth in recent years, the environmental challenges that this has posed, and efforts to balance development with environmental restoration. The Erhai Lake experience is a concrete example of China's science-based governance, illustrating the practices, challenges, and innovations that have characterised its pursuit of an 'ecological civilisation'.

How the 'Pearl of the Plateau' Became a Polluted Pond

Erhai Lake derives its name from its ear-like shape, although it has many other monikers. For the Bai people, Erhai is known as the 'Mother Lake', while their ancestors referred to it as the 'Golden Moon'. Due to the lake's scenic beauty, it is also called the 'Pearl of the Plateau'. Erhai is the seventh-largest freshwater lake in China, with a total area of over 250 square kilometres.

Erhai plays vital roles in supplying water, agricultural irrigation, power generation, and climate regulation for the surrounding areas. Local people also engage in fishing, shipping, and tourism activities in the lake. In 1981, the Yunnan provincial government established the Cangshan Mountain and Erhai Lake Nature Reserve, which was upgraded to a national nature reserve in 1994. Covering an area of 79,700 hectares, the reserve's main conservation targets are the plateau freshwater lake and its aquatic flora and fauna, the natural landscape of China's north-south transition zone, and glacial relics.

Since China's economic reforms began in the late 1970s and 1980s, the rapid development of China's chemical industry led to a significant increase in the use of fertilisers and pesticides in agriculture in Dali Prefecture. While this boosted ag-

ricultural production, it also severely polluted the water quality in the basin. Research by Dr. Chen Xiaohua and others from the Shanghai Academy of Environmental Sciences found that from 1988 to 2013, as socioeconomic development in the Erhai basin improved, water quality in the region deteriorated proportionally.[5] A 2013 monitoring report by the Yunnan provincial government found that for each of the seven main rivers flowing into Erhai Lake, water quality was rated as being unsuitable for human consumption or contact and, for the Luoshijiang, Yong'anjiang, and Baihexi rivers, unsuitable for any use.[6] The primary pollutants in these rivers were nitrogen and phosphorus from residual agricultural fertilisers, which flowed into the lake year-round, causing continuous eutrophication.[7]

The economic reforms initiated in 1978 gave farmers greater autonomy in agricultural production, allowing them to grow more profitable crops based on market demand, which greatly stimulated their enthusiasm for production. The gradual liberalisation of the production and sale of vegetables grown in China's southern regions to the northern regions, beginning in 1984, spurred shifts in cultivation in Dali Prefecture. Since the 1990s, farmers in Dali Prefecture's Eryuan County (meaning 'source of Erhai') began to extensively cultivate solo garlic, also known as single bulb garlic, a local specialty crop which originates in Yunnan province and is characterised by its purplish-red skin, sweet flavour, and strong aroma. By 2010, the production area of solo garlic in Dali reached 13,300 hectares, with an annual output of about 144,000 tons. The annual per *mu* (a Chinese unit of land measurement corresponding to 1/15 of a hectare) output value could reach 15,000 yuan, with a net income of 7,000-8,000 yuan, far higher than the income from growing ordinary grains. However, garlic cultivation requires large amounts of water and fertiliser, up to 175 kilograms of fertiliser per mu, half of which is absorbed by the garlic and the other half remaining in the soil. During the rainy season, the fertiliser and pesticide runoff led to serious excesses of nitrogen and phosphorus in Erhai Lake, resulting in eutrophication and blue-green algae blooms.

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[5] Chen Xiaohua, Qian Xiaoyong, Li Xiaoping, Wei Zhihong, and Hu Shuangqing, 'Long-Term Trend of Eutrophication State of Lake Erhai in 1988-2013 and Analyses of Its Socio-Economic Drivers', *Journal of Lake Sciences* 30, no. 1 (2018): 70–78.

[6] '九大高原湖泊水质监测状况月报 (2013年6月)' [Monthly Report on Water Quality Monitoring Status of the Nine Highland Lakes (June 2013)], Department of Ecology and Environment of Yunnan Province of the People's Republic of China, 29 August 2013.

[7] Eutrophication refers to a process that can occur in bodies of water, in which excessive nutrients lead to excessive plant and algal growth, the depletion of oxygen, and the creation of low-oxygen 'dead zones' causing harm to many aquatic organisms.

Another significant source of pollution was cattle raising, which has a long tradition in the Erhai basin due to the area's favourable climate and geography. The proximity of grazing areas to the lake caused cow excrement to wash into the lake and exacerbate eutrophication. In 2007, it was estimated that 140,000 dairy cows were raised in the Erhai basin, with the environmental load of each cow equivalent to that of 23 people. In other words, the dairy farming industry at that time contributed an environmental load equivalent to that of over three million people, effectively duplicating the environmental footprint of the human population of the entire Dali Prefecture.

Finally, the growth of tourism in the region, while increasing the income of local residents, also negatively impacted Erhai Lake's water quality. In recent decades, Dali Prefecture prioritised the development of tourism as a local pillar industry, with the government introducing policies that allowed foreign capital to lease local houses to build homestays. In 2009, the first batch of developers building homestays for tourists arrived in Dali Prefecture, turning the town of Shuanglang, home to the best scenic views along the Erhai shoreline, into the new trendy place to visit. Shuanglang was quickly transformed from a small fishing village into a nationally renowned 'homestay town'. From 2011 to 2017, the number of homestays in Shuanglang increased tenfold, reaching over 600. Although these homestays provided tens of thousands and, in some cases, hundreds of thousands of yuan in annual income to local residents, they also placed a major strain on the domestic water supply. By 2016, the total pollution load discharged in the Erhai basin had increased by more than 50% compared to 2004, with the growth of tourism-related pollution being the most significant factor in this jump. Furthermore, due to a lack of government investment at the time, the lake's sediment had not been dredged for many years, the water had not been cycled and replaced for a long time, and the pollution load was severe, endangering Erhai's aquatic ecosystem. To address these many factors behind Erhai's pollution, the different levels of government took on various strategies over the past two decades based on science and local realities.

Science-Based Governance and Development

Governmental efforts to protect Erhai began at the end of the twentieth century as environmental problems became apparent, including severe algal blooms in 1996 and 2003. Some areas of focus for these initial measures included the fishing indus-

try, chemical pollution, and land usage. At the end of 1996, to curtail the harmful impact of large-scale fish farming, Dali Prefecture implemented the 'double cancel' policy, prohibiting the use of all motorised fishing boats and nets within the Erhai area as well as limiting the harvesting of aquatic plants; within a year, 11,187 fishing nets and 2,579 motorised boats were prohibited from use in the lake. Local fishing and shipbuilding industries, which had existed for hundreds of years, were severely hit, and the rural economy fell into a slump. In November 1997, Dali Prefecture prohibited the production, sale, and use of phosphorus-containing detergents in the Erhai basin. Subsequently, in 1999, Dali Prefecture initiated the 'three withdrawals and three returns' policy: withdrawing farmland to return the soil to the forest, withdrawing fish ponds to return the water to the lake, and withdrawing houses to return the ground to the wetlands. Despite some successes, however, these initial measures could not keep pace with the scale of pollution growth in the Erhai basin.

In 2006, Erhai's environmental governance was elevated to China's national agenda as part of the State Council's national 'special project' for water pollution control. Beginning from the eleventh Five-Year Plan (2006–2010) and implemented across 15 years, the special project focused on developing the key technologies necessary for water pollution control. The special project consisted of six main themes, including 'research and demonstration of technology and governance measures to control lake eutrophication', which focused on identifying representative lake water bodies and key catchment areas across the country to conduct pilot projects in pollution control, providing technological and governance case studies in the large-scale management of eutrophication in a variety of contexts. As implementation of the special project progressed, water pollution control evolved from the efforts of individual teams and units to coordinated national-level efforts. The central government provided important support in terms of policies, mechanisms, funding, and personnel, assisting local lake governance to advance towards sustainable short- and long-term solutions.[8]

Erhai Lake served as a key pilot project, managed by a team consisting of 17 units and led by environmental scientist Kong Hainan of Shanghai Jiao Tong University. The special project team prioritised the most significant source of pollution – solo garlic cultivation. Experts from the Chinese Academy of Agricultural Scienc-

[8] Zhu Dajian, *海菜花开* [*Ottelia Acuminata* Blossoms] (Shanghai Jiaotong University Publishing House, 2023), 75–76, https://book.douban.com/subject/36432761/.

es recommended banning garlic cultivation within 200 metres of the Erhai Lake shoreline, restricting such activities to areas between 200 and 2000 metres from the shoreline, and planting other crops that use less water and fertiliser throughout the Erhai basin. Dali Prefecture called on farmers to stop growing garlic, and party members, civil servants, teachers, doctors, and other public officials led by example by asking their relatives to do the same. Under the government's persuasion and leadership, the people near Erhai quickly stopped planting garlic and switched to growing fruits such as pomegranates, cherries, and blueberries, or engaged in tourism.

To address the pollution caused by dairy farming, experts from Kunming University of Science and Technology, after years of investigation and field research, proposed two main recommendations: first, to properly confine dairy cows and prevent them from grazing too close to the lake and, second, to establish centralised fertiliser factories for processing cow dung. Working with the Chinese Academy of Agricultural Sciences, the experts designed a factory to collect cow dung for the production of organic compound fertilisers. Local entrepreneur Zhong Shunhe built four such factories and set up 25 cow dung collection stations every two kilometres in villages surrounding the Erhai basin. The four factories collected over 1,300 tonnes of cow dung daily and over 400,000 tonnes of cow dung, pig manure, and poultry droppings annually. Dali Prefecture provides an annual subsidy of over 10 million yuan to the fertiliser factories for purchasing cow dung from farmers and pays the factories 40 yuan for each ton of livestock manure collected and transported. The factories use the collected animal manure to produce various specialised organic fertilisers, including for tobacco, pu'er tea, flowers, grapes, walnuts, vegetables, and landscaping. These organic fertilisers are effective and environmentally friendly; they are used not only to control phosphorus and nitrogen levels in the more than two million mu of farmland in Dali Prefecture but are also sold nationwide and across Southeast Asia. Guided by scientific expertise, this initiative has helped control pollution while also generating benefits for enterprises and farmers.

The special project team also studied the rivers flowing into Erhai Lake upstream to develop a comprehensive basin-wide ecological governance plan. Before the special project, the most important water source for the lake, the Luoshijiang River, discharged 40 million tonnes of wastewater into Erhai annually. Taking into account

the specific conditions of different sections of the Luoshijiang River basin and the overall situation of economic underdevelopment that prevails in Dali Prefecture, the team designed a low-cost plan to clean the waters of the Luoshijiang. In the pristine upstream areas, the plan focused on 'ecological conservation' measures; in the middle reaches dominated by farmland and villages, the plan focused on 'ecological restoration and economic restructuring', guiding surrounding farmers to grow low-pollution, high-yield cash crops and to construct filtration ditches along the riverbanks to preliminarily purify farmland tailwater and village sewage; in the densely populated downstream areas, the plan focused on 'pollution control and ecological engineering governance', building ecological riverbanks and beds with filtration functions and constructing 1,500 acres of artificial wetlands before the river flows into the lake. These wetlands were filled with phosphorus filter materials and featured labyrinth-style aquatic plant walls to help settle pollutants and purify the water. By June 2011, after five years of implementation, water quality at the river mouth where the Luoshijiang flows into the lake had significantly improved, with the water being suitable for human consumption, water transparency reaching a depth of two metres, and artificially planted *Ottelia acuminata* successfully surviving after years of their absence. Owing to the success of this experience, during the twelfth Five-Year Plan period (2011–2015), the Luoshijiang plan was extended to another river flowing into Erhai, the Yong'anjiang River, which accounted for 20% of Erhai's total pollution.

The Erhai Lake experience and special project for water pollution control came about as the Communist Party of China placed increased emphasis on environmental protection. In 2003, then Chinese President Hu Jintao put forward the concept of a 'Scientific Outlook on Development', emphasising 'harmony between man and nature and the principle of all the people building and sharing a harmonious socialist society', which was ratified at the 17th Congress of the CPC in 2007.[9] This reflected the party's growing recognition of the unsustainability of a development model that focused only on economic growth while neglecting ecological protection. Also in 2003, Pan Yue took office as vice minister of the Ministry of Environmental Protection (then known as the State Environmental Protection Agency), becoming, at the age of 43, one of China's youngest deputy ministers. The following year, Pan began overseeing the country's environmental impact assessments (EIAs); one month after he did so, the State Environmental Protection

[9] 'Full Text of Hu Jintao's Report at 17th Party Congress', *China Daily*, 24 October 2007, https://www.chinadaily.com.cn/china/2007-10/24/content_6204564_4.htm.

Administration halted 30 large-scale projects due to non-compliance with EIA requirements, including the Jinsha River's Xiluodu Hydropower Station, the Three Gorges Underground Power Station, and the Three Gorges Project Power Source Station. Pan Yue's firm stance attracted considerable attention, earning him a reputation for being a 'tough guy' and his actions even being described in terms of a traditional Chinese idiom as 'touching the tiger's butt'. In 2006 and 2007, Pan Yue launched two consecutive EIA 'storms', during which 82 projects with investments totalling 112.3 billion yuan were halted for serious EIA violations, including in steel, power, and metallurgy. This, once again, garnered widespread attention from all sectors of society and decision-makers at the time.[10]

In a 2007 speech to a group of young students, Pan Yue candidly stated that 'our current economic development model is unsustainable'. He added that 'environmental pollution has severely constrained economic growth', and that 'social injustice leads to environmental injustice, which in turn exacerbates social injustice, creating a vicious cycle that brings social disharmony'.[11] Meanwhile, two years prior to these comments, Xi Jinping, then Secretary of the Zhejiang Provincial Party Committee, wrote an article in the *Zhejiang Daily*, entitled 'Green Mountains and Clear Waters are also Gold and Silver Mountains', in which he emphasised that although economic development is a priority, the environment cannot be sacrificed.[12] The special project for water pollution control and successes in Erhai should be understood in this context, as part of the CPC's shifting conception of development, with 'harmony between humans and nature' being increasingly viewed as a necessary condition for China's path to modernisation.

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[10] '潘岳的12年环保印记'[Pan Yue's 12-Year Environmental Imprint], *China Economic Weekly*, 18 August 2015, https://www.chinanews.com.cn/m/gn/2015/08-18/7473027.shtml.

[11] Pan Yue, °Green China and Young China (Part One)', *Dialogue Earth*, 17 July 2007, https://dialogue.earth/en/pollution/1167-green-china-and-young-china-part-one/.

[12] '幸福就在绿水青山间 ——习近平总书记和安吉县余村的故事'[Happiness Lies in the Green Water and Green Mountains – The Story of General Secretary Xi Jinping and Yu Village in Anji County], Xi Jinping Economic Thought Research Center, 16 January 2024, https://www.ndrc.gov.cn/xwdt/ztzl/NEW_srxxgcjjpjjsx/jjsxyjqk/sxzj/202401/t20240116_1364169.html.

Green Mountains and Clear Waters Are Also Gold and Silver Mountains

In January 2015, ten years after his article was published, Xi Jinping, now China's president, inspected Dali Prefecture and emphasised the need to protect 'the environment like we would protect something as sensitive as our eyes, and treating it like we would treat something as precious as our lives'.[13] On the shores of the lake, he affirmed that 'Erhai must be protected' and that he hoped to see cleaner and cleaner waters in the years to come. However, in September of that year, Erhai Lake suffered multiple algae outbreaks, with the lake water in several ancient towns becoming murky and foul-smelling and water quality deteriorating rapidly, mainly due to ecological burdens imposed by the rapidly growing tourism economy.

In recent years, Dali City has attracted many young people from major cities seeking an escape from smog- and traffic-filled urban lifestyles. Many have sold their city homes and moved to Dali City with their families to jointly build homestays with local residents along Erhai Lake. In a 'paradise-like' lifestyle, some young people in IT, design, and art industries have rented houses for long-term stays, working remotely and earning the moniker of 'digital migrants'. From 2014 to 2016, the number of 'new migrants' coming to Erhai from other parts of China increased from 30,000 to nearly 100,000, accounting for nearly 10% of the lake's residents. Furthermore, in 2014, Dali Prefecture received 808,300 overseas tourists and 25.67 million domestic tourists.

While the rapid growth of tourism contributed to the increasing incomes of local residents and anti-poverty efforts, environmental protection measures lagged behind. Prior to the surge in tourism and migration, Dali Prefecture had only a few small sewage treatment plants, and the increased environmental pressure overwhelmed Erhai. The homestays produced large amounts of domestic sewage, restaurant waste, and wastewater. By 2015, residential and tourism-related waste reached over 600 tonnes per day. In response to the deteriorating situation, the local government intervened in Erhai's rapidly developing tourism industry and enacted corresponding environmental protection measures.

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[13] Yuan Lihui, Wang Wenting, and Zhao Mengjie, 'Erhai Lake Must Be Protected', *Qiushi*, 14 January 2021, http://en.qstheory.cn/2021-01/14/c_582438.htm.

As part of these efforts, the Dali Prefecture government advised 2,498 restaurants, inns, and homestays discharging domestic and restaurant wastewater into Erhai to suspend operations. Initially, many owners were highly resistant. Kong Hainan, who led Erhai's special project team, personally communicated with inn owners and media reporters; government officials visited restaurants, inns, and homestays door-to-door, repeatedly informing owners about the pollution threats facing Erhai. The process of convincing local residents and business owners was difficult, but eventually, a consensus was built around the view that focusing only on short-term economic gains was akin to 'killing the goose that lays the golden eggs', thus destroying the whole community's future. Ultimately, all the inn and homestay owners in Shuanglang accepted the government's decision, suspending operations for 18 months to undergo relocation and renovation measures. In 2018, 1,806 households (belonging to 23 villages) within 15 metres of the lake were demolished with the owners' consent, the sites were restored to public space, and 7,270 people moved into newly built residential areas and were compensated by the government. To commemorate the sacrifices made by the 1,806 households for Erhai's environmental protection, the new residential area was named '1806 Town'. On top of this, restaurants, inns, homestays, and villages beyond the 15-metre line also completed sewage system renovations.[14]

More broadly, the Dali Prefecture government undertook a significant redrawing of its urban and developmental planning in response to President Xi Jinping's call to use Erhai Lake as the basis of all aspects of the region's economic and social development. For example, the urban-rural development boundary of the prefecture was reduced from 188 square kilometres to 148 square kilometres, the population around the lake decreased from 1.05 million to 860,000, and the core development area of Erhai Lake shrank from 140 square kilometres to 9.6 square kilometres. This promoted the transfer of industries and populations within the basin to outside the basin, completely transforming the development model of 'building a city around the lake'. Industries that did not need to be developed by Erhai Lake were moved out, with development zones being established in several counties surrounding Dali City to accommodate these relocated industries, thus driving economic development in the surrounding areas. The changes in Dali City are in line with a wider trend in

[14] Zhu, *海菜花开* [Ottelia Acuminata Blossoms], 188–190.

the country to relieve pressure on central urban areas. During the same period, around Beijing, similar measures were undertaken to address the problems of urban sprawl, 'big city diseases', and the formation of a 'poverty belt' around the capital. Tongzhou was designated as the city's sub-centre in the east, and the Xiong'an New Area was established in the southwest to relieve non-capital functions from the central areas of Beijing and promote coordinated development in the Beijing-Tianjin-Hebei region.

As a result of this robust environmental governance, Erhai Lake's health has been restored from its previous state of chronic pollution and eutrophication. Since 2016, the lake's water quality has been consistently rated 'fairly good' to 'excellent' by China's Ministry of Ecology and Environment.[15] However, while strong, comprehensive measures have been necessary to protect the environment and the collective commons, they often come with individual sacrifices, and indeed, many people have been personally affected by these measures to protect Erhai Lake.

Balancing Individual, Collective, and Environmental Wellbeing

He Licheng, who received us on our visits to Dali Prefecture, was one of the many people whose lives were directly shaped both by pollution and the waves of environmental measures enacted by the government in recent decades. Growing up by Erhai Lake in Gusheng Village, he earned his income through fishing and fish farming for many years. In 1996, after the government banned motorised fishing boats, he was forced to sell his boat to a scrap metal yard; a few years later, in 2000, he had to look elsewhere for work after the government prohibited self-built fish ponds in the lake. He Licheng eventually returned home and earned a living by opening an inn in 2014 after the government's 'village-to-village' project brought paved roads to He Licheng's doorstep. However, this did not last long. In 2017, his inn was one of the 1,806 houses demolished, and he and his family moved into a newly built 600-square-metre home in the 1806 Town. Finally, in 2021, after all of these ups and downs, He Licheng contracted a piece of land at the entrance of Gusheng Village to pursue green farming of rice and rapeseed under the guidance of the Yunnan Agricultural Reclamation Group.

[15] The annual 'Report on the State of the Ecology and Environment in China' by the Ministry of Ecology and Environment of the People's Republic of China, can be accessed here: https://english.mee.gov.cn/Resources/Reports/.

The Erhai basin has a long history of rice cultivation. However, in the past, farmers used low-quality varieties and excessive pesticides and fertilisers; consequently, the rice not only sold for low prices (less than 5 yuan per kilogram) but also polluted Erhai. During the environmental governance period, Yunnan Agricultural Reclamation Group carried out large-scale green, organic, and high-quality rice planting in the Erhai basin. The group developed an 'Erhai Fragrant' specialty organic rice that is fragrant and soft, with over 10% higher protein content than ordinary rice, and that, when cooked into porridge, forms a thick layer of rice oil that is popular among middle-class urban consumers. Green farming reduces agricultural non-point source pollution and the agricultural products fetch higher prices, with Erhai Fragrant rice being sold for more than 30 yuan per kilogram. The group utilised precise fertilisation, organic fertilisers, crop rotation, manual weeding, and biological pest control to ensure that rice production was green and organic from the source. Meanwhile, through internet e-commerce, the group directly connected with urban consumers and organisations in economically developed coastal areas before harvest, eliminating farmers' concerns about sales. The group planted over 10,000 mu of rice around Erhai, with households able to lease their land to the group for an annual rental fee of 2,000 yuan per mu (with households earning 5,500 yuan per year on average) and farmers able to earn incomes by directly contracting land from the group.

For He Licheng, green farming has provided a crucial source of supplementary income and greater overall economic security. While still earning most of his income from a new guesthouse that he opened beyond the 15-metre boundary, he makes 100,000 to 150,000 yuan annually from green farming (though he told us that there have been some difficulties in ensuring that farmers receive their payments in a timely manner).[16] In 2022, He Licheng applied to join the CPC and is currently going through the admission process.

Outside of He Licheng's contracted rice fields resides a research team from China Agricultural University. Since 2009, China Agricultural University has been exploring a 'Science and Technology Courtyard' model, where agricultural graduate students mainly coming from cities in China's eastern region are stationed at the frontlines of agricultural production to study and solve practical issues in agricul-

[16] Long Huirui, '留住洱海边的最美乡愁 ——重访云南大理市古生村' [Retaining the Most Beautiful Nostalgia by the Erhai – Revisiting Gusheng Village in Dali City, Yunnan Province], 中国民族 [China Nationality], 8 October 2017, https://www.neac.gov.cn/seac/c100475/201710/1083779.shtml.

tural and rural development at the grassroots level.[17] This initiative simultaneously helps to cultivate high-level agricultural talents and advance agricultural modernisation in rural areas. In Gusheng Village, the Science and Technology Courtyard aims to thoroughly eliminate Erhai's non-point source pollution – that is, pollution that does not originate from a single source but is accumulated over a large area. In collaboration with a team of national experts, the courtyard is developing a 'six vertical and seven horizontal' precise monitoring system in the Gusheng area and a comprehensive and spatiotemporal technological model for the prevention and control of agricultural and rural non-point source pollution. Experts conducted detailed surveys of soil, farmland, villages, and water systems in the Gusheng area, deploying over 1,000 personnel in 2022 for synchronised water quantity and quality monitoring, obtaining over 20,000 relevant indicators. According to Xu Wen, associate professor at China Agricultural University, the Science and Technology Courtyard in Gusheng identified the main agricultural source pollution discharge characteristics, regional non-point source pollution discharge loads and contributions, and preliminarily revealed the impact of non-point source pollution on surface water quality. Based on the precise monitoring of non-point source pollution, experts from China Agricultural University and Yunnan Agricultural Reclamation Group jointly optimised precise fertilisation for rice, reducing phosphorus, chemical oxygen demand, and other pollution indicators by about half.[18]

Beyond Erhai Lake

The environmental challenges that Dali Prefecture has faced and the government's restoration efforts provide some lessons beyond the region. For example, in the process of restoring Erhai Lake, the China Water Environment Group developed the 'distributed subsurface water reclamation ecosystem technology system', which is a management approach for large lakes over 200 square kilometres in size that has not been used anywhere else in the world. According to Dr. Feng Hou, chairman of the China Water Environment Group, the distributed subsurface water reclamation ecosystem is a groundbreaking new approach that changes the century-old wa-

[17] Party Committee of China Agricultural University, '解民生、治学问、育英才的科技小院' [Science and Technology Courtyards for Solving People's Livelihoods, Managing Learning, and Nurturing Talents], *Qiushi*, 16 August 2024, http://www.qstheory.cn/dukan/qs/2024-04/16/c_1130109150.htm.

[18] '洱海边上的科技小院' [Science and Technology Courtyard by the Erhai Lake], *Qiushi*, 6 May 2023, http://www.qstheory.cn/laigao/ycjx/2023-05/06/c_1129592968.htm.

ter management model worldwide, proposing an innovative idea of treating urban wastewater and treatment plants as a stable second water resource, second green energy, and second land resource, reducing investment by 20-50% compared to traditional solutions and saving about one-fourth of operating costs on average.[19]

In September 2022, the 'Erhai Lake Basin Pollution Control Innovation and Regional Development Project' won the silver award in the 'Excellent Project Execution and Delivery' category at the International Water Association (IWA) World Water Congress & Exhibition in Copenhagen, Denmark. The IWA expert review panel evaluated the project, jointly submitted by the China Water Environment Group, Shanghai Jiao Tong University, and the Dali Prefecture government, for aspects of innovation, major achievements, project design environment, and potential for broader impact. IWA President Tom Mollenkopf stated that the comprehensive management of Erhai Lake, integrating the improvement of Erhai's water ecological environment with the social and economic development model of the basin, provides significant insights for the development of the global water environment field.[20]

The restoration of Erhai Lake is a story of coming to terms with the environmental devastation that came with a certain model of development, which did not adequately address the social needs of the poorest regions nor the environmental costs. Through the leadership of the government to chart a new course towards an ecological civilisation and through the dedicated work of local residents like He Licheng, professors such as Kong Hainan, private entrepreneurs like Zhong Shunhe, and countless party cadres, university students, and peasant farmers, Erhai Lake has gone from an environmental crisis to an example of ecological restoration. Walking by the lake today, you can see the clean and transparent water, *haicaihua* flowers have begun to bloom again, and the 'Pearl of the Plateau' is glimmering once more.

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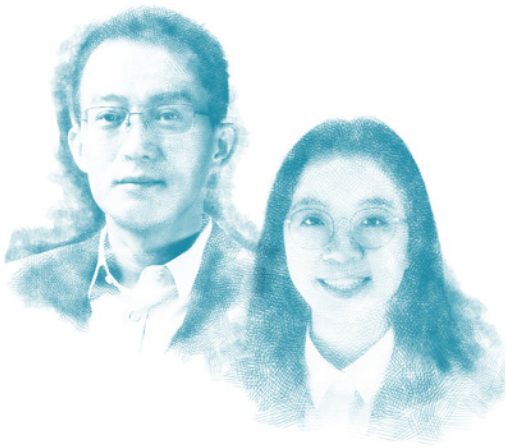
[19] Song Lingyan, Pan Shanju, '洱海治理二十年，大理经验如何成为世界范本？' [Erhai Lake Has Been under Treatment for 20 Years. How Can Dali's Experience Become a Model for the World?], *南方都市报* [Southern Metropolis Daily], 3 September 2023, https://new.qq.com/rain/a/20220903A02GZ600; Zhu, *海菜花开* [Ottelia Acuminata Blossoms].

[20] '2022年度世界水大会为大理洱海项目颁发创新大奖' [World Water Congress 2022 Awards Innovation Prize for Dali Erhai Project], Shanghai Jiaotong University, 16 September 2022, https://sese.sjtu.edu.cn/news/view/1020.

A New Machine to Change the World? The Rise of China's New Energy Vehicle Industry and its Global Implications



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Against the backdrop of an increasingly complex international environment as well as growing concerns over environmental protection and energy security, the development of new energy vehicles (NEVs), particularly in China, has become a global focal point.[1] Since 2016, China has consistently ranked first in the world in annual sales and ownership of NEVs. In 2023, China's NEV sector experienced explosive growth, with production and sales reaching 9.587 million and 9.495 million units, respectively; China's NEV sales accounted for 66% of the global total. Additionally, in 2023, China surpassed Japan to become the world's largest automobile exporter, a historic achievement closely linked to the rapid overseas expansion of its NEV industry. According to the China Passenger Car Association (CPCA), China

[1] This paper is a preliminary result of the research project 'Research on Optimising the Innovation Environment to Support the Improvement of Innovation Efficiency in the New Energy Vehicle Industry', commissioned by the National Academy of Innovation Strategy of the China Association for Science and Technology.

exported 1.73 million NEVs in 2023, representing over 30% of its total automobile exports. Furthermore, the quality of China's NEV exports has been steadily improving, with export prices rising and nearly half of the exports destined for European countries such as Germany, France, the United Kingdom, and Belgium. This marks a shift from China's traditional focus on developing countries as its primary export markets.

Conversely, the United States government announced a policy in February 2024 to restrict the entry of Chinese NEVs into the US market. The Alliance for American Manufacturing (AAM) has urged the Biden administration to take measures to prevent Chinese automotive and industrial products from effectively entering the US market through investments in Mexico. Almost simultaneously, after a decade of research and development costing billions of dollars, Apple announced it was abandoning its NEV project. European countries and their automotive companies, once engaged in a public relations race to announce timelines for phasing out gasoline vehicles and spearheading the implementation of carbon tariffs, have indicated shifts in their stance. For instance, at the end of February 2024, Mercedes-Benz announced that it was delaying its goal to become an electric vehicle-only brand by 2030 and that it planned to continue producing internal combustion engine vehicles well into the next decade. Given these developments, what will the international landscape of the NEV and automotive industry look like in the near future?

The automotive industry has a significant pull effect on various sectors, which prompted the renowned management scholar Peter Drucker to dub it 'an industry of industries' in the mid-twentieth century. In 1990, three professors from the Massachusetts Institute of Technology went further, calling automobiles 'the machine that changed the world'.[2] Today, few would doubt the importance of NEVs in international competition, as they are poised to become *the new machines that change the world* in the twenty-first century. Over the next ten to twenty years, NEVs will not only serve as key application platforms for technologies like semiconductor chips, cloud computing, artificial intelligence, and satellite communication, but also be closely linked to the development of smart transportation systems, smart grids, and smart cities. Whether driven by the ambition to dominate competition in cutting-edge technologies or by goals of economic stability and job security, no

[2] James P. Womack, Daniel T. Jones, and Daniel Roos, *The Machine That Changed the World* (Rawson Associates, 1990).

developed country can afford to be excluded from the NEV industry competition. This implies that competition between China and Western developed countries over NEVs will persist for a considerable period, encompassing technology, products, policy, strategy, and geopolitics.

In reality, the rise and overseas expansion of China's NEV industry is not an upstart force 'invading' the space occupied by traditional automotive powerhouses, as portrayed by some on Chinese social media. This can be seen from both local and global perspectives. Domestically, the growth of China's NEV industry has benefited from the innovation of the country's traditional automotive industry, a lengthy and arduous capacity-building process rather than the result of quick fixes or shortcuts. Internationally, since China began to pursue 'market access in exchange for technology' economic strategies in the 1980s, traditional automotive powerhouses from developed countries have included Chinese manufacturing and the Chinese market in their global plans, reaping significant profits in the decades since from their deep involvement in the Chinese market. Thus, Chinese automobiles are neither new nor sudden entrants into the global market that emerged outside the purview of developed countries. Over the past twenty to thirty years, China's automotive industry has risen from very unfavourable initial circumstances through independent innovation, breaking through the frameworks set by Western countries and leveraging the NEV opportunity window to achieve massive growth, something never foreseen in the plans of traditional multinational corporations.

Globally, the rise of Chinese NEVs is not the first challenge faced by traditional automotive powerhouses in the post-World War II period. Viewing the rise of China's automotive industry as the latest new player's impact on the global automotive landscape, it becomes evident that the fundamental issues of traditional automotive powerhouses lie within. Consequently, competition and trade disputes over NEVs are bound to intensify in the foreseeable future, presenting new challenges for China.

The 'World War' in the Traditional Automotive Industry

Due to the special importance of automobiles in the modern industrial economy, every historical shift in dominance and competitive advantage within the automotive industry has been determined by more than mere internal technological and

product competition. Instead, these shifts have been accompanied by intense trade wars among major countries.

After the birth of the automotive industry in the nineteenth century, the United States became the first country to gain dominance, in the early twentieth century, by creating large-scale assembly line production systems. By 1950, the US accounted for a staggering 80% of global automobile production.[3] From the 1960s, Germany, Japan, and South Korea successively challenged the United States. The first challenge came from Germany's Volkswagen with its low-priced models. By 1970, the number of passenger vehicles imported by the US from Germany accounted for about 10% of domestic passenger vehicle sales. The subsequent challenge from Japan was even more formidable. In 1980, the US imported 1.89 million passenger vehicles from Japan, accounting for 21% of its domestic sales. That same year, Japan topped the global automobile production list for the first time with a total output of 11.04 million vehicles. During the 1980s, yet another new 'invader' emerged in the form of South Korea's Hyundai, with Korean passenger cars making up nearly 5% of the US market share by 1987.

The rise of challengers from Germany, Japan, and South Korea was supported by new design concepts, manufacturing technologies, and production organisation methods, the most notable being Japan's lean production system. Led by Toyota, Japanese companies emphasised compact and fuel-efficient designs and empowered frontline workers with control over the production line to enhance manufacturing efficiency and quality. In terms of collaboration between assembly plants and parts suppliers, Japanese companies developed a Kanban production system, ensuring just-in-time supply and greatly reducing inventory pressures. For product development, Toyota involved its cooperative suppliers in the design and improvement processes from the outset, unlike US suppliers, who only produced according to the technical parameters and quantities specified by the main manufacturers.

These challenges had a significant impact on the United States. In 1978, over one million workers were employed in the US automotive manufacturing industry, but two years later, employment had dropped by 22%.[4] To counter these challenges, the US government not only provided substantial policy subsidies and loans do-

[3] Jean-Paul Rodrigue, *The Geography of Transport Systems*, 6th ed. (Routledge, 2024).

[4] Vaclav Smil, *Made in the USA: The Rise and Retreat of American Manufacturing* (MIT Press, 2013).

mestically but also took a series of retaliatory actions internationally. In 1981, the US and Japan signed a voluntary export restraint agreement, capping Japan's annual export volume to the US at 1.68 million vehicles for the next three years, with a limit of 1.85 million vehicles for 1984. Japan quickly adapted: on the one hand, Japanese companies maintained profit margins by exporting higher-priced products; on the other hand, from 1982 onwards, Japanese automakers began setting up factories in the US and Canada. By 1986, the eight major Japanese automakers had a combined annual production capacity of about 2.4 million vehicles in the US, accounting for more than 20% of the US's annual new car production.[5] Even though the 'Big Three' US automakers collectively invested $125 billion between 1988 and the mid-1990s in factory renovations and new product development, while also closing old factories and downsizing staff and operations, their domestic market share continued to decline, falling from 72% in 1995 to 59% in 2005.[6]

In response to the rapid expansion of Japanese production capacity in the US, the US government further escalated its restrictions. On the one hand, the US initiated Market-Oriented Sector-Selective (MOSS) talks with Japan, and in 1986, using MOSS, demanded that Japan relax restrictions on US automotive and parts companies entering the Japanese market. On the other hand, as Japanese companies established factories in the US, friction in auto parts trade between the two countries intensified. In 1993, the US government demanded that the Japanese government make specific commitments regarding the quantity and growth rate of US-made auto parts purchased by Japanese firms. When negotiations broke down, the US launched a 'Super 301' trade investigation against Japan and imposed punitive tariffs.[7] As trade frictions intensified, the Japanese yen appreciated against the US dollar following the 1985 Plaza Accord, production costs in Japan rose, and Japanese automakers' competitive advantage in the market began to decline gradually from the late 1990s.

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[5] Xia Dawei, Shi Donghui, and Zhang Lei, *汽车工业:技术进步与产业组织* [Automobile Industry: Technological Progress and Industrial Organization] (Shanghai University of Finance & Economics Press, 2002).

[6] In this automotive battle, the story between Europe and Japan is broadly similar to that between the United States and Japan. However, Japanese automotive companies have achieved less success in investing and establishing factories in Europe compared to the United States. See Timothy Sturgeon and Richard Florida, 'Globalization and Jobs in the Automotive Industry' (MIT Industrial Performance Center Working Paper Series, MIT-IPC-00-012, Massachusetts Institute of Technology, Cambridge, MA, 2000).

[7] Pei Guifen and Li Xiaoxiao, '*日美贸易摩擦与日本结构改革*' [Trade Friction between Japan and the United States and Structural Reform in Japan], *日本问题研究* [Japanese Research], no. 3 (2019).

The automotive wars from the 1960s to the 1990s profoundly altered the global landscape of the industry. After adjusting their strategies, multinational companies sparked a worldwide wave of mergers, acquisitions, and the formation of technical alliances in the automotive industry. This shift transformed automotive industry competition from being primarily national or regional to being truly global. Major automotive companies focused on developing several global product platforms, which allowed them to create a diverse range of models to meet the varying needs of different countries, balance market demand fluctuations across regions, and achieve economies of scale in product development and parts procurement. From the 1990s onward, large automotive manufacturers began divesting from non-core businesses while accelerating investments in manufacturing plants based in developing countries, aiming to leverage lower labour costs and fully tap into local markets. As the automotive wars drew to a close, the scale of the global automotive industry reached unprecedented levels, growing from 33.4 million units in 1971 to 58.95 million units in 2000. This expansion led to severe overcapacity, with global excess automotive production capacity reaching 20 million units in the early twenty-first century, equivalent to the entire capacity of Western European countries.[8] Some automotive brands or companies did not survive the wars. British automotive brands experienced the most severe wave of acquisitions. Rolls-Royce, Bentley, Jaguar, Aston Martin, Lotus, and Rover were all acquired, with some brands changing hands multiple times. As a result, the UK no longer had a major car manufacturer capable of large-scale production under its control.

However, developed countries with automotive industries do not view automotive industrial development purely from an economic rationality perspective due to the industry's strong employment-driving effect. Each assembly plant typically employs 5,000 workers and indirectly supports 20,000 jobs in the parts supply sector. In the mid-twentieth century, when the US automotive industry was thriving, and Detroit was still the centre of the automotive world, one in six people in the country was directly or indirectly employed by the automotive industry.[9]

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[8] Matthias Holweg, 'The Evolution of Competition in the Automotive Industry', in *Build to Order: The Road to the 5-day Car*, ed. Glenn Parry and Andrew Graves (Springer, 2008), 13–14.

[9] In China, the automotive industry is also crucial for driving economic growth and employment. According to data from 2002, for every one percentage point increase in the value added by the national automotive industry, it stimulated a 1.7 percentage point increase in other economic sectors. There are approximately two million workers directly involved in automobile production annually, with a total of 27.9 million people employed in related sectors, accounting for 1.6% and 13.5% of the national workforce, respectively. See Huang Zhengxia, '电动汽车:21世纪汽车工业的方向' [Electric Vehicles: Direction of the 21st Century Automotive Industry], 当代经济

Thus, even in the face of severe overcapacity, reducing production and laying off workers in the automotive sector remains politically challenging. In 2022, Japan's automotive-related workforce reached 5.54 million people, accounting for 8.2% of total employment.[10] In 2021, the European Union's automotive-related workforce was 12.9 million people, making up 6.8% of total employment. In 2022, in the US, the number of people working in automotive manufacturing, wholesale and retail, and aftermarket services was 7.39 million, amounting to about 5% of total employment.[11] This makes competition in the automotive industry not just a battle for market share among companies but also a political-economic contest among nations.

The traditional automotive 'world wars' have left a series of aftershocks that continue to influence new automotive industry competition in the twenty-first century. This is first reflected in Japan's misstep in energy-saving and NEV technologies. Since the mid-1990s, Japan invested heavily in traditional hybrid and hydrogen technologies to secure a technological edge, achieving significant results. However, mainstream European and US companies were slow to follow Japan's lead, not only due to strategic predictions at the technical level but also as a tactical move to resist Japanese competitive advantages.

Another unexpected aftershock is the development of the Chinese automotive industry. On the one hand, traditional automotive giants took advantage of the Chinese government's 'market for technology' policy, integrating China's automotive industry and market into their systems to gain larger market scales to spread costs or to profit by selling mature or older generation product blueprints and machinery. Before China joined the World Trade Organisation in 2001, more than ten leading multinational companies had already established over twenty joint ventures in China. After 2001, all major multinational automakers targeting the mass market utilised the 'market for technology' policy to enter China. These joint ventures deliberately suppressed the technological innovation of their Chinese partners, focusing resources on localising the production of introduced models.

[Contemporary Economics], no. 5 (2003).

[10] In official statistics from various countries, there are slight variations in the definition of 'automotive-related industries', so comparisons between countries may not be entirely accurate. The point being made here is that for Japan, the European Union, and the United States, the automotive industry holds significant employment absorption capabilities and is a crucial sector that governments cannot afford to neglect.

[11] The data is sourced from the Japan Automobile Manufacturers Association (JAMA), the European Automobile Manufacturers' Association (ACEA), and the US Bureau of Labor Statistics (BLS).

On the other hand, the traditional automotive 'world wars' also created conditions for the rise of innovative Chinese automotive companies. Due to widespread over-investment and lack of growth by multinational giants, many specialised technology companies began to break away from whole vehicle manufacturers to seek better survival opportunities through external markets. Some design and engineering companies, originally serving mainstream car manufacturers, started to look for opportunities in emerging markets. Renowned Italian design firms such as Pininfarina, Bertone, and Italdesign played significant roles in the early stages of technological capability development for innovative Chinese automakers like Hafei, Chery, Geely, and Great Wall. Similarly, engineering companies like Lotus, Ricardo, AVL, FEV, and Mitsubishi focused on selling engineering and technical services to Chinese innovators.

When China's development policy shifted towards 'independent' or 'indigenous' innovation in 2005, automotive companies that had fallen short in the previous 'world wars' became targets for acquisition by Chinese firms. This strategy helped Chinese companies, especially traditional state-owned enterprises, to accelerate their acquisition of vehicle technologies and access international markets, though the outcomes varied significantly across different cases. For instance, SAIC's acquisition of Korea's SsangYong was unsuccessful, but later, SAIC and Nanjing Automobile's acquisition of some assets of the UK's Rover were eventually integrated into SAIC's MG brand. Meanwhile, BAIC acquired part of Saab's technological blueprints, and leading Chinese innovator Geely successfully acquired Volvo with state support and later acquired stakes in Lotus and Smart brands.

Transformations and Breakthroughs in the New Energy Vehicle Industry

In the twenty-first century, a new wave of automotive 'world wars' has been gradually brewing around the field of NEVs. Efforts to industrialise NEVs originated during the tail end of the automotive wars of the previous century. Triggered by the oil crisis and an increasing societal demand for environmental protection and fuel efficiency, major industrial nations began developing NEV projects. As power battery technology has advanced, new companies have emerged (like Tesla since 2003), and environmental concerns have grown more prominent in sociopolitical life, NEVs have increasingly become the clear direction for future development.

Although China was a latecomer to the NEV sector compared to Japan and the United States, it was the first country to explicitly outline a direction for NEV development at a national strategic level and achieve fundamental breakthroughs in large-scale industrial applications. As part of the tenth Five-Year Plan (2001–2005), China established major projects for electric vehicles in its national high-tech research and development program, or '863 Program', and set up a specific 'three verticals and three horizontals' research framework.[12] In 2010, China's State Council designated NEVs as one of the seven strategic emerging industries, and in 2012, it released the Energy-Saving and New Energy Vehicle Industry Development Plan (2012–2020), which clearly defined the strategy for pure electric drive technology. Although China has long been in a state of rapid catch-up in developing key core technologies, a series of factors enabled it to achieve significant progress in the industrialisation of NEVs, including advancements in power battery safety, power battery structure, and electric vehicle chassis platforms.

First, the development of China's traditional automotive industry laid a solid foundation for its NEV industry. The rise of independent innovation companies such as Chery and Geely in the late 1990s spurred intense competition in scale and product innovation within the domestic automotive industry. By 2009, China had become the world's largest producer and seller of automobiles, with production and sales approaching 13.8 million and 13.65 million units, respectively. Not only did this process directly give birth to a number of important domestic firms in the NEV field, it also laid a solid foundation for the establishment of a robust industrial chain for China's automotive industry. Moreover, due to the enduring reputation and cultural influence of foreign brands in the traditional fuel vehicle market, Chinese independent brands struggled to shake off the perception of making 'cheap small cars' prior to 2010. Many attempts to enter the larger B-class and higher-priced 'premium' car segments were unsuccessful. This positioning challenge motivated Chinese automotive companies that were pursuing independent innovation to have a stronger drive for transformation when faced with new industrial opportunities in the transition from traditional fuel to electric vehicles.

[12] The 'three verticals and three horizontals' framework set out research and development priorities in the NEV sector, with the 'three verticals' referring to vehicle types (hybrid vehicles, pure electric vehicles, and fuel cell vehicles) and the'three horizontals' referring to key technologies (battery development and innovation, charging and refuelling infrastructure, and connectivity and autonomous driving technology).

Second, the Chinese government has consistently implemented policies to promote the development of strategic emerging industries. From 2009 onwards, initiatives such as the 'Ten Cities, A Thousand Vehicles' NEV demonstration and promotion project and other pilot projects began to be rolled out. Despite some early setbacks, the goal of having 500,000 NEVs in operation was essentially achieved by 2015. More importantly, during this period, with strong central government support and active participation from local governments, the domestic NEV supply chain gradually took shape. Between 2010 and 2020, the central government provided over 150 billion Chinese renminbi (RMB) in subsidies for NEV purchases (commonly known as 'national subsidies'), attracting industry participants in the early stages of development. Most of today's active domestic parts suppliers in the NEV sector were established during this time. From late 2015, numerous intelligent connected vehicle (ICV) testing and demonstration zones began to emerge across the country. Local governments in Shanghai, Chongqing, Beijing, Zhejiang, Changchun, Wuhan, and Wuxi actively collaborated with China's Ministry of Industry and Information Technology (MIIT) to promote testing and verification on semi-closed and open roads. By the end of 2020, the construction of pilot cities for 'Dual Intelligence' (intelligent transportation and smart cities) was gradually rolled out. In November 2023, the MIIT announced the opening of road tests for level 3 and level 4 autonomous driving, marking a new milestone for China's ICV industry and officially entering the mass production and application phase.[13]

Third, continued reforms by the Chinese government have mobilised market forces, especially since 2015, when a series of institutional reforms and adjustments created space for new entrants in the automotive industry. On the one hand, a clear subsidy phase-out scheme and the 'dual-credit' policy forced companies to focus more on investing in technological research and development, and improving manufacturing scale and quality to gain market share.[14] Simultaneously, the govern-

[13] In China, autonomous driving technologies are categorised into six levels, ranging from level 0 (L0), which requires complete human control over the driving process, to level 5 (L5), which requires no human intervention.

[14] In 2017, the government introduced the 'dual-credit' system for passenger vehicle manufacturers, which manages average fuel consumption and NEV credits concurrently. For fossil-fuel-powered vehicles, the assessment criterion is fuel consumption; vehicles meeting the standard earn positive credits, while those failing to do so earn negative credits. For NEVs, the criterion is the proportion of NEV sales to total vehicle sales, with credit calculation rules considering other technical parameters. Negative credits for fossil-fuel-powered vehicles can be offset through carryover, transfer within affiliated enterprises, or deduction using positive credits from NEVs. However, negative credits for NEVs can only be offset by purchasing positive credits from other enterprises. See Miao Wei, *换道赛车：新能源汽车的中国道路* [The Race to Change Lanes: China's Road to New Energy Vehicles] (Posts & Telecom Press, 2024).

ment continued to implement favourable policies such as purchase tax reductions and exemptions and infrastructure construction incentives. On the other hand, the entry of Tesla into the Chinese market not only created a 'catfish effect', spurring innovation and improvements among 'weaker' competitors, but also encouraged capital from the internet and high-tech industries to enter the field. Additionally, the government adopted a relatively lenient attitude towards new automotive players, allowing for various flexible measures such as contract manufacturing and purchasing certifications. The entry of these new players brought fresh ideas and technologies, and the integration of internet and artificial intelligence technologies led to rapid development in the fields of intelligent cockpits and smart driving in China. These new companies also introduced innovative business models, adeptly capturing changes in market demand, and focusing on continuous technological upgrades to extend the value chain for users. This shift transformed traditional business models from 'manufacturing' to 'manufacturing plus service', with much of the product value stemming from post-delivery services and upgrades, thereby creating new strength for China's NEV industry.

These factors have enabled China to achieve large-scale industrialisation in the NEV and power battery industries ahead of others. In 2015, the market penetration rate of NEVs in China was just over 1%; by 2022, it had reached 25.6%, meaning that China achieved the 20% target that it had set for 2025 three years ahead of the schedule. China has also produced globally competitive NEV manufacturers. For instance, in 2022, the Chinese firm BYD surpassed Tesla to become the world's top seller of NEVs, and in 2023, it broke into the top ten in global car sales with an annual volume of 3.02 million units. More importantly, China has preliminarily established an NEV industry system with a self-sufficient and controllable supply chain, without any chokepoints in the supply of critical components that could be constrained by other countries. Notably, China's promotion of NEVs has led them to penetrate deeply into the vast markets of the country's third- and fourth-tier cities and rural areas. According to data from the China Association of Automobile Manufacturers, since the Chinese government began promoting NEVs in rural areas in July 2020, total sales of rural NEV models reached 4.12 million units by the end of 2022. This indicates that even after multiple rounds of subsidy phase-outs and the complete cancellation of national subsidies starting in 2023, the overall market has continued to experience rapid growth.[15] It can be said that market

[15] Monthly sales were affected around the time of changes in government subsidies, but overall, they continued to increase.

mechanisms have successfully taken the baton and become the most crucial driving force for China's NEV industry.

In fact, the rise of China's NEV industry broke through a prolonged impasse, in which domestic brands were unable to surpass a 45% market share in the country's automobile market. Various data indicate that the market share of domestic brands in China reached approximately 55% in 2023. After 2020, not only did the sales market share of German, Japanese, and Korean brands show a significant downward trend in China's automobile market, but their absolute sales levels also declined.

During this period, with breakthroughs in key NEV technologies, various countries have successively formulated national-level electric vehicle transition strategies. In 2018, the UK Department for Transport issued its Road to Zero strategy, a policy document that set out a phased timetable for the full electrification of vehicles, proposing to end the sale of traditional fuel vehicles by 2040. A few years later, in 2021, the Japanese government released its Green Growth Strategy, aiming for all new car sales to be electric vehicles by 2035. That same year, the EU proposed an amendment to CO2 emission standards for light-duty vehicles, stipulating that all new light-duty vehicles sold must achieve zero emissions by 2035. Finally, the United States also clearly stated in 2021 that NEVs should account for 50% of new car sales by 2030.

However, in contrast to these ambitious governmental declarations, traditional automobile enterprises in Europe, the United States, Japan, and South Korea have found the transition process to be slow and challenging. There are several key reasons for this difficulty. First, these countries and regions generally face resistance from large interest groups related to the petrochemical industry. Conflicts between multinational corporations and labour and social groups can also impede the transition to new energy. For example, in September 2023, the United Auto Workers in the United States launched a strike against the three major automobile giants simultaneously for the first time in history. Along with aiming to secure wage increases and other benefits in a new round of labour negotiations, the strike fundamentally reflected workers' concerns and dissatisfaction with the new energy transition and their demand for a 'just transition' rather than one dictated by corporations.

Second, traditional automotive giants find it difficult to transform their strategic thinking and planning. The technical architecture of traditional cars is centred around mechanical power systems, whereas NEV designs focus on batteries, software, sensors, and intelligent computing. This shift is prominently reflected in the differences between the electronic systems of traditional and new energy vehicles. In traditional cars, electronic systems serve to assist mechanical and electrical systems in performing their functions, whereas NEVs, in addition to having traditional mechanical control chips, also incorporate chips related to smart cockpits and intelligent driving. These smart chips need to communicate in real time with various control chips, becoming the neural network that dominates the entire product system. In terms of hardware, the number of chips in NEVs is increasing, including consumer-grade computational chips that were previously absent. Conceptually, this electronic system defines the fundamental logic of NEV design, manufacturing, and control. It is also evolving, currently transitioning from distributed control to domain control, and it may further develop into centralised computing control by a few chips in the future to improve communication efficiency and reduce costs. This architecture provides expandability and upgradability, allowing smart vehicles to adapt to different user habits and to update their functions as software technology evolves, posing a significant challenge to traditional enterprises' design and development approaches.

Third, the transformation difficulties of traditional enterprises are also reflected in their path dependency within and between organisations. Throughout their long-term engagement in the automotive industry, these firms have established structured institutional arrangements for internal and external collaboration. When faced with technological challenges that necessitate transformation, the internal departments of traditional enterprises may easily encounter conflicts over strategic decision-making power and resource allocation priorities, making it difficult to quickly adjust organisational structures and smoothly advance the development and industrialisation of emerging technologies. In the past, some multinational enterprises have even developed highly promising products, but the success of these products and technologies have been buried amid internal organisational struggles during crises.

For these large multinational enterprises, a considerable amount of NEV development may need to be transferred to China. Traditionally, multinational companies have primarily developed new products at their headquarters and then introduced

them to other markets around the world (with possible adjustments according to specific market characteristics). However, China has become a leading market in the NEV industry, necessitating a thorough understanding of China's technological frontiers and potential consumer demand changes to better complete developmental work. Additionally, operating in China can help them avoid various bureaucratic hurdles that exist in their head offices. More importantly, the automotive revolution brought about by NEVs is not occurring in isolation but is intertwined with revolutions in energy, transportation, and information technology. NEVs can absorb a wide array of new technologies from a range of sectors, including information technology, networking, artificial intelligence, big data, cloud computing, new materials, power electronics, and advanced manufacturing, thereby becoming a platform for integration and innovation in numerous industries. For example, NEVs need to integrate with the information technology industry to achieve information interconnectivity between vehicles and cities, roads, and charging facilities. This requires developers to participate in innovation ecosystems closely related to cutting-edge technologies such as 5G, big data, artificial intelligence, smart grids, and smart cities. However, such complex and advanced innovation ecosystems are mainly flourishing in China and a few other countries and regions, which undoubtedly increases the difficulty for multinational giants to develop technologies and products based on their headquarter markets.

The 'rise in the East and decline in the West' dynamic that is prevalent in the NEV industry marks a profound change from the traditional pattern of industrial development. In 2021, China's automobile production accounted for over 30% of the global total, while the shares of Japan and the United States were only around 10%. In the Chinese domestic market, ordinary consumers' recognition of local NEV brands has surpassed that of foreign multinational brands, as local brands have broken through a longstanding barrier that they had been unable to overcome in the traditional fuel vehicle market. Major multinational companies have had to repeatedly lower the prices of their NEVs, with their NEVs, in some cases, being cheaper than traditional fuel vehicles. After impressive showings by Chinese enterprises at auto shows in Shanghai and Munich in 2023, multinational automotive giants began investing in or cooperating with Chinese NEV companies, hoping to accelerate their own transformation by leveraging the technology and product architecture of Chinese enterprises, such as Volkswagen's investment in XPeng, Stellantis' investment in Leapmotor, and Audi's cooperation with SAIC.

The Unfolding Conflict: A 'New World War' in the Automotive Industry

Reflecting on the automotive wars of the 1960s to 1990s, one can almost certainly predict that NEVs will become the focus of intense competition among major industrial countries in the new era. The COVID-19 pandemic and the Russia-Ukraine war have exacerbated the economic difficulties in European countries, leading major Western nations to adopt significant protective economic policies to support the development of their domestic NEV industries.

In August 2022, the United States passed the Inflation Reduction Act. This act will invest $369 billion to incentivise the development of industries related to new energy, particularly providing highly exclusive subsidies and protective clauses for the US domestic NEV and key component industries. Under the act, consumers can receive a tax credit of up to $7,500 for purchasing NEVs, provided that the vehicles are assembled in the United States and a certain proportion of the battery pack components and key battery materials come from US domestic enterprises.[16] This move is part of broader US efforts to attract vehicle and key component companies from Europe, Japan, and South Korea to invest and set up factories in the United States. In December 2023, the US government proposed new rules regarding electric vehicle tax credits, directly restricting US electric vehicle manufacturers from sourcing battery materials from China or other competing countries. Meanwhile, the National Defense Authorization Act for Fiscal Year 2024, passed at the end of 2023, prohibits the US Department of Defense from purchasing batteries from Chinese companies such as CATL and BYD starting in October 2027. In late February 2024, the White House released a statement on 'national security risks to the US auto industry', in which President Biden explicitly instructed the US Department of Commerce to investigate and take actions to 'respond to the risk' posed by connected vehicles using technologies linked to China.

The Inflation Reduction Act and other US policies not only impact China's exports but also exacerbate Europe's difficulties. As traditional automotive powerhouses, France and Germany jointly issued a statement in November 2022 to strongly counter the challenges posed by the Inflation Reduction Act, with France

[16] The bill requires a yearly increase of 10% in the localisation rate of battery pack components and battery raw materials from 2023 to 2029. Canada and Mexico have been included in the exemption clause.

even proposing a 'Buy European Act'. In February 2023, the European Commission proposed the Green Deal Industrial Plan and, in March, the EU successively unveiled drafts of the Net-Zero Industry Act and the Critical Raw Materials Act as key pillars of the plan. The former aims to stimulate investment in green industries by simplifying regulatory frameworks and improving the investment environment, listing battery technology as one of eight strategic net-zero technologies. The latter requires a certain percentage of strategic raw materials to be mined and processed locally to strengthen the security of supply chains for key raw materials and clean technology products. These two acts entered into force May and June of 2024, respectively. In the EU, 21 member states already offer direct subsidies for consumers purchasing NEVs, with France's new industrial policy tightening the scope of subsidies by linking subsidy standards to carbon footprints, thus imposing requirements on carbon emissions during production. In May 2023, then French finance minister Bruno Le Maire stated that 40% of France's electric vehicle subsidies flowed to Asian car companies, and that the new policy essentially aimed to reserve subsidies for European domestic manufacturers. In December 2023, the French government announced the NEV models eligible for a subsidy of up to 7,000 euros, excluding models produced in China.[17]

The EU also has adopted targeted measures for the key component industry of power batteries. In August 2023, the EU Batteries and Waste Batteries Regulation officially came into effect, imposing three mandatory requirements for locally produced and imported batteries in the EU: first, a battery passport must be provided, detailing the source of battery minerals, the content of rare metals, the number of battery cycles, and more; second, battery manufacturers are required to recycle old batteries and use a certain proportion of recycled materials in new battery production; third, the carbon footprint of the entire lifecycle of the battery must be provided. This move aims to curb the positive export momentum of China's lithium battery industry to the EU and seeks to buy time for the development of the European domestic battery industry. This situation is similar to the US-Japan automotive war gradually spreading from the vehicle sector to key components during the late 1990s.

Faced with the rapid growth of China's electric vehicle exports to Europe, the EU has even adopted more direct protectionist policies. According to data from the Chi-

[17] An Limin, '*中国产电动汽车失去法国补贴资格*' [Chinese Electric Vehicle Production Loses Eligibility for French Subsidies], *Caixin Online*, 15 December 2023.

na Passenger Car Association, the number of pure electric vehicles exported from China to Europe reached 338,000 units in 2022, an increase of 94% year-on-year. In the first eight months of 2023, the number of pure electric vehicles exported to Europe has already reached the scale of the entire year of 2022. In early October 2023, the European Commission launched an anti-subsidy investigation into pure electric vehicles from China, raising the level of suppression of Chinese electric vehicle exports to new heights. The legal basis for the anti-subsidy investigation comes from the Foreign Subsidies Regulation passed by the EU in November 2022. This regulation defines 'foreign government subsidies' broadly, including preferential loans, tax reductions, and low-cost land or energy provision; additionally, some common commercial transactions, such as obtaining loans from policy banks or state-owned commercial banks, debt/equity swaps, debt restructuring, equity investments from government investment funds, and government public procurement, may also be recognised as foreign financial support; state-owned enterprises with government capital injections may also be recognised as receiving subsidies. In fact, the prices of domestically produced cars exported to Europe from China are generally higher than those in the domestic market.

Besides providing a legal basis for anti-subsidy investigations, the Foreign Subsidies Regulation introduces two additional investment review tools, significantly impacting Chinese enterprises' investment and operations in Europe. As of October 2023, companies engaged in mergers and acquisitions and public procurement activities in the EU are required to notify the European Commission in advance if they have received foreign subsidies and to meet the relevant reporting thresholds within the past three years. The maximum penalty for violations can be up to 10% of the company's total annual revenue from the previous year. These regulations will greatly increase the transaction costs, extend the preparation period, and add uncertainty to Chinese enterprises' activity in Europe. Some industry insiders predict that the strategy of acquiring excess capacity from European local factories or merging with poorly performing enterprises will face significant obstacles in the future.

The Way Forward: 'A New Type of Globalisation'?

Facing intense global competition, any optimistic theory of a 'quick victory' for China's NEV industry is likely unrealistic. The growing protectionist tendencies among major industrial countries will prolong the competition process in mainstream European and US markets, thereby granting more time for Western multinational giants to progress in the automotive energy transition. Under the influence of protective policies, the US and European countries will lobby for more direct investments from

Chinese or other East Asian parts and vehicle companies into their local markets. Simultaneously, multinational corporations will be more active in trying to acquire NEV technology assets from China through investments and mergers to accelerate their own transitions. The production capabilities, brand influence, and market channels that these multinational companies have established globally over their long development histories will also be valuable resources in their transition processes.

Reflecting on the previous 'world war' of the automotive industry, on the one hand, Japanese and Korean companies broke into the mainstream markets of developed countries by relying on product quality, technological level, and new models, despite the established market share held by traditional large automobile manufacturers. This, in turn, promoted the continuous improvement of their technologies and products. On the other hand, Japanese and Korean companies also achieved rapid global sales growth by exploring new markets, thanks to their excellent product quality and the recognition they received in mainstream markets. According to export data from the Japan Automobile Manufacturers Association, from 1975 to 2023, in addition to gaining recognition in the European and North American mainstream markets, Japan's automobile exports to other countries and regions accounted for about 38% of the average share of overseas markets, reaching 48% in 2022.

Currently, Chinese NEV companies are also actively exploring previously underdeveloped emerging markets, with regions such as South Asia, Southeast Asia, and the Middle East becoming growth points for Chinese NEV exports. In 2022, China exported more than 50,000 NEVs to each of Thailand, the Philippines, India, and Bangladesh; nearly 80,000 units were exported to Thailand alone, accounting for 7% of the total NEV exports. In 2022, China's NEV exports to Israel and the United Arab Emirates grew rapidly from less than 10,000 units in 2021 to nearly 40,000 units, and the number of exports to Uzbekistan, Jordan, and Turkey surpassed 10,000 units for the first time. Additionally, in 2023, Chinese NEV exports also performed well in countries like Australia, New Zealand, and Brazil. According to data from the International Organization of Motor Vehicle Manufacturers, in 2020, the US had 860 cars per 1,000 people, Europe had about 518, and China only had 223; some South Asian and Southeast Asian countries had not yet reached 100 cars per 1,000 people. These countries and regions have large populations and significant potential for increased car ownership per capita, but lack domestic NEV manufacturing capabilities.[18] Moreover, countries like Thailand, Indonesia, and Vietnam have implemented tax incentives, purchase subsidies, and consumption tax reduction and ex-

[18] It is generally believed that a market reaches saturation when there is approximately one car for every three people, on average. This indicates that, as per capita income levels rise in many developing countries and regions, there is a vast potential consumer market for automobiles.

emptions for NEV imports, as well as foreign investment subsidies, providing a great opportunity for Chinese products, technologies, and industrial chains to go abroad.

However, developing markets in the Global South also presents new challenges for China's automotive industry, including the NEV industry's mandatory regulations in areas such as infrastructure, environmental protection, and safety. For example, China has not joined the '1958 Agreement', meaning that Chinese NEV exports still need to undergo separate testing and certification procedures in overseas markets, which poses certain risks and increases export costs.[19] Currently, China is developing a testing and certification alliance with some developing country governments in the NEV export process. In the future, opportunities and challenges will coexist in promoting related products and testing standards abroad.

More importantly, to successfully promote the internationalisation of Chinese NEVs, China must explore a 'new type of globalisation'. Logically, the traditional model of globalisation shaped by multinational corporations has inherent limitations in value creation and distribution. They have built a pyramidal structure globally: at the top, Western countries possess core technologies, exporting management, capital, and some production equipment, and dominate the value chain to to reap high profits; at the bottom, developing countries mainly provide cheap resources and labour, earning relatively meagre returns while bearing environmental costs. This model's inherent flaw is that cheap labour earning minimal incomes cannot become consumers of the complex technological products they produce. Workers from developing countries, who constitute the majority of the population, can consume clothing, shoes, and daily necessities produced by this world system, but generally are unable to purchase complex technologies or products like NEVs, smart grids, or cloud computing services. In fact, during the 'three-plus-one' (export processing with supplied materials, samples, or components, plus compensation trade) or 'market for technology' development models of the 1990s, most of China's population could not afford the complex products produced locally in China.

The realistic expectations of international competition and China's population size both determine that China must embark on a 'new type of globalisation'. First, developed countries still possess advantages in scientific and technological capabilities and capital accumulation, making them very strong competitors. China cannot solely rely on NEVs to completely replace their share in the global automotive industry. Assuming a world where China completely replaces the G7 countries is unrealistic.

[19] Under the framework of the '1958 Agreement', contracting parties certify products under the same set of regulations, allowing for mutual recognition of certifications and enabling direct market entry without the need for repeated certifications for exports.

Second, China's population is nearly twice that of the G7, which means that China cannot drive the vast majority of its population from middle to upper-middle and high-income levels simply by replicating the existing globalisation logic or by hoping to replace the market share of developed countries. This implies that Chinese industrial practitioners must substantially promote the industrialisation process of Global South countries, transforming the emerging working class of those countries into consumers of complex industrial products through NEV capacity exports and infrastructure development. At the same time, China needs to vigorously promote innovation-based domestic circulation, forming local strength in product innovation and frontier technology development agendas, ensuring that innovation activities centred on domestic technological agendas and market demands involve a broader international scope, incorporating the industrialisation activities of Global South countries into China-related value chains to secure China's competitive advantage in exporting technology, industry, and standards.

It is important to emphasise that the industrialisation process of Global South countries is not solely determined by China or other developed nations. As China's rise gradually breaks the control of the US-led system over China, it also eliminates the possibility of replicating such a system. The 'great changes unseen in a century' that the world is undergoing not only alter the relationship between China and the global system but also drive the emergence of economic autonomy in some developing countries. In the context of the NEV industry, there is currently a separation between the supply of raw materials and the production of critical metals such as lithium, nickel, and cobalt on a global scale. Some mineral-rich countries, which hold key metal resources, are increasingly asserting their autonomy. They seek to leverage their positions for greater benefits and have started to form OPEC-like organisations for metals in relevant fields. This reality requires China to view the relationship between its development and the Global South with a long-term perspective. Economic cooperation achieved through complex industrial collaboration under equal external conditions is more robust than relationships built merely on goods trade or simple industrial cooperation. Therefore, ensuring the safe and efficient global operation of China's NEV and other industrial sectors, while promoting the industrialisation process in more Global South countries and generating consumers with the purchasing power for complex technological products and industries, is not only an important topic in terms of China's long-term industrial competitiveness but also a central issue concerning the construction of a global community with a shared future for humankind.

Why Chinese Agriculture Must Undergo an Ecological Transformation

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When talking about contemporary ecological and agricultural issues in the world, the so-called 'Green Revolution' is a topic that inevitably arises and a topic with which China has a deep connection.[1] In the US government's 1949 White Paper on China, Washington attributed the Chinese Revolution to the country having too many people and too little land. Chairman Mao Zedong amply refuted such Malthusian historiography in his eloquent essay 'The Bankruptcy of the Idealist Conception of History'. However, Malthusianism would still dominate global approaches to development and social policy for a long time, and its immediate policy conclusion – that technological improvements in food production

[1] An earlier version of this article was published in the Chinese edition of *Wenhua Zongheng*. Ding Ling and Xu Zhun, '中国农业为什么必须生态转型' [Why Chinese Agriculture Must Undergo an Ecological Transformation], 文化纵横 [Wenhua Zongheng], no. 3 (2024): 96–106.

could solve the social/revolutionary problem – was the essence of the Green Revolution.

After the victory of the Chinese Revolution, the imperialist efforts to control China and the entire Third World suffered a significant blow. To counter the revolutionary wave in Asia, the imperialists turned their focus to another major Asian country, India. Paul Hoffman, administrator of the US Marshall Plan and president of the Ford Foundation in the early days of the Cold War, once observed, 'if in 1945 we had embarked [in India] on such a program [as the rural development program in Taiwan] and carried it on at a cost of not over two hundred million dollars a year, the end result would have been a China completely immunised against the appeal of the Communists. India, in my opinion, is today what China was in 1945'.[2] Hoffman's comments reflected the underlying motivation behind the Green Revolution, which, as is now widely recognised, was not truly 'green' or ecological but primarily aimed at distinguishing itself from the 'Red Revolution'.

Discussing ecological issues and the Green Revolution in the Chinese context can sometimes deliver a paradoxical experience. On the one hand, ecological civilisation has become central to the mainstream discourse in China thanks to the push by Chinese policymakers, and related terms such as emissions reduction, low carbon, and new energy have become very familiar to the general public. The general public prefers to buy green, pollution-free produce and even prefers to make their main food purchases at vegetable markets directly supplied by farmers. This deep-rooted awareness of ecological issues is perhaps remarkable on a global scale. Scepticism about the ecological transition and denial of the global climate crisis are invisible, at least at the official level in China. This is one of the direct benefits of China's long-term emphasis on and belief in science.

On the other hand, however, China's government and non-government sectors often have an ambiguous understanding of the meaning of ecological civilisation and ecological transformation. One of the most prominent points here, for example, is the perception of the Green Revolution. In China, the Green Revolution – or at least a part of it, the so-called hybrid high-yield crops – still

[2] E. B. Ross, 'Malthusianism, Capitalist Agriculture, and the Fate of Peasants in the Making of the Modern World Food System', *Review of Radical Political Economics* 35, no. 4 (2003): 437–461.

has unshakeable support, which is quite different from global attitudes toward the Green Revolution.

In a broad sense, China's attitude towards the Green Revolution is directly related to its historical background. In the course of China's socialist construction, a large number of scientific research activities for the benefit of the people arose, organised either by the government or by the masses on their own initiative, in particular efforts to help the countryside improve their agricultural production methods and breed good seeds. The technologies produced as a result of this scientific research, such as new varieties of seeds, were often promoted in suitable areas at low prices and did not merely remain in the hands of a few. Other essential parts of the Green Revolution, such as water resources and fertilisers, were also the common property of the people, as in the case of the people's communes, which built many collective water facilities that are still functioning decades later.

But no matter how special the historical context of the Green Revolution in China is, it does not change the basic fact that the Green Revolution itself was not 'green', but part of industrial civilisation. Chinese President Xi Jinping has argued that China needs to transition from an industrial civilisation to an ecological civilisation. What is the distinction between the two? In essence, in terms of production relations, the main and defining feature of industrial civilisation is not industry but rather the highly unbalanced and disharmonious relationship between human beings and nature. Since the emergence of class society, there has always been a contradiction between urban and rural areas, and over the past two to three centuries, this disharmony has reached unprecedented heights and is unsustainable. Therefore, President Xi Jinping stressed that, in the context of such profound contradictions, it is necessary to build an ecological civilisation. This concept is characterised by the need to repair the contradictory relationship between human beings and nature; whether there is industry or not is not the key, but to what extent the highly tense relationship between human beings and nature, and between human beings and the environment, which has developed over the past few centuries, has been resolved.

Over the past two decades, a number of Marxist scholars concerned with ecological issues, such as US scholar John Bellamy Foster, have uncovered important theoretical tools such as the 'metabolic rift' to help us understand the

important ecological issues that have arisen in the age of capitalism. Since the turn of the twenty-first century, some Chinese universities have been using US economics textbooks to educate their students. Some of these textbooks have impressed the authors of this article, such as those that praise the greatness of capitalism and the market economy, roughly speaking, in the following manner: 'Imagine you live in a city in the United States, and when you get up in the morning, you can drink coffee made in Africa, eat fruit made in Latin America, and wear clothes made in East Asia'. These kinds of imagery and narratives of prosperity have undoubtedly fuelled blind faith in capitalism and the globalised economy. From an ecological point of view, this prosperity of the market economy, in fact, contains the seeds of disorder and destruction. A highly developed market economy involves a high volume of long-distance trade, where African coffee and Latin American fruit, containing the labour of local people and the fertility of the land, are shipped to New York and Europe to become consumer goods. After the nutrients are absorbed in the cities of developed market economies, the leftovers end up as rubbish. However, in traditional agricultural societies, such human and food waste are not rubbish but rather a valuable source of soil nutrients. In the absence of long-distance trade and the frequent interregional movement of materials, these nutrients would flow back to where they came from and be recycled. But in contemporary times, especially in the last two centuries of highly developed globalisation and marketisation, a great contradiction has arisen, namely, that the fertility of the land is being transported from its place of origin to other regions in the form of products, and that the nutrients produced never have the means to return, which in turn leads to a diminishing of fertility at the place of production and, in the long run, is unsustainable and destructive.

The phenomenon of the fertility of the countryside becoming concentrated in the city and then becoming waste is the material basis of the contemporary urban-rural conflict. Over the past two centuries, during which capitalism gradually became dominant, there have been two waves of the Green Revolution in the world. The first took place in the nineteenth century, before the concept of 'green revolution' had emerged and before the development of the modern chemical industry. At this time, the way to increase soil fertility was to mine bird droppings, or guano, from the small islands scattered in the Americas. To mine guano, many Chinese labourers were transported to the region to work as 'coolies'. The foundation of the agricultural revolution in Europe and

the Americas at that time included these poorly paid Chinese labourers and the non-renewable guano fertiliser. The second wave came about with the rise of the chemical industry in the twentieth century, when compound fertilisers were widely used in agriculture through different ratios of nitrogen, phosphorus, and potassium, and fertiliser-sensitive crop varieties were bred to sustain agricultural production.

It can be observed that regardless of which Green Revolution we consider, the underlying logic has always been to maintain or even expand the metabolic rift. This has been achieved by continually injecting fertility from external sources, fundamentally based on the super-exploitation of labour and the unsustainable depletion and pollution of the environment. Logic dictates that this will not solve or even alleviate ecological problems whatsoever, and indeed, it has not in practice. The Green Revolution came with huge ecological costs. For example, since Green Revolution agriculture relied on only a few high-yielding varieties of each crop, the original, diverse varietal system of Indian crops gradually disappeared. Land degradation was also one of the major negative consequences of the Green Revolution. Excessive use of chemical fertilisers has altered the soil microbial community and increased soil salinity, leading to physical and chemical degradation of the soil.[3]

China's Green Revolution, despite its early widespread benefits and relatively low overall chemical usage, still saw rural collectives exploring some ecological conservation efforts, which limited environmental damage during the commune period. However, after China dissolved the communes and entered a market economy, countless small-scale farmers, driven by market forces, rapidly increased their use of chemicals, and the negative impacts of China's Green Revolution gradually became apparent. Around 1970, every kilogram of grain output in China corresponded to only 20 grams of fertiliser input on average; by 2010, every kilogram of grain output corresponded to 110 grams of fertiliser input.[4] In just a few decades, China has become the world's largest consumer of fertiliser. Today, China uses more than 30% of global fertiliser and pesticides

[3] R. B. Singh, 'Environmental Consequences of Agricultural Development: A Case Study from the Green Revolution State of Haryana, India', *Agriculture, Ecosystems and Environment* 82, no. 1–3 (2000): 97–103.

[4] Xu Zhun, 'Farm Size, Capitalism, and Overuse of Agricultural Chemicals in China', *Capitalism Nature Socialism* 31, no. 3 (2020): 59–74.

annually on less than 9% of the world's arable land.[5] The overuse of fertilisers and pesticides has caused agriculture to surpass industry as China's number one source of surface pollution. Can we continue on this path of heavy reliance on chemical fertilisers and pesticides? Such a situation is clearly unsustainable.

One might counter with the following question: does rejecting the Green Revolution mean that we should all go hungry? Taking India as an example, it is true that India's food production has increased if we look only at the production in a certain number of years after the Green Revolution; but before the Green Revolution, India's total food production was already increasing relatively steadily, and the Green Revolution has not accelerated this trend.[6] From 1950 to 1965, India's wheat production increased by 4% per annum, and for about 20 years after the introduction of the Green Revolution (1968–1984), wheat production increased by about 5.6% per annum, which is the major evidence that is usually cited to affirm the Green Revolution in India. However, wheat is not a staple food in India, and its status is far less than that of rice. Whereas rice production increased by 3.5% per year prior to the Green Revolution, this fell to less than 2% in the two decades after the Green Revolution. Thus, if one looks at India's entire food supply, production increased by 2.8% per annum for a dozen years before the Green Revolution but fell to 1.9% per annum during its implementation, only to return to 2.5% per annum a number of years after the Green Revolution. Looking at longer-term food data, the Green Revolution did not have a significant impact in terms of solving India's food problems.[7]

Looking at the global food issue, we can observe that over the past 40 years or so, per capita grain production worldwide has basically remained stagnant. This indicator surpassed 370 kilograms in the early 1980s, but it has hovered at a low level for decades since, often not even reaching the levels of the 1980s. Although there has been a slight increase over the past decade, it still hasn't exceeded 390 kilograms.[8] These past few decades have been an era in which

[5] Yiyun Wu, Xican Xi, Xin Tang, Deming Luo, Baojing Gu, Shu Kee Lam, Peter M. Vitousek, and Deli Chen, 'Policy Distortions, Farm Size, and the Overuse of Agricultural Chemicals in China', *Proceedings of the National Academy of Sciences* 115, no. 27 (2018): 7010–7015.

[6] Glenn Davis Stone, 'Commentary: New Histories of the Indian Green Revolution', *The Geographical Journal* 185, no. 2 (2019): 243–250.

[7] See above for data here.

[8] Data based on the Food and Agriculture Organisation (FAO) of the United Nations.

the Green Revolution and industrial agriculture have dominated worldwide, yet humanity's ability to feed itself has not seen any substantial improvement.

In other words, even if we forget about ecological issues for a while, the potential of the Green Revolution to increase food production overall has been exhausted, and the mere maintenance of the situation requires continued reliance on high-intensity fossil fuel inputs. But for a large country like China, this possibility does not exist. On the one hand, China has decided to achieve significant carbon reductions, and the industrialised food system is involved in a large amount of carbon emissions, with the latest research suggesting, for example, that the food system accounted for up to a third of total carbon emissions in 2018.[9] If emissions reductions are to be made in food production and processing, fossil fuel consumption in the agricultural sector will have to be reduced. On the other hand, China's decision to reduce emissions comes against the backdrop of global climate change, which is bringing about an increase in average temperatures, a decrease in glacial snow water, and an increase in extreme weather, which will undoubtedly have a considerable impact on agricultural production. Under unfavourable conditions, China's yields of crops such as wheat, rice, and maize could even decline by 20-30% by 2050.[10] Against this backdrop, the 'de-risking' of food security should be given top priority. Green Revolution-style agriculture lacks the resilience to withstand risks due to the prevalence of monoculture crops and high dependence on external conditions, making it difficult to rely on for food security.

The history of socialist construction in North Korea provides us with another important lesson. The socialist construction of North Korea has made great achievements, but the country's agriculture is essentially based on fossil fuels and the Green Revolution. As early as the Kim Il Sung era, North Korea proposed the electrification of agriculture, and its agricultural development once achieved very good results, far exceeding that of South Korea, but this relied on oil imports and intensive use of fertilisers. From 1961 to 1991, its fertiliser inputs and cereal outputs were on an overall upward trend, however, in the

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[9] Francesco N. Tubiello, Cynthia Rosenzweig, Giulia Conchedda, Kevin Karl, Johannes Gütschow, Pan Xueyao, Griffiths Obli-Laryea, et al., 'Greenhouse Gas Emissions from Food Systems: Building the Evidence Base', *Environmental Research Letters* 16, no. 6 (2021): 065007.

[10] Shilong Piao, Philippe Ciais, Yao Huang, Zehao Shen, Shushi Peng, Junsheng Li, Liping Zhou, et al., 'The Impacts of Climate Change on Water Resources and the Impacts of Climate Change on Water Resources and Agriculture in China', *Nature* 467, no. 7311 (2010): 43–51.

early 1990s, due to the impact of geopolitical changes, North Korea's inputs of fertilisers dropped by 90%, which led to a significant drop in grain output, and then triggered what is known as the Green Revolution in North Korea. This led to a period of food hardship, which North Korea called the 'March of Misery'.[11] At that time, North Korea's heavy industry was already one of the best in Northeast Asia, but the country paid a high price for its complete dependence on industrial agriculture based on oil imports.

Indeed, the examples of China and North Korea have provided important lessons for Third World countries. From an environmental and ecological point of view, the Third World cannot rely on industrialisation and fossil fuels to solve its agricultural problems, nor is fossil fuel a reliable option from a geopolitical and risk-reduction point of view. If the Third World wants to truly solve its food security problems without developing a dependence on the so-called 'rules-based international order' of the United States, it must undergo an ecological transformation as soon as possible.

Of course, for a country like China, which is already dependent on industrialised agriculture, would an ecological transition not lead to a loss of production and thus threaten food security? The ecological transition is certainly not costless. But if China can face up to the limitations of the Green Revolution and truly begin to explore the transition to an ecological civilisation, it can make full use of its own strengths to minimise the impact of the ecological transition on food security.

An important condition that China possesses is the existence of extensive grassroots party organisations. These organisations are held in high esteem by the people, and are guided by the line of pursuing socialism and building an ecological civilisation. In the past few years, there have been several important and successful explorations of primary-level party organisations leading cooperatives, which have ensured food security and maintained ecological balance. In the cases we have studied, whether rice and shrimp farming in the lake areas of the Jianghuai Plain or animal husbandry in the Qinghai-Tibet Plateau region, the economic power of the collectives and the political leadership of the party have made it possible to ensure ecological sustainability by making

[11] Xu Zhun, 'Industrial Agriculture: Lessons from North Korea', *Monthly Review* 75, no. 10 (2024): 30–47.

agriculture people-centred rather than profit-centred, and by taking both ecology and production into account from a political standpoint.

Taking the Wuhu region as an example, in March 2022, Wuhu Prefecture's Wanzhi District set up a party organisation-led specialised cooperative to promote the development of the regenerative rice industry, which provides a whole industrial chain of services for 33,000 mu (2200 hectares) of regenerative rice growers in the district, and ensures that the total output of the first season and the second crop stabilises at more than 900 kilograms.[12] Regenerative rice uses rice stubble to re-grow seedlings and spikes with no pesticides and only a small amount of fertiliser, to ensure food production and achieve ecological benefits.

The leading industry established by the party organisation-led cooperative in Dongba Village, Liulang Town, Wanzhi District, is 'rice-shrimp co-culture', a composite farming model that integrates rice cultivation with crayfish farming. As of August 2023, the Dongba Village Cooperative had attracted 171 members. In August 2022, through land transfers, the cooperative consolidated land from two villager groups for contiguous farming. After the land was consolidated and improved together, the cooperative divided 260 mu (17.3 hectares) of land into 11 plots of varying sizes, the largest over 60 mu (4 hectares) and the smallest over 10 mu (0.67 hectares). While cultivating high-quality rice, they dug ring-shaped ditches around the plots for crayfish farming, implementing standardised transplanting, management, and farming practices. By directly returning rice straw to the fields as rich feed for the next season's crayfish, this low nitrogen fertiliser input still yielded high productivity. This method not only addressed the issue of straw utilisation but also achieved increased yields, reduced costs, promoted green farming practices, and improved land use efficiency.

During the field survey, flocks of egrets were seen foraging in the rice fields. Village officials noted that these birds had rarely been seen in the area before. However, since the introduction of the rice-shrimp co-culture, the use of pesticides and fertilisers in the rice fields has been reduced by at least three-quarters due to the high water quality requirements for crayfish farming. Technicians

[12] Hu Xiaodong, '湾沚区农业农村局积极种植再生稻 增产又高效' [Wanzhi District Agriculture and Rural Affairs Bureau Actively Plants Regenerated Rice to Increase Production and Efficiency], Wanzhi District People's Government, Wuhu Prefecture, 1 April 2022, https://www.wanzhi.gov.cn/xwzx/gzdt/12065463.html.

regularly cultivate beneficial algae and bacteria, further improving the water quality in the rice-shrimp base. In just one year, the farmland's ecosystem has significantly recovered, which is why the egrets, known for their high standards in habitat selection, have been attracted to the area.

Why develop the rice-shrimp industry through party organisation-led cooperatives? The party secretary of Liulang Town offered the following explanation:

> The role of party organisation-led cooperatives goes beyond just developing and expanding the collective economy and helping the people prosper. The more important aspect is the social benefits. If large-scale farmers were to manage it, they would focus on crayfish because it's more profitable, neglecting the rice since it isn't as valuable, which would jeopardise food security. By having party organisations lead cooperatives, we ensure food security, not just in terms of yield per acre but also in terms of ecological sustainability. While we do pursue profits, we don't prioritise them excessively. The rice yield is guaranteed to be at least 500 kilograms per mu.

As a result, the collective not only strengthens farmland protection and safeguards the bottom line of food security, it also creates a green, eco-friendly agricultural model, continuously improving the rural environment and restoring biodiversity.

In the pastoral regions of the Qinghai-Tibet Plateau, we also found examples of collective organisations pursuing ecologically protective production, aiming for social optimisation and ecological sustainability. Gacuo Township, located in the northern part of Shuanghu County, Nagqu City, Tibet, covers an area of 27,400 square kilometres, with an average altitude of 4,900 metres. Once known as an uninhabitable zone, Gacuo Township currently has 125 households and 570 people, spread across two administrative villages. By the end of 2017, the township had a total of 34,456 livestock, including yaks, sheep, and goats. The herders collectively own pastures, livestock, tents, and other production materials as a village unit, with the village collective coordinating the division of labour and planning. At the end of each year, members receive cash incomes as well as distributions of beef, mutton, and dairy products based on the work points they have earned from the collective.

Shuanghu County faces natural disasters almost every year. Eight or nine months of the year are a dry season with withered grass, making its ecosystem extremely fragile. During our field research, we found that, besides achieving significant results in production, distribution, public supervision, and collective cultural development, Gacuo has also made notable contributions to ecological protection, particularly in preserving the snowfields and glaciers (which are also regarded as valuable natural resources).[13] Gacuo Township not only integrates ecological practices into collective production but also diligently protects the surrounding environment.[14] In their herding practices, the herders maintain traditional methods of handling livestock, avoiding the use of vaccines or veterinary drugs unless absolutely necessary. Moreover, they do not leave any waste on the grazing land, but instead regularly transport it back to the township for centralised disposal. Gacuo Township is located in the heart of the Qiangtang National Nature Reserve and extends north into the Hoh Xil National Nature Reserve. According to tests conducted by national authorities, Gacuo's pasture resources could support the grazing of 210,000 sheep units, yet the total number of livestock in Gacuo is kept below 50,000 sheep units, with a strict rotational grazing schedule enforced to protect the grasslands. Even during seasonal migrations, locals use yaks instead of tractors, saying, 'tractors are good, but they create tracks that, over time, damage the grasslands'.

With the implementation of the dual responsibility system for livestock and grassland contracting in the late 1980s, China's pastoral areas have faced severe challenges of overgrazing. Issues such as grassland degradation and soil desertification have, in turn, become significant obstacles to the continuous income growth of herders.[15] To address these issues, the government implemented the Grassland Ecological Protection Subsidy and Incentive Mechanism in 2011, encouraging herders to reduce livestock numbers and restore degraded grasslands. However, the actual impact has been limited, with some areas seeing an increase in livestock rather than a reduction, leading to continued grass-

[13] Researchers: Ding Ling, Qi Lixia, Yan Hairong (July 2018).

[14] Ding Ling, Qi Lixia, and Yan Hairong, '藏北高原上的牧业集体社区——那曲嘎措乡的乡村振兴之路' [Pastoral Collective Community on the Northern Tibetan Plateau: The Road to Rural Revitalisation in Gacuo Township of Nagchu], *经济导刊* [Economic Herald] 10, 2018.

[15] Yang Siyuan and Song Zhijiao, '玛曲高寒草原畜牧业的可持续性考察' [An Examination of the Sustainability of Livestock Husbandry in the Maqu Alpine Grassland], *政治经济学报* [Journal of Political Economy] 5, (2015).

land degradation.[16] So, how does Gacuo Township strictly maintain the sustainability of its grasslands and surrounding ecosystems? First, the collective manages grazing and resting periods according to the characteristics of winter and summer pastures, with grassland planning being the most critical task. A major planning session is conducted every three years, and at the end of each year, there is a patrol and assessment of the grasslands. If any degradation is found, the area is designated for resting or prohibited from being grazed the following year while also reserving grasslands for disaster prevention during the winter and spring. Second, there are clear limits on how many livestock each pasture can support and for how long, with no overloading allowed under any circumstances.

Additionally, if a production team needs to migrate, for example, from Pasture A to Pasture B, there are strict regulations on how long the migration should take. If they need to stop at Pasture C due to special circumstances like weather, and the stay exceeds two days, they must report and apply to the village to use the pasture to prevent overloading Pasture C. In special cases, such as when a snow disaster hits one village's pasture, production teams can apply to use a nearby pasture from another village for emergency relief. This kind of adjustment is only possible through a collective economic organisation, which effectively maintains the sustainability of pastoral production.

Over the years, Gacuo Township has led Shuanghu County in economic development. Due to the collective division of labour and supervision mechanisms, the quality of livestock products like beef and mutton produced here is superior to that of surrounding townships, commanding the highest prices – a concrete manifestation of the strength of the collective economy. Notably, Gacuo's development has not been driven by external trade but has focused on meeting internal demand. In the face of harsh climate and fragile ecological conditions, they chose to use collective strength to protect and manage public resources and safeguard the surrounding environment. This proves that only a collective economy can maintain a balance between community life, economic development, and environmental sustainability.

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[16] Fan Mingming and Zhang Qian, '生态补偿给谁？——基于尺度问题反思草原生态保护补助奖励政策' [Ecological Compensation to Whom?: Rethinking the Grassland Ecological Protection Subsidy Incentive Policy Based on the Scale Problem], 学海 [Xuehai] 4, (2018).

The discussion above highlights the importance of grassroots party organisations in China. We understand that many Third World countries lack such formal organisational structures, but they do possess a variety of widespread mass political organisations, both formal and informal local community organisations, and a significant number of socialist forces, all of which can play a substantial role. Fundamentally, Third World governments and the masses can generally benefit from an ecological path, so the political foundation for an ecological shift objectively exists, and the specific forms of practice can certainly flourish in diverse ways.

In recent years, China's ecological civilisation has made significant progress in theory, policy, and local practice. However, looking to the future, the task remains daunting, and determining how to advance towards an ecological civilisation is an issue that we must address both now and in the future. Of course, this is not just China's task but a challenge for all humanity. There is much that China and the world can learn from each other. China's practitioners and researchers need to better understand practices and theories from around the world that go beyond industrialised agriculture, while people in many other countries can find inspiration and encouragement in the achievements and prospects of China's collective economy and ecological agriculture.

Review: Unveiling the Curtain on South Africa's Thirty Years of Democracy

Zhang Xueying (张雪滢) is an assistant professor at the School of International Relations and Public Affairs, Fudan University. Her research interests include East Asian economic strategies, international institutions, the United Nations, and Chinese and US foreign policies. She is also committed to youth participation in global affairs and represented China at the G20 Youth Summit in 2017.

Ngcaweni, Busani, ed. *Liberation Diaries: Reflections on 30 Years of Democracy*, vol. 2. Jacana Media, 2024.

I recently came across a book titled *Liberation Diaries: Reflections on 30 Years of Democracy* (vol. 2), edited by Busani Ngcaweni. It is a book about South Africa, a country that we in Chinese academia are increasingly studying, because of its achievements but also its challenges. This edited volume is a sophisticated and ambitious follow-up to the first volume, published in 2014, marking a notable evolution in both structure and depth. While the initial volume laid a foundation for discourse on South African democracy, this second instalment elevates the discussion with richer thematic coherence, rigorous scholarship, and a broader array of voices. Organised into well-defined sections on state formation, social transformation, and internal and international drivers, the book offers a balanced, composite view of South Africa's three-decade journey post-apartheid. This clear thematic

structure not only enhances reader engagement but also ensures a more cohesive narrative flow that guides readers through complex reflections on the promises and pitfalls of democracy.

One of the volume's key strengths lies in its impressive diversity of contributors, including sociologists, economists, journalists, and public policy experts who bring a multidimensional lens to the reflections on South Africa's democratic evolution. Most chapters display high standards of scholarly rigour, contributing well-supported analyses that make this volume feel more composite and academically robust than its predecessor. Ngcaweni's editorial expertise is especially noteworthy; he has an uncanny ability to introduce readers to fresh perspectives from established and younger voices alike. One is left wondering: where does Ngcaweni find these contributors? Time and again, he manages to curate a collection of writers who bring a conscientious and captivating approach to their work, making *Liberation Diaries* (vol. 2) both intellectually engaging and emotionally resonant.

The anthology excels in providing one of the most balanced accounts of South Africa's democratic era to date. By weaving scholarly essays with personal reflections, the book transcends the limitations of purely academic or anecdotal work, capturing the real and human dimensions of South Africa's ongoing transformation. Unlike its predecessor, this second volume strikes a refined balance between critique and praise; even chapters that may lack extensive evidence are 'rescued' by Ngcaweni's deft editorial choreography, as they are placed alongside more data-driven essays that strengthen the overall narrative. The result is an anthology that appeals to both academic and general audiences alike, particularly those invested in understanding the full complexity of South Africa's democratic journey. It is this composure, diversity, and high calibre of voices that position *Liberation Diaries* (vol. 2) as perhaps the most complete account of the country's thirty years of democracy.

Among the volume's highlights is a remarkable interview with Wonderboy Peters, who offers a deeply personal and brave reflection on racial identity and mental health. His narrative stands out for its courage and vulnerability, addressing the existential issues of identity and psychological well-being that many prefer to keep private. Growing up in post-apartheid South Africa, Peters reflects on the unique challenges of navigating a racial identity that does

not fit into traditional categories of 'black' or 'white', exposing the psychological weight of being viewed as 'other'. This intimate look into his lived experience gives voice to an often silent struggle faced by individuals with mixed racial backgrounds, highlighting how identity can be a source of both pride and alienation in a society still grappling with the legacy of racial classifications.

Peters' interview also boldly discusses the effects of these identity struggles on mental health – a theme rarely addressed openly within South African discourse. By candidly recounting his experiences of alienation, confusion, and the inner conflict of being seen as neither fully 'black' nor 'white', Peters sheds light on the psychological toll of such societal expectations. His reflections on resilience and the quest for self-acceptance emphasise the mental health impacts of racial categorisation, a burden that is often unseen yet deeply felt. This chapter is one of the anthology's most courageous interventions, as it invites readers to consider the full breadth of liberation, which must include the right to personal complexity, to navigate one's heritage without judgement, and to mental wellbeing as an essential aspect of freedom.

Ultimately, *Liberation Diaries* (vol. 2) offers a nuanced and thought-provoking contribution to the literature on South Africa's democratic journey. By blending scholarly essays with deeply personal stories, the anthology transcends pure critique to deliver a balanced, humanised portrayal of the nation's successes and ongoing challenges. Through this volume, Ngcaweni and his contributors capture the essence of a country grappling with both the achievements and failures in its struggle to realise its democratic ideals. As South Africa reflects on its journey through the milestones of liberation, this volume emerges as an indispensable resource for understanding the nation's past, present, and potential future. By holding a mirror to South Africa's progress and pitfalls, *Liberation Diaries* (vol. 2) not only commemorates three decades of democracy but also encourages readers to imagine a more inclusive and just society, making it essential reading for anyone invested in the country's path forward.

Through this book, Chinese readers will understand South Africa's social and political dynamics better.

WENHUA ZONGHENG (文化纵横) is a leading journal of contemporary political and cultural thought in China. Founded in 2008, the journal publishes issues every two months, featuring articles by a wide array of intellectuals across the country and building a platform for discussion of different ideological positions and values in China's intellectual community. The publication is an important reference for debates and developments in Chinese thought, on matters ranging from China's ancient history and traditional culture to its current socialist practices and innovations, from the important cultural trends in contemporary Chinese social life to Chinese views and analyses of the world today. Tricontinental: Institute for Social Research and Dongsheng News have partnered with *Wenhua Zongheng* to publish an international edition of the journal, releasing multiple issues per year featuring a selection of articles that hold particular relevance for the Global South.

In Chinese, the word 'Wenhua' (文化) means 'culture' as well as 'civilization', while 'Zongheng' (纵横) literally means 'verticals and horizontals', but also alludes to the strategists who helped to first unify of China, roughly 2,000 years ago through diplomacy and alliances. It is impossible to translate the journal's title into English while retaining its historical meaning and significance, therefore, we have chosen to keep the pinyin romanisation of the title to remind our readers: China has a complex history and culture that is challenging to translate and navigate, and this project seeks to bridge this understanding.

文化纵横 Dongsheng tricontinental