



# 中外对话

## chinadialogue

### “一带一路” 绿色影响力 A green Belt and Road

中国能否帮助其他国家解锁循环经济?

Will China help countries unlock the circular economy?

中国在海外为什么要“绿色”投资

Why China should green its overseas finance

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Shanghai's compulsory waste sorting begins

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## 关于“中外对话”

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*chinadialogue's* primary vehicle is our website (<http://www.chinadialogue.org.cn>), a unique bilingual platform which promotes a global understanding of the environmental impact of China's rise by publishing informed articles, commentaries and analysis by writers from inside and outside of China. We aim to inform, educate, and contribute to building a global consensus on fair and workable solutions.

*chinadialogue* is now read in 208 countries and regions and in all regions of China.

## About our journal

Produced on a bi-monthly basis, our journal brings you the best articles and reports from *chinadialogue*. If you want to contribute to the discussion you can visit our website (<http://www.chinadialogue.org.cn>) to add your comments and thoughts. Join the debate and be part of the solution.

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# 中国能否帮助其他国家 解锁循环经济？

新报告显示，中国可以帮助发展中国家更好地迎接可持续发展的挑战。

□ 山姆·吉尔

**中**国能否像在气候变化问题上一样，成为全球循环经济的领军者？这是英国智库查塔姆研究所在一份新报告中提出的问题，报告强调循环经济有机会成为推动发展中国家可持续和弹性增长的动力。

循环经济最早出现在日本，是以回收、再利用以及原材料和产品修复为基础的经济模式，中国国内一直将其视为政治优先事项，广泛运用于产业政策中，并于 2008 年写入法律。

“中国早就知道循环经济是实现可持续发展的双赢手段——满足消费需求，创造就业和保护环境，”查塔姆研究所研究员、报告作者之一的劳拉·韦尔斯利提到中国国内的循环经济倡议时说。

“但中国还没有把握住在发展中国家推广这种做法的机会，”她补充说。“中国通过‘一带一路’倡议等项目，积蓄了巨大的潜力，能够促进区域和国际社会的合作，在这一关键的窗口期关闭之前锁定可持续发展。”

但如果中国不断增长的海外投

资遵循原先“先污染，后治理”的模式，把“一带一路”沿线国家带上碳和资源密集型的发展道路，结果可能恰恰相反。

“一带一路”项目带来的环境和气候影响正面临更严格的审查，其背景是在富裕国家，越来越多的行业正在向可持续消费和生产模式转型，其中一家汽车制造商许下了极具雄心的气候承诺，戴姆勒公司近来宣布到 2039 年其整个乘用车投资组合将实现碳中和。类似的，全球最大的建材公司之一德国海德堡水泥集团也承诺到 2050 年实现碳中和。

随着中国的海外投资继续流向水泥等传统能源密集型行业，要求中国绿化投资的呼声只会越来越大。

## 构建循环经济

查塔姆研究所的报告列举了这方面现有的一些积极例子，并指出贫穷国家的大型非正式部门已经在电子废弃物和电话维修等领域开展“循环”活动。

认识并利用这一专门知识，将其作为工业发展和增加就业战略的替代方案，可以获得包括减缓和适应气候变化在内的多重效益。

除了废弃物行业，循环经济的方法还出现在了从住房到交通和食物等多个领域。例如越南民众用稻壳制成的材料来建造房屋，防火、隔热和隔音效果都更好。在印度，人们尝试不再填埋塑料垃圾，而是打碎后埋入路基，有助于提高道路的耐久性。

但挑战依然存在，包括机构能力不足、监管不力、资金和技术的获得等一系列问题。

例如卢旺达和肯尼亚实施了全面的塑料袋禁令，但仍有塑料袋走私入境。在缺乏物美价廉的替代品的情况下，零售商别无选择，只能继续加剧塑料危机。

翻新后的手机有望为贫穷国家带来福利，在节约资源的同时增加互联和经济机会，但目前非正式电子废物行业往往雇佣脆弱的群体，对他们的健康会产生巨大的负面影响。





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循环经济在行动：南非好望角收集的塑料瓶做成的灯具

## 中国的支持作用

中国如何才能帮助贫穷国家克服这些挑战，释放循环经济的潜力？习近平主席承诺，“一带一路”倡议应该促进“绿色、低碳、循环和可持续的发展形式”。

中国推广自身在新的商业模式方面经验的例子包括投资非洲国家的塑料回收部门。约 60 家中国工厂在坦桑尼亚从事塑料回收，20 家中国的塑料回收公司在加纳活动，3 家中国塑料回收公司在埃塞俄比亚注册。

报告还列举了由专门从事资源回收的深圳格林美有限公司主导、拟建在南非的中非循环经济产业园，以及一个由中国政府资助的项目，该项目旨在评估阿塞拜疆、塔吉克斯坦、土库曼斯坦和乌兹别克斯坦的工业园和工业区成为“一带一路”一部分的可能性。

但发展中国家要走得更远，就需要开发银行等多边机构和国际企业提供更大的支持。在这方面，不仅是“一带一路”这样的新兴区域形式，中国的大型政策性银行，以及在

工业共生体和共享经济等模式方面经验愈发丰富的中国其他大型国有企业也可以发挥更大的作用。

报告还特别指出中欧合作或将凭借双方最近达成的协议推动与发展中国家的最佳实践分享，帮助其实现中欧正在经历——也是全世界都急需的——制度转变。<sup>5</sup>

山姆·吉尔，中外对话执行主编，英国智库查塔姆研究所助理研究员，同时也是苏塞克斯大学科学政策研究部 (SPRU) 的副教授

# Will China help countries unlock the circular economy?

A new report shows that China can help developing countries meet the challenges of sustainable growth

□ Sam Geall

Can China be a global leader on the circular economy, as it has purported to become on climate change? It's a question posed by a new report from UK thinktank Chatham House, which highlights the opportunities for the circular economy as an engine of sustainable and resilient growth in developing countries.

The circular economy is an economic model based on recycling, reusing and repairing raw materials and products that was first proposed in Japan. In China it has been a domestic political priority, widely adopted in industrial policy and written into law in 2008.

“China has long understood that the circular economy can be a win-win for sustainable growth – meeting consumer demand, creating jobs and protecting the environment,” said Laura Wellesley, research fellow at Chatham House and a report co-author, referring to the country's domestic circular economy initiatives.

“But opportunities for scaling up this approach in developing countries are being missed,” she added. “Through projects like the Belt and Road Initiative (BRI), China has huge potential to foster greater coordination regionally and internationally, and lock in sustainable growth before a critical window of opportunity passes.”

However, China could also achieve the opposite result if its growing overseas investments follow the traditional

“pollute first, clean up later” model, which could steer BRI countries into carbon- and resource-intensive development pathways.

Greater scrutiny of the environmental and climate impacts of BRI projects is happening amid increasing industry commitments in rich countries on the shift to sustainable consumption and production models. In one of the most ambitious climate commitments from a vehicle manufacturer, Daimler recently announced its entire passenger car portfolio will be carbon neutral by 2039. Similarly, one of the world's largest building materials companies, HeidelbergCement, pledged in Germany to go carbon neutral by 2050.

As Chinese overseas investment continues to flow into traditional, energy-intensive industries, such as cement, calls for China to green its spending will only grow louder.

## Building out the circular economy

The Chatham House report cites a number of existing, positive examples in this regard. Large informal sectors in poor countries already practise “circular” activities, the report points out, in areas like e-waste and phone repairs.

Recognising and drawing on this expertise as the seed of an alternative industrial development and job-creation



strategy could reap dividends, including for climate change mitigation and adaptation.

Potential circular economy approaches can be found beyond the waste sector, from housing to mobility and food. In Vietnam, for example, materials made from rice husks are being used to build more fire-resistant, heat- and sound-insulated homes. In India, burying shredded plastic in road construction is being trialled as an alternative to landfill that can help increase road durability.

But a range of challenges still exist, from institutional capacity and weak regulation, to access to finance and technology.

Rwanda and Kenya, for example, have imposed total bans on plastic bags, but they're still smuggled into the country. In the absence of cheap and high-quality alternatives, retailers are left with little choice but to continue adding to the waste crisis.

Refurbished phones promise welfare benefits in poor countries, increasing connectivity and economic opportunities while conserving resources, but today's informal e-waste industry can bring significant negative health impacts for the often vulnerable populations they employ.

### China's supporting role

How could China help poor countries to move past such challenges and unlock the potential of the circular economy? President Xi Jinping has pledged that the BRI should promote a “green, low-carbon, circular and sustainable form of development”.

Examples of China building on its own experience in new business models include investments in plastic recycling sectors in African countries. About 60 Chinese factories are engaged in plastic recycling in Tanzania, 20 Chinese plastic recycling firms operate in Ghana, and three more are registered in Ethiopia.

The report also cites the planned construction of a China-African Circular Economy Industrial Park in South Africa, led by GEM Co. Ltd, a Shenzhen-based company specialising in resource recycling, as well as a Chinese government-funded project to assess the potential of industrial parks and zones in Azerbaijan, Tajikistan, Turkmenistan and Uzbekistan, as part of the BRI.

However, for developing countries to go further they will require greater support from multilateral institutions, such as development banks, and international businesses. Here, not only emerging regional formats like the BRI, but also China's large policy banks can surely play a greater role, as can its large and state-owned enterprises, which have increasing experience in models like industrial symbiosis and the sharing economy.

Specifically, the report points to the potential of EU-China cooperation, drawing on a recent agreement between the two, which could lead to joint sharing of best practices with developing countries, to realise the potential of a system shift getting underway in China and Europe – but urgently needed around the world. ☺

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# 中国在海外为什么要“绿色”投资

中国的开发银行可以支持新的制造业走出去，并积极应对气候变化

□ 海伦娜·赖特

**在**4月下旬举办的“一带一路”高峰论坛上，国家开发银行签署了“一带一路”绿色投资原则。该原则于去年发布，是一套自愿准则，目的是促进“一带一路”倡议之下的低碳、可持续投资。

作为世界上最大的开发银行，也是“一带一路”项目的主要融资机构，国家开发银行此举意义非凡。但与其他开发银行不同的是，国家开发银行仍在为海外煤炭项目提供融资（超过18千兆瓦的煤炭产能仍在建设中），并且目前尚未公布气候战略。

国家开发银行在煤炭问题上的立场不符合中国的经济利益和不断变化的国际规范。国开行应迅速转向可持续投资，利用全球清洁能源市场，避免气候风险加剧，在气候问题上表现出一致性和领导力。

## 全球清洁能源机会

通过提高海外绿色融资，中国既可以应对气候变化，也可以支持其制造业。2014年，清洁能源制造业为中国经济带来近400亿美元

收入，全球太阳能发电的价格也因此而大幅降低。有估计称，从成本优势的角度来讲，中国太阳能发电的成本比美国低20%。中国在能源效率方面也处于领先地位。近来一项研究估计，全球可再生能源市场有机会给中国带来1万亿美元的收入。如果中国继续投资海外煤电厂，其在这方面的优势将受到影响。

## 经济学更倾向清洁能源

中国仍是全球煤炭项目最大的融资方。但事实上，全球近40%煤电厂的营收情况都不佳，而且到2040年这一比例可能会上升至75%。这意味着国开行支持的煤炭项目可能会沦为无法获得经济回报的搁浅资产。最近的研究发现，这些损失可能导致严重的金融困境，进而影响宏观经济和金融稳定。

过去之所以会优先考虑投资海外煤炭项目，一个原因就是为吸纳国内煤炭行业过剩的产能。但中国不是煤炭的主要出口国，2017年排在全球第10位，2016年中国煤炭产量下降7.9%，创历史新低。建立

煤炭出口所需的投资其实可以更好地投资于一些转型项目，创造可持续就业。

国开行的投资对象从煤炭转向清洁能源将促进中国自身经济的发展。中国可再生能源领域的就业岗位已经超过了煤炭开采业，且呈上升趋势，从2016年的360万增至2017年的390万。继续为煤炭出口提供融资，可能会延长煤炭行业逐渐衰落的过程，而这些资金本可以更好地用于增加清洁能源就业岗位。国家开发银行可以通过从煤炭向清洁能源的战略转变，促进国内长期就业岗位的增加。

## 气候风险

如果国家开发银行继续投资海外煤炭项目，全球气候政策失败，那国内受气候变化的影响将很严重。中国气候变化专家委员会提出了4种气候风险：冰川融化引发水资源风险；海平面上升和洪水带来的城市安全风险；气候引发的贫困风险；和对疾病的影响。

中国的中期增长取决于“一带



一路”国家是否走上可持续发展的道路，所以没有理由让这些国家的经济中存在这种脆弱性。“一带一路”有让这些经济体朝着好的方向转型的能力，但也可能导致全球陷入灾难性的气候变化，让巴黎气候目标变得遥不可及。

## 中国领导力与国际规范

各大开发银行正在放弃煤炭投资，新的绿色投资原则也是国家开

发银行的一个机会。国开行可以借鉴其他机构的经验，在应对气候变化方面确立自己全球领先金融机构的地位。

清洁能源投资如今成为金融行业新的规范。目前全球超过 100 家主要金融机构都在限制煤炭融资，银行和贷款机构平均每两周就会宣布一项新政策。作为国际开发性金融俱乐部的一员，国开行已经承诺遵守《巴黎协定》，并有机会展示中国的气候领导力。

最后，国家开发银行作为中国对外投资的大使，应该支持更好的发展选择。一些国家选错了投资领域，可能难以抵挡煤炭融资的诱惑，但帮助他们转向清洁能源，并在这个过程中分享自己在该领域的专业知识，这才是符合中国利益的。☺

海伦娜·赖特博士，英国智库E3G高级政策顾问，致力于推动国际金融实现气候目标。

# Why China should green its overseas finance?

The country's development banks can support its new manufacturing industries and respond to climate change

□ Helena Wright

At China's Belt and Road Forum in late April, China Development Bank signed up to the Green Belt and Road principles, a voluntary set of guidelines released last year to promote low-carbon, sustainable investments in the Belt and Road Initiative (BRI).

The move is important because China Development Bank (CDB) is the largest development bank in the world and is a key financier of BRI projects. But unlike some of its peers, CDB is still funding coal projects overseas – with over 18 gigawatts of coal capacity still in the pipeline – and is yet to publish a climate strategy.

This position on coal is not in line with China's economic interests and shifting international norms. CDB should pivot quickly to sustainable investments in order to capitalise on the global market for clean energy, avoid worsening climate risks and demonstrate both alignment and leadership on climate change.

## Global clean energy opportunities

By shifting to green overseas lending, China can both respond to climate change and also support its manufacturing industries. Clean energy manufacturing added almost US\$40 billion to China's economy in 2014 and has dramatically reduced the price of solar power

around the world, with one estimate suggesting it has a 20% cost advantage over the United States. China is also leading the way in energy efficiency. One recent study estimated that the global market for renewable energy represents a US\$1 trillion opportunity for China. This is being undermined by continued funding for coal plants abroad.

## Economics favours clean energy

China is still one of the biggest funders of international coal projects despite the fact that almost 40% of coal plants globally are unprofitable, a figure that could rise to 75% by 2040. This means that CDB's support for coal could result in stranded assets which are no longer able to earn an economic return. Recent research has found these losses could induce severe financial distress, with implications for macroeconomic and financial stability.

One reason why overseas coal investment has been prioritised in the past was to support excess capacity at

**Domestic climate change impacts would be severe if CDB continues to invest in coal abroad.**

home. Yet China is not a major exporter of coal, being the 10th largest in 2017, and coal production fell by 7.9% in 2016 – a record decline. Investment needed to create viable export industries under competition from others would be much better spent investing in a transition to sustainable jobs.

Shifting CDB's investment from coal to clean energy will boost China's own economy. There are already more jobs in China in renewable energy than in coal mining, and there is an upward trend in renewable energy jobs, which rose from 3.6 million in 2016 to 3.9 million in 2017. Continued public finance for coal exports may prolong the decline of the fading coal industry while the funds could be better spent supporting clean energy jobs. CDB could promote additional, long-term domestic jobs through a strategic shift from coal to clean energy.

### Climate risks

Domestic climate change impacts would be severe if CDB continues to invest in coal abroad and global climate policies fail. The China Expert Panel on Climate Change presents four types of climate risks: water resource risks triggered by glacial melting; urban security risks including sea level rise and floods; climate-induced poverty risks; and impacts on diseases.

China's medium-term growth depends on BRI countries adopting sustainable development pathways, so it does not make sense to build vulnerability into their economies. BRI

has the potential to transform these economies but it could also tip the world into catastrophic climate change and make the Paris targets unachievable.

### Chinese leadership and international norms

Major development banks are moving away from coal, and the new green finance guidelines are an opportunity for CDB to do the same. There is a lot of experience from other institutions that the CDB could build on to establish itself as the world's leading global financial institution in tackling climate change.

The new norm is investment in clean energy. Over 100 major global financial institutions now restrict coal funding, with new policies announced by banks or lenders on average every two weeks. As a member of the International Development Finance Club, CDB has committed to align with the Paris Agreement. It also has an opportunity to demonstrate Chinese climate leadership within this group.

Finally, China Development Bank is an ambassador for China so it should support better development choices. Some countries are not investing in the right places and may find it hard to resist coal finance, but it is in China's interests to help them shift to clean energy, sharing China's expertise in this area along the way. ↻

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# 中国核能国际化瞄准阿根廷市场

中阿两国核能合作协议即将达成，而成本、排放和安全问题仍然待解决。

□ 白莉莉 费尔明·库普



秦山核电站的控制室

**虽**然国内经济政治都不稳定，但阿根廷仍然选择在对华核电协议上双倍下注。得益于中国的技术和金融支持，这座位于布宜诺斯艾利斯省的全新核电站将帮助弥合阿根廷的能源需求缺口。

中国希望加大核电出口，而不少国家也在寻求低碳电力资源，所

以说阿根廷的这个项目也许将成为中国领导的核能产业复兴的开始。然而，针对核电成本和安全的担忧却一直阻碍着这项技术的推广。

## 达成协议

在建设协议正式签署四周年之

后，阿根廷正在积极推动阿图查 3 号（Atucha III）核电站于 2021 年正式投入运营。

今年 4 月，阿根廷总统毛里西奥·马克里领导下的政府与中国国家能源局签订了一份意向书，并且将在未来几周签定合同。合同中将包括中国工商银行提供的一笔 100

亿美元的贷款，约占该核电站建设资金总额的85%。

而近日于北京召开的第二届“一带一路”高峰论坛上，阿根廷外交部长豪尔赫·富里耶也证实了该项目的进展情况。

阿图查3号（Atucha III）项目是阿根廷前总统克里斯蒂娜·费尔南德斯·基什内尔在2015年签署的一份协议的一部分。协议批准了两个核电站项目：一个是在阿根廷现有设备上利用加拿大技术进行升级改造，另外一个则是采用中国技术直接新建。

马克里上任后，出于对核能经济性的种种质疑，对这项协议进行了严格的核查，并最终批准了这个项目。但是，阿根廷经济危机导致其中一个项目被搁置，以缩小贷款规模。

卡内基核政策项目高级研究员马克·希布斯表示：“阿根廷正处于经济危机之中，资金紧张。核能建设是一项长期投资，但是中国可以为我国国际用户提供资金补贴。”

“这样来看，中国的确比其他核能出口国更有优势。”

## 加强联系

这项核能协议是中阿两国“全面战略伙伴关系”的一部分。“全面战略伙伴关系”是中国与为数不多的国家建立的具有较高外交等级的联盟关系。费尔南德斯·基什内尔总统任内，中阿两国共签署了20多项协议。

去年在布宜诺斯艾利斯举办的G20峰会上，马克里与中国国家主席习近平签署了一项两国未来五年的行动计划（2019-2023），但是习近平主席并未明确表示阿根廷能否获

得中国“一带一路”技术设施建设倡议行动的正式背书。这个核电合作项目曾有望直接获批，但是相关谈判却陷入了僵局。

阿根廷现任政府将这个项目看作减少阿根廷能源短缺、促进对华关系发展的一个契机。阿根廷驻华大使盖铁戈近日表示：“这项协议说明了中阿战略关系已经走向成熟。”

阿根廷总统马克里已经同意采用中国技术建设核电站，这也是获得中国工商银行贷款的一个条件。

中国核工业集团最初计划与阿根廷国企Nucleoelectrica共同建设这个核电站。而前者出席了上月举行的中-阿核能领域投资合作意向书签字仪式也表明，其仍将参与该项目建设。

## 项目推进遭遇抵制

不过，这项核能协议却引来了几位前能源部长的批评。他们在去年11月发布的一篇新闻稿中表示，发展太阳能和风能的成本或许更低。

阿根廷前能源部长豪尔赫·拉佩尼亚表示：“任何能源项目都必须是国家长期能源规划的一部分，而目前阿根廷还没有这样的规划。此外，所有新的项目都应该具有经济竞争力，应该与国家的温室气体减排承诺相一致。”

认为应该优先发展风能和太阳能资源的环境保护组织也持同样观点。

环境与自然资源基金会（FARN）负责人安德烈·那波里说：“我们认为核能不是可再生能源，核反应堆和核废料会产生很多风险，不宜在阿根廷进行推广。”

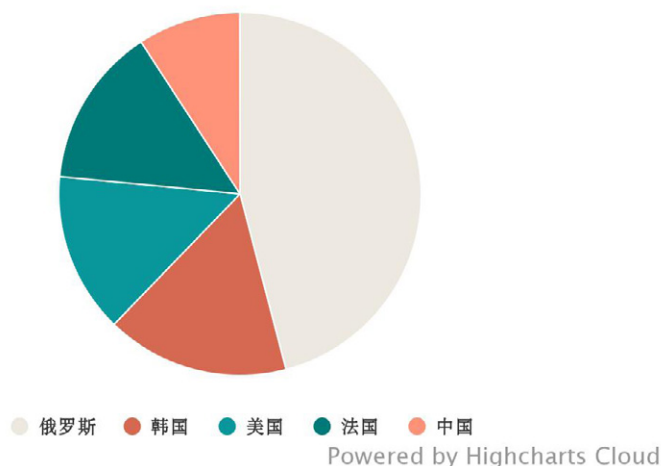
他补充道：“新建核电站必须要进行风险和影响评估，但是我们现在一样也没看到。”

## 阿根廷核能发展回顾

阿根廷是拉丁美洲第一个采用核能资源的国家。阿根廷第一个核电项目—362兆瓦的阿图查1号（Atucha I）核电站于1974年正式投

## 世界主要海外核电开发国

来源：微信公众号“核能科普ABC”



入运营。随后，阿根廷又在同一座设施内建了阿图查 2 号（Atucha II）核电站，并在内陆科尔多瓦省建设了恩巴尔斯（Embalse）核电站。

如今，这些项目约占阿根廷能源供应总量的 3%。其中，享受补贴的碳氢化合物（化石燃料）仍是能源供应的主力军。随着该国 147 个总装机 4466 兆瓦的太阳能、风能项目先后招标完成，太阳能与风能在阿根廷能源结构中所占的份额也日渐增加。

按照最初协议，中国还将在阿根廷建设第 4 座（阿图查 3 号）和第 5 座（阿图查 4 号）核电站，新增发电能力 1700 兆瓦。其中阿图查 3 号核电站将为该国增加 745 兆瓦的发电能力。

虽然阿根廷一直都在引进核反应堆技术，但是该国同样也拥有先进的核研究能力。

成立于 40 年前的阿根廷国有 INVAP 公司就可以为全球市场提供核反应堆开发服务。就在最近，INVAP 还向荷兰、沙河阿拉伯和巴西出口了较为简单的在低温环境下运转的研究型核反应堆，但是该公司目前还没有能力出口电厂级别的核电技术。

阿根廷核监管机构前负责人迭戈·赫尔塔多说：“阿根廷只能在全球范围内参与少数几个领域的竞争，而研究用核反应堆的开发就是其中之一。”

### “一带一路”上的缺口

就在阿根廷等国还在探讨是否值得发展核电的时候，中国已经崛起为这一领域的全球领军力量。受

国内大气污染、气候变化、能源安全等因素的推动下，中国如今已经成为全球最大的核能项目国家。

过去，中国也依赖技术进口。但近几年来，中国已经生产出了自己的核反应堆，其中就包括阿根廷即将使用的“华龙一号”反应堆（HPR1000）。根据中国政府的《中国制造 2025》计划，中国计划更多地采用国内技术，将中国核工业打造成全球的龙头力量。

此次阿根廷项目也是中国核能产业首次出海的一个成功案例。自 2000 年以来，俄罗斯一直主导着国际核能市场，占到全球总装机的 45%。中国目前是第五大核能出口国，仅占全球总装机的 9%。目前，中国在海外建设的唯一一座核反应堆在巴基斯坦。

除了与阿根廷和巴基斯坦已经签订的协议外，我们还不清楚中国核反应堆能否在其他国家和地区找到市场。

国家电力投资集团科学技术研究院高级工程师张华（音译）以个人身份对“中拉对话”表示：“福岛核电站事故后，全球核电需求已经不那么强劲了，而美国、德国、韩国等国正开始逐步淘汰核电。”

张华补充道：“南非、土耳其、阿根廷等国的核电需求也没有预想的那么高。所以说，目前中国核电出口的前景并不乐观。”

中国能源研究所高级研究员姜克隽指出，中国计划出口的是第三代核反应堆，其技术安全性比福岛核电站那个时候的更加可靠。

2014 年，中国的“华龙一号”反应堆通过了国际原子能机构的安全审查，目前正在接受欧洲相关机构的评估。

除此之外，中国核能出口的经济竞争力也是影响其成功的一个关键因素。因为与其他低价能源相比，核能已经没有那么有竞争力了。

美国的核电站数量在全球首屈一指。目前，该国已经开始提前淘汰无法与天然气和可再生能源发电等低价能源竞争的核电设备。“华龙一号”副总设计师告诉《南华早报》，中国反应堆的价格是可以和法国、美国技术相抗衡的。

姜克隽表示，随着中国国内核能建设提速，核反应堆的成本很有可能在未来几年大幅下降。虽然中国还面临着俄罗斯等老牌核能出口国的激烈竞争，但是核能出口应该还是会受益于国内核能的发展。

姜克隽指出：“如果我们能打造一个核能产业标杆，我相信全球核工业还会复苏。”

“忧思科学家联盟”核能安全项目代理负责人艾德温·莱曼表示：“如果 HPR1000 的确能够在降低成本的同时提高安全性，那将成为核能设计领域的巨大进步。但是在安全性

除了与阿根廷和巴基斯坦已经签订的协议外，我们还不清楚中国核反应堆能否在其他国家和地区找到市场。



得到证实之前，必须要累积大量的实际运营经验。”

## 核能可以解决气候危机吗？

2018年，政府间气候变化专门委员会（简称IPCC）发布了一份具有里程碑意义的报告。报告指出，大多数情境下，要想实现全球升温不超过1.5摄氏度的温控目标，都要加大核能的比重。

核能是为数不多的能够平衡风能、太阳能等可变能源的非碳能源。能源模型研究显示，采用核能的同时，在化石燃料电厂开展碳捕获与封存（CCS）技术，其电网去碳化的成本比实现100%可再生能源转型还要低廉。

但是从全球范围来看，核电机组的建设速度远远赶不上淘汰速度，这就意味着零碳电力的一个关键来源正在日渐减少。

核电供应不足，各国将不得不更加依赖电池存储、高效输电网和碳捕获与封存（CCS）等方法，从而平衡逐渐实现100%可再生能源供电后，电网的电力供应波动和排放。

## 平衡风险

即便是在气候危机日益严峻的今天，各国仍然会出于安全和成本顾虑而拒绝使用核能。

虽然第三代核反应堆的安全性有所提高，但是核电仍存在大量的风险，比如铀矿开采带来的核辐射，类似福岛核电站事故的堆芯熔毁风险，以及利用核技术制造核武器等。

核电支持者认为，即便是存在堆芯熔毁和事故风险，核电的单位电力致死率仍远远低于煤电和天然气发电。

地缘政治紧张可能也会影响中国核能出口规划的实施。中广核集团通过投资核电厂已经在英国取得了一席之地，并计划在英国建设一

座“华龙一号”反应堆。但是批评人士却对中国参与建设如此敏感的基础设施表示了担忧。

研究人员还警告称，新开辟的核能市场国家目前的监管环境可能还不够成熟，无法对新建的中国核电站进行评估和安全管理。

阿根廷的一些民间社会团体反对核能。里奥内格罗省已经通过了禁核法案。

中-阿核电建设协议将在几周内达成，这也是一个检验的机会，看看人们为了获得长期的零碳电力供应，对核能风险和新能源出口方的技术到底有大的接受能力。<sup>5</sup>

英文原文首发于中外对话网站中拉对话

白莉莉，中外对话研究员，北京能源网络（Beijing Energy Network）执行制作

费尔明·库普，阿根廷记者，致力于环境报道

# China eyes Argentina in global nuclear roll out

Costs, emissions and safety at stake as Argentina and China look set to seal a nuclear power deal

□ Lili Pike Fermín Koop

In the midst of economic and political uncertainty, Argentina has doubled down on a major Chinese nuclear power deal. The new nuclear plant in Buenos Aires province will help meet Argentina's energy needs with the support of Chinese technology and finance.

With China looking to increase its nuclear power exports and countries seeking low-carbon electricity, the project in Argentina could be the beginning of a China-led renaissance. However, concerns over the cost and safety of nuclear power continue to plague the technology.

## Striking a deal

Four years after formally agreeing to its construction, Argentina is moving forward with the Atucha III nuclear power plant that will likely become operational in 2021.

In April, Argentine president Mauricio Macri's administration signed a letter of intent with China's National Energy Administration. The contract, which is expected to be signed in the coming weeks, will include a US\$10 billion loan from the Industrial and Commercial Bank of China (ICBC), which will cover 85% of the plant's construction costs.

Foreign minister Jorge Faurie recently confirmed the project at the second Belt and Road forum in Beijing.

The Atucha III project is part of an agreement signed in 2015 by former president Cristina Fernández de Kirchner, which approved two nuclear plants: one using Canadian technology in Argentina's existing plants, and one using Chinese technology.

Macri scrutinised the deal on taking office, amid doubts over whether nuclear was a sufficiently economical energy source. He eventually approved construction, but Argentina's economic crisis led one of the plants to be shelved to reduce the size of the loan.

"Argentina is going through an economic crisis and money is tight. Investing in nuclear requires a long-term commitment, but China can offer subsidised capital to its foreign customers," said Mark Hibbs, senior fellow at Carnegie's Nuclear Policy Program.

"This gives China an advantage over other nuclear exporting countries."

## Strengthening ties

The nuclear deal is in line with Argentina's "integral strategic alliance" with China, a high diplomatic status the latter reserves for only a few countries. Under Fernández de Kirchner, the two signed more than 20 treaties.

Macri and Chinese president Xi Jinping then signed a



Former president Cristina Fernández de Kirchner applauds the opening of the Atucha II plant in 2015

joint five-year action plan (2019-2023) at last year's G20 Summit in Buenos Aires, but Xi did not secure Argentina's formal endorsement of China's Belt and Road infrastructure initiative. The nuclear project was also expected to get the green light, but negotiations stalled.

The current government has now justified the project as a way of reducing the country's energy deficit and fostering closer ties with China. "The agreement shows the level of maturity of our strategic relationship," Diego Guelar, Argentina's ambassador said recently.

Macri agreed to build the plant using Chinese technology, a condition of the ICBC loan.

State-owned China National Nuclear Corporation was originally slated to build the plant with Argentina's state-owned Nucleoelectrica. The former's presence at the letter signing last month signals that it will remain involved.

### Backlash

The nuclear deal attracted criticism from a group of former energy secretaries, who claimed in a November press release that it would be cheaper to develop solar and wind projects.

"Any future energy projects have to be part of a national and long-term energy plan, which now doesn't exist. All new projects should be economically competitive and should be in line with the country's mitigation commitments," said Jorge Lapeña, a former energy secretary.

Environmental organisations that prioritise wind and solar proliferation agree.

"We don't consider nuclear as renewable energy, it has many risks regarding the functioning of the reactors and waste. It's not suitable for Argentina," said Andrés Nápoli, head of Fundación Ambiente y Recursos Naturales (FARN).

He added: "A new nuclear plant would require risk and impact studies and we haven't seen any."

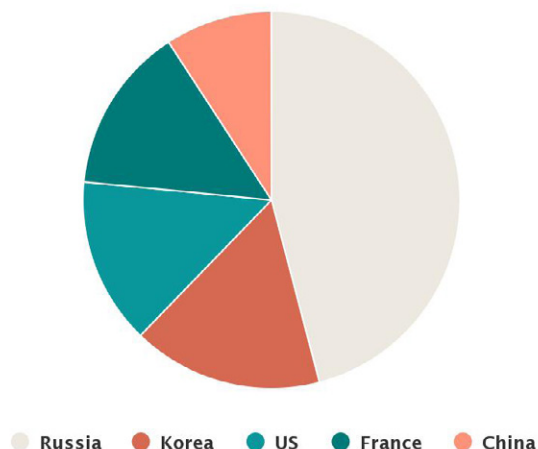
### Argentina's nuclear history

Argentina was the first country in Latin America to adopt nuclear power. The first Argentine nuclear project, the 362-megawatt Atucha I plant, started operation in 1974. It was followed by Atucha II, which is located in the same complex, and the Embalse plant in the interior Córdoba province.



### World's top overseas nuclear power developers

Source: compiled using data from BJX (China)



Today, these projects account for around 3% of Argentina's energy mix, which mainly relies on hydrocarbons, the production of which is subsidised. Solar and wind energy have scaled up recently after tenders for 147 projects totalling 4,466 megawatts.

The original deal with China would have added Argentina's fourth and fifth (Atucha III and IV) nuclear plants, adding 1,700 megawatts to the grid. The one plant will add 745 megawatts.

Argentina has always imported nuclear power reactor technologies, but it also has an advanced research industry of its own.

Created 40 years ago, state-owned Argentine firm INVAP develops nuclear reactors for global markets. INVAP has recently sold simpler research-scale reactors (which operate at lower temperatures) to the Netherlands, Saudi Arabia and Brazil, but does not have the capacity to export power plant-scale technology.

"Argentina can only compete in a few areas on an international scale and developing nuclear reactors for research is one of them," said Diego Hurtado, former head of Argentina's nuclear regulatory authority.

It is unclear whether China's nuclear power reactors will find other markets beyond Argentina and Pakistan.

### A notch in China's belt

As countries like Argentina debate whether nuclear power is worth pursuing, China has emerged as a global champion. Driven by air pollution, climate change and energy security concerns domestically, China now has the world's largest pipeline of nuclear power projects.

In the past, China has also relied on imported technology. But in recent years it has produced its own

reactors, including the Hualong One reactor (HPR1000), to be used in Argentina. According to the government's Made in China 2025 plan, China aims to use more domestic technology and make its nuclear industry a global leader.

The Argentina deal is one of the first success stories for Chinese nuclear overseas. Since 2000, Russia has dominated overseas nuclear power, supplying 45% of total capacity. China is the fifth largest exporter, supplying just 9%. So far, the only Chinese reactors constructed overseas are in Pakistan.

Beyond the Argentina and Pakistan deals, it is unclear whether China's nuclear power reactors will find other markets.

"After the Fukushima accident, global demand for nuclear power hasn't been strong, and the US, Germany, South Korea and others are phasing it out," said Zhang Hua, a senior engineer at the State Power Investment Corporation's Institute of Science and Technology.

"Demand from South Africa, Turkey, Argentina and other countries is also not as high as expected. The current outlook for China's nuclear power exports is not optimistic," Zhang added.

Jiang Kejun, senior researcher at China's Energy Research Institute pointed out that the reactor design China plans on exporting is Generation III, which has enhanced safety features compared to the era of reactor technology used in Fukushima.

In 2014, China's Hualong One reactor passed the International Atomic Energy Agency's safety review and is now undergoing assessments in Europe.

Alongside this, the economic competitiveness of Chinese nuclear exports will be a major determining factor in its success as cheaper forms of energy have made nuclear less attractive.

The US, home to the world's largest fleet of nuclear power plants, has been prematurely retiring plants that cannot compete with cheaper natural gas and renewable electricity generation. The Hualong One's deputy chief designer told the South China Morning Post that the reactor's price would rival French and US technologies.

As China ramps up construction domestically, the cost of its reactors may fall significantly in the coming years, Jiang said. Although China also faces stiff competition from "legacy" exporters, especially Russia, its overseas nuclear expansion could benefit from domestic development.

"If we make a good case for nuclear, I believe the world will come back," Jiang Kejun said.

Edwin Lyman, acting director of the Nuclear Safety Program at the Union of Concerned Scientists, said: "If the HPR1000 indeed delivers increased safety at reduced cost, then it would represent a significant advance in nuclear power design. But it will take considerable operating experience before its safety features can be proven."

### Is nuclear a solution to the climate crisis?

According to the Intergovernmental Panel on Climate Change's landmark 2018 report, the role of nuclear power will increase under most scenarios that keep the global temperature increase below 1.5C.

Nuclear power is one of few carbon-free options that can balance variable energy resources like wind and solar. Energy models show that utilising nuclear as well as carbon capture and sequestration (CCS) for fossil fuel plants makes the decarbonisation of the power grid cheaper than a switch to 100% renewable energy.

However, worldwide, new nuclear power plants are not keeping pace with retirements, meaning that a key source of zero-carbon power is decreasing.

With less nuclear, countries would have to rely more heavily on other options like battery storage, better grid transmission, and CCS to balance a grid that approaches 100% renewable energy.

### Weighing risks

Even as the climate crisis deepens, countries may reject nuclear because of concerns over safety and cost.


While Generation III reactors are safer, nuclear power still poses myriad risks. These include radiation exposure from uranium mining, meltdowns like Fukushima and using the technology to produce nuclear weapons.

Advocates say that even with meltdowns and accidents, nuclear causes far fewer deaths per unit of electricity compared to coal and gas.

Geopolitical tensions could also stymie China's export ambitions. In the UK, where the utility China General Nuclear Power has gained a foothold through investment in nuclear plants and plans to build a Hualong One, critics have raised concerns over China's involvement in sensitive infrastructure.

In markets new to nuclear power, researchers also warn that the regulatory environment may not be mature enough to assess and safely manage new Chinese plants.

In Argentina, several civil society groups oppose nuclear. Rio Negro province has already passed a law banning it.

As the Argentina deal is formalised in the coming weeks, it will provide a test case for how open the public is to the risks of nuclear, and technology from a new exporter, in return for a long-term supply of zero-carbon electricity. 

*This article is republished from Diálogo Chino*

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# 中国对航运的“绿化”作用独一无二

作为世界上最大的出口国和造船国，中国可以为一个碳中和的全球贸易系统铺平道路。

□ 内德·莫洛伊

**中**国国家主席习近平上个月说，“一带一路”倡议必须推动全球贸易的“绿色和可持续发展”。

迄今关于“一带一路”的报道主要集中在如何保证陆上的“丝绸之路经济带”的环境标准上，而对于这项宏伟的全球性倡议的另一半——“21世纪海上丝绸之路”的探讨却要少得多。实际上，后者涵盖了中国在34个国家将要参与建设或运营的42个港口。

当今世界80%的国际贸易量都要依靠航运。因此，中国在全球贸易“绿色化”方面的作用远超大多数人的认知。

去年4月，联合国国际海事组织的100多个成员国签署了一项标志性协议，即到2050年将全球航运业的温室气体排放减半，中国对于这一目标的实现至关重要。

全球航运业每年的温室气体排放量约为10亿公吨二氧化碳当量，几乎比前五大排放国的排放总量还多。1997年的《京都议定书》就要求各国政府通过国际海事组织来控制航运的温室气体排放，但20多年来却一直未能奏效。

去年4月，国际海事组织成员国一致达成了航运减排协议。中国代表团第一个对此表示祝贺。当时我就在场。

中国在本次“一带一路”高峰论坛上对绿色海上贸易的支持之所以重要有两个原因。一是商业原因：中国是世界上最大的商品出口国。因此要按照《巴黎协定》的目标实现航运去碳化而又不伤及全球贸易，中国可能就是最大的那颗“定心丸”了。

二是技术原因：中国是世界最大的造船国（仅中日韩三国就占新造船只的九成以上）。由于现代船舶的寿命长达25年，所以更换得很慢。

因此，要达到国际海事组织2050年的减排目标，零碳船舶必须在2030年，也就是短短的10年之后实现商业化，然后才能成为常态。

## 建造绿色船只，保持领先地位

我相信，如果中国没有信心在整个转型过程中保持其在造船业的领先地位，并利用其在可再生能源技术方面的显著领先优势在10年内造出零碳船舶，就不会承诺遵守国际海事组织的排放协议。

尽管中国政府支持这个时间表，





但我还没有看到其国内造船商对此有太多的讨论；如果它们不能跟上航运业要求的去碳步伐，中国可能会失去其头号造船国的地位。全球最大的集装箱航运公司丹麦马士基和日本邮船也承诺在同样的时间内实现碳中和。如果大型集装箱公司不能从中国购买零碳船，它们会从其他地方购买。

那么我们探讨的是何种技术呢？

到2023年挪威的所有渡船将以电池为动力。苏州的177艘内陆清理船甚至广东珠江上一艘2000吨的货船也将采用电池动力。然而，在可预见的未来，电池还无法为承载国际贸易的巨轮提供动力。

因此，碳中性燃料是必不可少的。最近关于氢燃料的探讨备受瞩目，尽管到目前为止航运在这场争论中被忽视了。

海运业目前已经有很多绿色氢燃料动力项目投入了运营：美国的一艘渡船、英国的世界首艘既能搭载汽车又能搭载乘客的海上渡船，以及连接波兰、瑞典和挪威的两艘零排放氢燃料电池集装箱船。

在比利时，拥有120年历史的集装箱航运公司CMB正在一艘集装箱船上试用燃料电池，今年晚些时候，安特卫普港将为船舶开设一个氢燃料补给站。

这个消息来得如此之快令许多业内人士感到惊讶，他们原以为海运行业的氢燃料还需要数年时间才能实现商业化。与此同时，发动机制造商将船舶脱碳视为一场“淘金热”。全球最大发动机制造商之一的曼恩动力设备

公司(MAN Energy Solutions)去年12月宣布，该公司已成功开发出将低温冷却的氢作为船上燃料的技术，这是一项重大突破。

氢在零下253摄氏度的条件下，就会从气体变成液体，体积减少到原来的1/800，从而降低了其装船运输的难度。因此，曼恩公司表示，其目标是到2050年实现海运业的零化石燃料排放，而氢燃料则将在实现这个目标的过程中发挥重要作用。

尽管中国的航运公司和港口在空气污染治理，尤其是硫的治理方面取得了令人惊喜的进展，但缺乏对绿色氢燃料或其他潜在的零碳燃料的探讨。例如，液化天然气虽然在减少空气污染方面非常有效，但若考虑到甲烷滑脱，它在减少温室气体排放方面几乎没有任何益处。

甲烷滑脱是指未燃烧的甲烷从工业生产各个环节中逸出的过程，从上游生产，到储存，再到内燃机。尽管石油和航运公司正在努力减少甲烷滑脱，但即便百分之几的外逸也会削弱油转气带来的温室气体减排效益，因为甲烷在其外逸后头二十年的温室效应是二氧化碳的84倍。

或许中国世界领先的可再生能源企业应该与其世界领先的航运业进行更多对话，以便使自己国家成为未来碳中性全球贸易体系的领头羊。

在推进对话的同时，短期内还会发生什么？本月，国际海事组织在伦敦举行了新一轮的航运去碳化讨论。讨论的关键议题是如何在未来四年实现该行业的短期二氧化碳减排。

## 限速与限排

三个主要的候选方案分别是全球速度限制(如路上的车辆一样，低速行驶的船舶耗油量更少)，所有现有和未来船舶的运行效率标准，以及日本提出的降低轴功率的建议。后者将要求在所有商业船舶上安装一个类似于汽车发动机上用的功率限制系统，以将功率限制在最佳的燃料消耗水平。

除了减少二氧化碳排放以减缓气候变化，减速还极大地有益于海洋生物，比如减少了影响鲸鱼、海豚和鱼类的水下噪音，降低了船只撞击的风险(目前一些濒危的鲸鱼品种因此走向了灭绝边缘)。

法国和希腊正提议出台减速政策。按吨位计算，希腊在世界航运业中所占的份额达到17%，没有国家可以与之比肩。本周，100多位航运公司老总也加入了这一行列。他们致信国际海事组织，表示支持全球海上限速，其中包括中国最大的船东之一中外运航运有限公司。

这一措施将需要中国代表团在国际海事组织的支持才能通过，但中国在这个问题上的立场还有待观察。但如果海运速度得到控制，中国出口的大多数制成品的碳足迹将会减少，或许到加州政府等大买家更注重其“进口碳”的时候，这一点能派上用场。☞

内德·莫洛伊，伦敦航运顾问，专注于燃料和环境监管

# China uniquely placed to ‘green’ shipping

As the world’s largest exporter and shipbuilder, China could pave the way to a carbon-neutral global trading system

□ Ned Molloy

The Chinese president, Xi Jinping, said last month that his country’s Belt and Road Initiative (BRI) to stimulate global trade and integration must be “green and sustainable”.

Media coverage of the BRI has focused so far on how to ensure environmental standards on the land-based “belt”. But there has been far less discussion about the other half of this vast global project – the 21st-century “maritime silk road”, in which Chinese firms are involved in either building or operating 42 ports in 34 countries.

In a world where 80% of the volume of international trade is carried by ship, China has a far bigger role in “greening” global trade than most people realise.

China’s support was crucial to the adoption of the UN International Maritime Organisation’s (IMO) landmark deal to at least halve the global shipping sector’s greenhouse gas emissions by 2050, signed in April last year by more than 100 IMO member states.

The global shipping sector emits more of these gases each year than all but the top five emitting countries, at almost 1 gigatonne of CO<sub>2</sub> equivalent. Getting these emissions under

control had eluded governments for more than 20 years, after the 1997 Kyoto protocol tasked them with working through the IMO to do so.

I was there last April and saw China’s delegation speak first in congratulation of the IMO agreement upon its adoption.

China’s support for greener maritime trade in this forum matters for two reasons. The first is commercial: China is the world’s largest exporter of products. This was therefore the biggest possible vote of confidence that shipping could decarbonise in line with the Paris agreement, without harming global trade.

The second is technological: China is the largest shipbuilder in the world (just three countries, China, Japan and South Korea, build more than 90% of new ships). Because of the long, 25-year lifespan of modern ships, there is a slow replacement rate. Meeting the IMO’s 2050 emissions reduction goal therefore requires that zero-carbon vessels are commercialised by 2030, just 10 years away, before expanding to become the norm.

If Chinese shipbuilders don’t keep up with the decarbonisation demanded by the shipping industry, they risk losing top spot.

## Building green to stay on top

I believe China would not have committed to the IMO emissions agreement unless it was confident it could maintain its top spot in the shipbuilding industry throughout this transition, and use its remarkable lead in renewable energy technology to build zero-carbon vessels within a decade.

Although the government supports this timeline, I'm not seeing much discussion of this yet from China's shipbuilders; if they don't keep up with the decarbonisation demanded by the shipping industry, China risks losing its top shipbuilder spot. Denmark's Maersk, the world's largest container shipping company, has committed to this same timeline to reach carbon neutrality, as has Japan's NYK. If big container lines can't buy zero-carbon ships from China, they will buy them somewhere else.

So what kind of technologies are we talking about?

Batteries are set to power all of Norway's ferries by 2023, 177 inland clean-up vessels in Suzhou near Shanghai, and even a 2,000-tonne cargo ship on the Pearl River in Guangdong province. However, for the foreseeable future, batteries will not be able to power the huge ships which carry international trade.

Fuels, of a carbon-neutral sort, are therefore essential. Hydrogen has been given a boost by recent announcements on fuel cells, although so far shipping has been neglected in this debate.

The maritime sector already has many green hydrogen projects underway: a ferry in the US, the world's first ocean-going car and passenger ferry in the UK, and two zero-emission hydrogen fuel cell container ships set to connect Poland, Sweden and Norway.

In Belgium, the 120-year-old container shipping company CMB is trialling fuel cells on one of its container ships, and later this year the port of Antwerp is opening a hydrogen refuelling station for ships.

The speed of this announcement surprised many in the industry who thought hydrogen in the maritime sector was years away from commercialisation. Meanwhile, engine manufacturers view shipping decarbonisation as a "gold

Aside from its CO<sub>2</sub> cuts to slow climate change, speed reduction has huge co-benefits for ocean life.

rush". MAN Energy Solutions, one of the world's largest engine manufacturers, announced in December it had successfully developed the technology to use cryogenically cooled hydrogen as an onboard ship fuel – a major breakthrough.

Once cooled to a temperature of -253C, hydrogen turns from a gas to a liquid, and is reduced to 1/800th of its volume, making onboard transportation easier. As a result, MAN says hydrogen will play a significant role in its target of achieving zero fossil fuel emissions within the marine sector by 2050.

While China's shipping companies and ports are making incredible progress on cleaning up air pollution, especially sulphur, there is a lack of debate on green hydrogen, or other potential zero-carbon fuels. Liquefied natural gas for instance, while great at reducing air pollution, has little to no benefit in reducing greenhouse gas emissions once methane slippage is taken into account.

Methane slippage is the process of unburnt methane escaping from all parts of the industrial process, from upstream production, to storage, to the internal combustion engine. While oil and shipping companies are making efforts to minimise methane slippage, even very small single-digit percentage leaks can erode the greenhouse gas benefits of switching from oil to gas, because methane is 84 times more potent than CO<sub>2</sub> in its warming effects, in the first two decades after its release.

Perhaps more dialogue is needed between China's world-leading renewable energy firms, and its world-leading shipping sector, to place the country at the head of a future carbon-neutral global trading system.

While this dialogue develops, what else is happening in the short term? This month the IMO held its newest round of talks in London on how to decarbonise shipping. The key topic discussed was how to achieve short-term CO<sub>2</sub> cuts in the next four years.




### Limiting speeds and emissions

The three main candidates are global speed limits (like road vehicles, ships consume less fuel at slower speeds), operational efficiency standards for all existing and future ships, and Japan's proposal of shaft power reduction. The latter would require an engine power limitation system, similar to those used in automobiles, to be installed on all commercial shipping vessels to limit power to an optimum level of fuel consumption.

Aside from its CO<sub>2</sub> cuts to slow climate change, speed reduction has huge co-benefits for ocean life, in terms of reduced underwater noise affecting whales, dolphins and fish, and reduced risk of the ship strikes which are currently pushing some endangered whale species to the brink.

Speed reduction as a policy is now being proposed by France as well as Greece, which owns 17% of the world's

shipping tonnage, more than any other country. They were joined this week by over 100 shipping company CEOs who wrote a letter to IMO in support of global speed limits at sea, including one of China's largest shipowners Sinotrans Shipping Ltd.

This measure will need the support of China's delegation at IMO to be adopted – something that remains to be seen. But if speeds at sea were regulated it would reduce the carbon footprint of most manufactured products China exports, perhaps useful at time when big consumers such as the government of California are more closely studying their “imported carbon”. 

*Ned Molloy is a shipping consultant focused on fuels and environmental regulation, based in London.*

# G20在减少化石燃料补贴上停滞不前

全球最大的几个经济体正在日本开会，它们对采取行动消减化石燃料补贴的兴趣不大。

□ 费尔明·库普



20国集团不顾10年前的承诺，仍在补贴化石燃料

**在** 20国集团(G20)成员在大阪举行年度峰会之际，全球主要经济体未能逐步取消浪费的化石燃料补贴，东道主日本也屈从于美国的压力，取消了公报草案中有关排放的内容。

10年前，G20承诺“逐步取消并合理化”化石燃料补贴。但是，

补贴额从2007年的750亿美元增加到2016年的1470亿美元，这是可获得的整个20国集团最近一年的数据。

“2009年以来，G20只是在年度文件中复制粘贴同样的声明，称化石燃料补贴效率低下，阻碍了能源转型。但这还不够，”环境与自然资

源基金会(FARN)气候政策高级顾问恩里克·毛尔图阿·康斯坦提尼蒂斯如是说。

## 规模与重要性

G20经济体占全球GDP的80%以上，占全球贸易的四分之三。该集

团还占全球排放总量的 79%，在实现《巴黎协定》目标方面发挥着重要作用。

然而，G20 目前的承诺不足以阻止全球平均气温较工业化前水平上升 2 摄氏度以上。

G20 国家的大部分能源仍然来自化石燃料。2013 年到 2015 年，该集团每年在煤炭、石油和天然气项目上花费 914 亿美元。海外发展研究所的一份新报告发现，它们每年花在煤炭生产和消费上的费用达 639 亿美元。

海外发展研究所的补贴专家伊佩克·詹克苏说：“自该组织做出承诺，10 年已经过去，但它一直无法提出补贴的定义，也无法确定取消补贴的具体日期。”

该集团 2009 年的承诺很快被其他组织效仿。与 G20 成员重叠的七国集团（G7）承诺到 2025 年取消补贴。可持续发展目标（SDGs）中，目标 12 承诺对“低效化石燃料补贴进行合理化调整”。

环境和社会团体正在向 G20 东道国日本施压，要求其在最终领导人声明中设定一个取消补贴的具体日期。对此，人们并不寄予太多的希望。事实上，日本目前草案中的减排呼吁与近年来的类似呼吁并未有所不同。

### 补贴的作用

G20 国家通过税收减免、财政激励、补偿和奖金等多种机制提供补贴，针对的是碳氢化合物的生

产和消费，从而降低消费者的燃料价格。

国际可持续发展研究所（IISD）可持续能源供应主任艾薇塔·格拉西姆丘克说：“这些机制也随着石油价格的变化而变化。当价格较低时，补贴也会下降，因为消费者不太在意价格。但油价较高时情形则相反。”

专家们一致认为，由于污染和温室气体排放，国家对化石燃料的支持很难正名。而且，随着可再生能源的成本竞争力日益增强，从经济上讲，化石燃料补贴也越来越站不住脚。据国际可再生能源机构的数据，2010 年以来太阳能发电成本下降了 73%。

尽管如此，全球的化石燃料补贴和投资仍然处于高位。

国际货币基金组织的研究估计，2015 年化石燃料补贴占全球 GDP 的 6.3%，其中中国、美国和欧盟的支出最多。如果没有补贴，温室气体排放将减少 28%。

国际能源署发现，2018 年天然气和石油项目投资增加，而可再生能源投资下降。天然气占全球能源消费增量的一半。

G20 多次支持使用天然气作为过渡燃料，直至可再生能源得到进一步发展。然而，这种方法受到环保组织的质疑。他们认为，尽管天然气的排放更少，但它不是清洁能源。

在最近峰会前举行的 G20 能源与环境部长会议上，各国呼吁更广泛地使用天然气。

### 进展有限

G20 已就补贴问题采取行动，建立了自愿的同行审议机制。结组的国家对彼此提交关于化石燃料补贴的自我报告，然后互相审查，提出建议。

参加上述机制的 G20 国家包括中国、美国、加拿大、阿根廷、印度尼西亚、意大利、德国和墨西哥。然而，这一进程并没有给任何国家的国内补贴政策带来重大变化。

“美国和中国对这一进程最为热心，但只有中国落实了一些建议。其他国家因没有包括所有类型的补贴而受到批评。因为他们是自愿参与这一进程的，所以不受任何约束，”格拉西姆丘克说。

G20 东道国参与这一机制是惯例，但今年日本将成为例外，因为它在担任主席国期间并没有研究化石燃料补贴问题。

根据《从灰暗到绿色：20 国集团低碳经济转型评估》的最新数据，日本 2016 年的补贴支出为 38 亿美元，比 2007 年增加了 17 亿美元。补贴是通过直接转移和减税发放的。

日本不仅承诺通过 G20 削减补贴，还承诺通过 G7 进行削减。在 G7 内部，在终结对化石燃料的支持方面，日本排名倒数第二，仅比美国好一点。报告发现，日本不仅并未停止补贴，还在易受气候变化影响的国家投资数十亿美元建设燃煤电厂。☞

英文原文首发于中外对话网站中拉对话

费尔明·库普，阿根廷记者，致力于环境报道

# G20 stalls on fossil fuel subsidies despite calls for climate action

As the world's largest economies meet in Japan, there's little appetite for action on subsidies

□ Fermín Koop

As G20 countries meet for the group's annual summit in Osaka, the world's leading economies are failing to phase out wasteful fossil fuel subsidies and host Japan is bowing to US pressure to remove references to emissions in the draft communiqué.

Ten years ago the G20 pledged to “phase out and rationalise” fossil fuel subsidies yet the cost increased from US\$75 billion in 2007 to US\$147 billion in 2016, the last year that data is available for the entire group.

“Since 2009, the G20 is limited to copying and pasting the same statement every year in its annual document, stating that fossil fuel subsidies are inefficient and hinder the energy transition. But that's not enough,” said Enrique Maurtua Konstantinidis, senior advisor on climate policy for the Environment and Natural Resources Foundation (FARN).

## Size and importance

The G20 economies represent more than 80% of global GDP and three quarters of global trade. The G20 is also responsible for 79% of global emissions so it has a major role in fulfilling the goals of the Paris Agreement.

However, current G20 commitments are insufficient to prevent a global average temperature increase of more than 2C compared to pre-industrial levels.

G20 countries still generate most of their energy from fossil fuels. From 2013 to 2015, at the group level, they spent US\$91.4 billion per year on coal, oil and gas projects. A new report by the Overseas Development Institute finds that they provide US\$63.9 billion per year to the production and consumption of coal.

“Ten years have passed since the group's commitment and it hasn't been possible to advance a definition of subsidies or a specific date to remove them,” said Ipek Gencsu, a specialist in subsidies at the Overseas Development Institute (ODI).

The group's 2009 commitment was quickly replicated by other organisations. The G7, which includes members of the G20, promised to remove subsidies by 2025. Goal 12 of the Sustainable Development Goals (SDGs) commits to “rationalising inefficient subsidies”.

Environmental and social groups are pressuring G20 host Japan to set a specific date for the group to eliminate subsidies that is reflected in the final leaders' statement. Expectations that this will happen are low. Indeed, the

Support for fossil fuels is difficult to justify because of pollution and greenhouse gas emissions.



current draft by Japan does not call for the reduction of emissions in a departure from recent years.

### The role of subsidies

G20 countries grant subsidies through various mechanisms such as tax exemptions, financial incentives, reimbursements and bonuses. They are directed at the production of hydrocarbons and their consumption, decreasing the prices of fuel for consumers.

“They also vary with the price of oil. When it is low, subsidies also go down since consumers are not so concerned about prices. But the opposite happens with more expensive oil,” said Ivetta Gerasimchuk, director of sustainable energy supplies at the International Institute for Sustainable Development (IISD).

Experts agree that state support for fossil fuels is difficult to justify because of pollution and greenhouse gas emissions. And with renewables increasingly cost competitive, fossil fuel subsidies are becoming more difficult to justify economically. Since 2010, the cost of generating solar energy has fallen 73%, according to the International Renewable Energy Agency.

Despite this, subsidies and investment in fossil fuels remains high globally.

Research by the International Monetary Fund estimated that in 2015 fossil fuel subsidies represented 6.3% of global GDP, with China, the United States and the European Union spending the most. Without subsidies, greenhouse gas emissions would have been 28% lower.

The International Energy Agency found that investment in natural gas and oil projects increased in 2018, while investment in renewable energy declined. Gas represented half of the increase in global energy consumption.

The G20 has repeatedly supported the use of natural gas as a transition fuel until further development of renewable energies is achieved. However, this approach has been questioned by environmental organisations. While it generates fewer emissions, gas is not clean energy, they argue.

At the recent meeting of G20 energy and environment ministers prior to the leaders’ summit, countries called for more extensive use of natural gas.

### Limited progress


The G20 has acted on subsidies by establishing a voluntary peer review mechanism. Paired countries submit self-reports on fossil-fuel subsidies and then each country reviews the other, making recommendations.

The G20 countries that have participated include China, the United States, Canada, Argentina, Indonesia, Italy, Germany and Mexico. However, the process has not resulted in major changes to domestic subsidy policies in any country.

“The United States and China were the most committed to this process but only China implemented some of the recommendations. The rest of the countries were criticised for not including all types of subsidies. As volunteers, they aren’t bound to anything,” said Gerasimchuk.

It is typical for the G20 host country to participate in this mechanism but this year Japan will prove the exception as it has not worked on fossil fuel subsidies during its presidency.

Japan spent US\$3.8 billion on subsidies in 2016, according to the latest data available in the Brown to Green report, an increase of US\$1.7 billion on 2007. The subsidies were granted through direct transfers and tax reductions.

Japan not only committed to reduce subsidies through the G20 but also through the G7. Within the G7, its progress on ending support for fossil fuels was ranked second to last behind the US. The report found that Japan continues to support subsidies and is spending billions building coal plants in countries vulnerable to climate change. 

*This article was first published in Diálogo Chino*

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# 欧盟 2050 年零碳目标的下一步是什么？

欧盟有四个成员国仍反对净零目标，但若补偿得当，他们的态度可能会改变。

□ 乔斯林·廷珀利

上个月，欧盟在本世纪中叶达成“净零”排放这一集体目标的希望被成员国打破。

以波兰为首的四个国家在欧盟理事会会议上反对确定实现气候中和的具体期限。

很大程度上来看，这一结果不过是暂时的失败。“这是胜利路上的挫折，而不是胜利的终结。”环境智库 E3G 布鲁塞尔办公室主管昆廷·吉纳德说。而波兰随后表示支持在年底前确定净零目标。

两年来，欧洲一直稳步推进实现净零排放。法国、德国等一些欧盟国家已提出或通过了气候中和目标。

## 净零动力

气候中和目标将有效地促进欧盟在本世纪中叶实现温室气体排放小于吸收，至于利用国际碳信用额来实现这一目标，或各国如何分配目标等具体细节仍有待商榷。

这一想法自 2015 年《巴黎协定》发布以来就一直在酝酿。去年，政府间气候变化专门委员会（IPCC）发布了将气候变暖控制在 1.5 摄氏度以下的特别报告。之后，欧盟的气候中和目标被提上议事日程。



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上海虹桥火车站顶棚的太阳能板

青年气候罢工运动、反抗灭绝（Extinction Rebellion）行动等来自民众的压力也发挥了作用。与此同时，欧盟 5 月大选中的绿色浪潮意味着支持环保的党派可以在欧洲议会中保持权力平衡。

各国纷纷单方面采取行动。就在上个月，英国承诺将 2050 年的气候目标修改为净零排放，新的芬兰联合政府则承诺到 2035 年实现碳中和。

虽然法国率先呼吁欧盟设立净零目标，然而直到德国政府迫于国内日益增长的政治压力于上个月早

些时候决定加入这一行列，人们才开始信心大增，认为欧盟领导人会正式同意设立该目标。这并不是在想当然：德国和波兰一样，都担心提高欧盟气候目标会影响本国煤炭主产地的就业。

2018 年 11 月，欧盟委员会在提出的一个议案中提到，将到 2050 年实现气候中和和经济，终于朝着达成净零目标的方向取得了切实的进展。议案指出，净零目标对欧洲而言不仅是可行的，而且是提高竞争力和构建新市场的机会。

2019年3月，欧盟议会投票支持设立2050年净零目标，并将欧盟2030年的减排目标从40%提升至55%。

然而，尽管发布的成果文件中包括“按照《巴黎协定》”向气候中和过渡的承诺，但却没有提到“2050年”这一关键期限。

### “寻常嫌犯”

该目标需要28个欧盟成员国一致批准才能通过，但波兰、匈牙利、捷克共和国和爱沙尼亚不同意。

“反对国的数量一直在减少，3月份还只有少数国家支持这一目标，但到上周初就增加到18个，”都柏林城市大学法律和气候政治助理教授迪阿尔木德·托尔尼说。

作为维谢格拉德四国集团的一部分，斯洛伐克通常与波兰、匈牙利和捷克共和国共进退。“值得注意的是，斯洛伐克因为新就任的总统决定不再追随其他三国。”吉纳德说。“新就任的总统”指的是斯洛伐克首位女总统、绿色活动家苏珊娜·卡普托娃。

### 融资

波兰总理马泰乌什·莫拉维茨基称其反对净零目标是为了“保护波兰企业和民众的利益”，并强调签署协议前必须先拿出切实的财务措施。

这一点说明，欧盟拿出钱来，让那些受气候目标严重影响的工人（如波兰煤炭行业工人）能够公平地过渡十分重要。吉纳德说，这一点需要讨论，但得有个度，因为相对激进

“**欧盟目前不太可能在9月联合国气候峰会召开前达成2050年的目标。**”

的国家可能不愿为阻止目标制定的国家提供奖励。保加利亚和罗马尼亚有着与波兰类似的担忧，但没有阻止目标的设立。

“像波兰这样严重依赖煤炭的成员国反对也不奇怪，”托尔尼说。“净零意味着从根本上对现代经济进行重新设计，不仅要推动其逐步远离化石燃料，而且还要转型。”

吉纳德说，导致目标设立受阻的可能还有两个因素。

首先是波兰即将到来的大选。“气候不是一个能帮助你赢得选举的话题，”吉纳德说。另一方面，勇于抵制欧盟对其国民经济实施的强制措施反而可能赢得选票。

其次，对个别国家而言，在2050年之前实现全欧盟净零排放究竟意义何在，仍存有疑虑。“目的实际上是确定政治目标，然后再研究达成目标的细节，”吉纳德说。但这样波兰就会怀疑，更广泛的目标中是否会给脱碳困难的国家留出灵活空间。“这说明需要讨论并解决这些国家提出的关切，”吉纳德说。

然而，波兰本周表示可能会在2019年年底前支持达成2050目标。“我们可能会同意达成目标，只是需要知道成本多少，以及如何减轻整个转型的社会影响。”波兰负责能源事务的副国务卿托马斯·德布洛夫

斯基周四在伦敦举行的一次会议上表示。

他还说，需要“某种补偿机制”来解决波兰承担的费用。

### 下一步行动

欧盟目前不太可能在9月联合国气候峰会召开前达成2050年的目标，也无法借此理直气壮地鼓励其他国家在2020年制定下一轮气候承诺前提高斗志。

虽然峰会重点关注的是未来10到15年的目标，但2050年的目标也被视为制定这些目标的重要参考。

《巴黎协定》还要求各方在2020年之前向联合国提交长期气候计划，但欧盟也可以坚持目前的2050年气候目标，即一定程度上承诺在1990年的水平上减排80%到95%。

绿色非政府组织仍在向欧盟施压，要求其在2040年前实现净零排放，并更新2030年的气候目标。气候行动网络欧洲和绿色和平组织都呼吁欧盟召开紧急峰会，努力在9月联合国气候大会前达成协议。

托尔尼还说，净零目标以及针对转型困难国家的配套的气候融资和支持可能会与明年结束的欧盟预算谈判挂钩。欧盟议会已经提议拿出额外的50亿欧元设立“公正过渡基金”。

“这是一个复杂的过程，我们希望有一个恰当、合理的过渡，这需要时间，”吉纳德说。“需要所有人齐心协力。”

乔斯林·廷珀利，气候及能源领域的自由撰稿人

# EU 2050 zero carbon goal: what next?

Four countries are holding out on supporting the net zero target but may shift if the right compensation is offered

□ Jocelyn Timperley

EU member states dashed hopes last month of committing the bloc to a collective goal of “net zero” emissions by mid-century.

A group of four countries, led by Poland, blocked the inclusion of a specific deadline for climate neutrality at the EU Council session.

The outcome is largely seen as a temporary setback. “It’s a bump in the road, rather than the end of the road,” says Quentin Genard, acting head of the Brussels office at environmental thinktank E3G. Poland has since indicated support for a net zero goal to be set by the end of the year.

Efforts towards net zero have been building steadily in Europe over the past two years. Several EU countries such as France and Germany have already proposed or adopted climate neutrality goals.

## Net zero momentum

The climate neutrality goal would effectively commit the EU to not releasing any more greenhouse gases than it absorbs by mid-century. The finer details, such as the use of international carbon credits to achieve this or how the goal would be split up between countries, are yet to be decided.

The idea has been on the cards since the 2015 Paris Agreement but rose up the agenda following the release last year of the International Panel on Climate Change (IPCC)’s special report on warming at 1.5 degrees.

Popular pressure, such as through the youth climate strike movement and Extinction Rebellion, has also played a role. Meanwhile, the green surge in the EU elections in May means environmentalist parties could hold the balance of power in the European parliament.

Countries are also moving unilaterally. Just last month, the UK committed to revising up its 2050 climate goal to net zero, while Finland’s new coalition government has pledged to reach carbon neutrality by 2035.

France has spearheaded the calls for a net zero goal at the EU level. However, it was Germany’s decision, under growing political pressure at home, to join the push earlier last month that raised optimism EU leaders could formally agree to the goal. This was not a given: Germany, like Poland, is concerned about raising the EU’s climate goals due to the possible impact on employment in its coal heartlands.

Concrete developments towards the EU goal began in November 2018, when the European Commission put forward a proposal for a climate-neutral economy by 2050. A net zero goal is not only feasible for Europe, it said, but



an opportunity to increase its competitiveness and build new markets.

In March 2019, the EU parliament voted in support of a net-zero 2050 target as well as an increase of the EU's 2030 emission reduction target from 40% to 55%.

But while the outcome text included a pledge to ensure a transition to a climate-neutral EU "in line with the Paris Agreement", it failed to include the all crucial "by 2050".

### 'Usual suspects'

Unanimous approval from the 28 EU member states was needed to adopt the target but Poland, Hungary, the Czech Republic and Estonia did not support it.

"The number of member states opposed has been shrinking over time, so it was a minority in favour in March and then at the start of last week it was 18," says Diarmuid Torney, an assistant professor in law and climate politics at Dublin City University.

Slovakia normally coordinates with Poland, Hungary and the Czech Republic as part of the Visegrád Four political alliance. "What is remarkable is that Slovakia decided not to follow them because of the new president," says Genard, referring to the country's first female president, green campaigner Zuzana Čaputová.

### Finance

Poland's prime minister, Mateusz Morawiecki, said he blocked the climate goal to "protect the interest of Polish businesses and Polish citizens". He emphasised the need for concrete financial measures to be on the table before he could sign up for a deal.

This points to the importance of EU money

**The net zero goal could be tied into EU budget negotiations to be concluded next year.**

supporting a just transition for workers strongly impacted by a tough climate goal, such as those working in Poland's coal industry. This will need to be discussed, says Genard, but will be a fine line since the more progressive countries may be hesitant to reward countries for blocking the decision. Bulgaria and Romania have similar concerns to Poland but did not block the goal.

"It's not surprising that particularly those member states that are heavily reliant on coal such as Poland are reluctant to come on board," says Torney. "What net zero means is fundamentally re-engineering our modern economies to shift them not just incrementally away from fossil fuels but in a transformational way."

Genard says two other factors likely contributed to the deal being blocked.

Firstly, Poland's upcoming elections. "Climate is not perceived as a topic that's going to make you win elections," says Genard. Standing up to EU imposition of measures on the national economy, on the other hand, may be seen as a vote winner.

Secondly, there are still doubts about the meaning of an EU-wide net zero target by 2050 for individual countries. "The aim was really to fix the political objective, and then figure out the detail about how we're going to do it," says Genard. But this has left Poland unclear about whether there would be some flexibility within the wider goal for countries finding it harder to decarbonise. "What it shows is there needs to be discussion on addressing the concerns that were raised by these countries," says Genard.

However, Poland this week indicated it may support the 2050 target by the end of 2019. "We will probably subscribe to this target, it's just we need to know what the cost will be, and in what way we can mitigate the social impact of the whole transformation," Tomasz Dąbrowski, Poland's undersecretary of state for energy, said at a conference in London on Thursday.

He added this would require "some kind of compensation mechanism" to address the costs Poland would bear.

### Next steps

The EU is now unlikely to arrive at the UN climate summit in September with a 2050 goal in place and the extra legitimacy to encourage others to raise ambition ahead of the next round of climate pledges in 2020.

While the focus of the summit is on goals for the next 10-15 years, 2050 targets are also seen as important goalposts for setting these.

“It’s unfortunate, from that kind of signalling perspective, what it shows to the rest of the world,” says Torney.

The Paris Agreement also commits parties to submit a long term climate plan to the UN by 2020. But the EU could stick to outlining its current 2050 climate goal, which somewhat broadly promises a 80-95% reduction in emissions compared to 1990 levels.

Green NGOs are also still pushing the EU to commit to net zero emissions by 2040, as well as update its 2030 climate target. Climate Action Network Europe and Greenpeace both called for an emergency EU summit to try to reach a deal ahead of the September summit.

Torney adds that the net zero goal, and accompanying climate finance and support for countries that face a tougher transition away from fossil fuels could be tied into EU budget negotiations due to be concluded next year. The EU parliament has already proposed an extra €5bn for a “just transition fund”.

“It’s complicated because we want to have a proper, a well-mannered transition, and that takes time,” says Genard. “We need to have everyone on board.” ☺

*Jocelyn Timperley is a freelance climate and energy journalist.*

# 工行能否履行气候承诺将在南非见分晓

中国工商银行拥有南非最大的贷款机构——标准银行五分之一的股份，是这家银行最大的股东。那么工商银行是否会投票支持披露气候风险呢？

□ 白睿



© Paul Gregg / Alamy

工商银行是否会投票支持披露气候风险呢？

**明**天，标准银行的股东们将就是否披露和报告气候风险进行投票。用一位专家的话说，此举迈出了“开创性的一步”。

这项决议是由标准银行的股东

提出的。中国工商银行拥有标准银行 20.1% 的股份，所以它的决定将直接影响投票结果。

中国工商银行是全球最大的银行，并参与了气候相关财务信息披

露工作组（TCFD）和其他多个类似倡议活动。所以，本次投票也被认为是对中国工商银行气候诚信的一次检验。观察家们不禁想问：“中国工商银行会做出正确的选择吗？”

## 业内首次就气候风险公开投票

这项股东决议的提出还要归功于南非非盈利组织 RAITH Foundation 和股东活动家西奥·博塔，并得到了投资者行动组织 JustShare 的支持。这也是约翰内斯堡证券交易所上市公司中首个由股东提出的有关气候风险的决议。

去年，这些股东和组织联盟还向南非最大的碳排放机构一能源化工企业萨索尔 (SASOL) 提交了类似的决议申请。但是萨索尔公司拒绝了这个提案，股东投票自然也就没有举行。

JustShare 执行董事特雷西·戴维斯表示，标准银行能够接受股东提案，这对南非地区的负责任投资来说是“突破性的一步”。

戴维斯指出：“这是他们（南非投资者）第一次需要向客户明确表明自己对气候风险的认真态度。”

这个决议包括两部分。首先，要求银行评估和报告其投资行为导致的温室气体排放，以及银行因此面临的气候风险。其次，要求银行必须全面披露其煤电融资政策（目前公开的只有一份媒体公告），并将该政策拓展到煤炭开采领域。

披露气候风险依据的理念是，对污染性行业的投资最终都将成为风险资产。披露此类风险符合投资者的利益，因为他们需要这类信息来做出合理的投资决策。同时，这也符合全球经济从碳密集型资产转型的需要。

近些年来，这一理念在股东中间越来越有市场，建立气候相关财

务信息披露工作组 (TCFD) 更是体现了这一点。TCFD 成立于 2015 年，宗旨是“制定企业向投资者、债权人、保险公司及其他利益相关方提供相关信息时使用的、自愿、一致的气候相关风险披露原则”。如今，TCFD 已经拥有了 580 个组织成员。

## 工行与气候承诺

决议通过至少需要 50% 的股东投票赞成。但是，提出这项决议的团体只拥有不到 0.001% 的投票权。而全面支持这项决议的资管经理公司 Mergence Investment Managers 只有不到 0.4% 的投票权。

中国工商银行拥有标准银行五分之一的股份，是该行目前最大的股东。中国工商银行已经在 2017 年 6 月加入了 TCFD，也是中国唯一一家参与这一组织的银行。而目前，还没有一家南非银行参与这个组织。

JustShare 和 Mergence 指出，这项决议被提上标准银行股东大会的议程与 TCFD 的建议是一致的，而 Mergence 更是称 TCFD 的建议是气候风险披露领域的“全球最佳实践”。

包括中国工商银行在内的 TCFD 成员在 2017 年 6 月声明：“通过签署这份协议，我们很自豪地表达了自己对更好地披露气候相关风险和机遇的坚定支持。同时，我们也敦促其他商业领袖也加入我们的行列。”

通过中英 TCFD 试点小组，中国工商银行还签署了自己的气候风

险披露时间表，并计划于今年年底开始实施。

绿色和平组织东亚地区可持续金融项目负责人劳伦·胡莱特认为，秉承自己有关气候风险披露的承诺，中国工商银行应当投票赞成这项决议。但是她也强调，工行的言行其实并不一致。比如在 2018 年的气候风险披露项目的排名中，中国工商银行的评分只有 F。

胡莱特说：“中国工商银行多次公开表示支持气候风险披露。如今，面对这样一个信息披露的约束性要求，工行也的确该表明自己真实的态度了。”

## 可能的结果

标准银行董事会已经建议股东投票否决这一决议，因为董事会认为，南非政府目前的环境、社会和监管措施以及碳报告制度已经能够解决股东关切的问题。

中国工商银行还没有公开表示自己的投票意向。但是，JustShare 的戴维斯认为，在标准银行董事会拥有两个席位的工行不大可能会赞成这项决议，而且建议其他股东反对这一决议的决定很有可能就是受到了工行的影响。

绿色和平的胡莱特表示，投票仍然是一个“试金石”。

“通过这次投票，中国工商银行有机会表明，他们深刻地认识到了气候风险披露对环保的重要性。”

白睿，中外对话气候研究及沟通专员



# Shareholders test ICBC's climate commitment in South Africa

Industrial and Commercial Bank of China holds one-fifth of shares in South Africa's biggest lender, Standard Bank. Will it vote for climate risk disclosure?

□ Tom Baxter

Shareholders in Standard Bank will tomorrow [30 May] vote on the disclosure and reporting of climate risks, in a move that one expert described as a “ground-breaking step”.

The resolution has been proposed by the bank's shareholders. Owning 20.1% of shares, the Industrial & Commercial Bank of China (ICBC) may determine the outcome of the vote.

ICBC is the world's largest bank. It is signed up to the Task Force on Climate-related Financial Disclosures (TCFD) and other similar initiatives so the vote is being seen as a test of ICBC's climate credentials. Observers are asking: “Will ICBC make the right choice?”

## A first of its kind

The shareholder resolution was brought forward by South African non-profit organisation the RAITH Foundation and shareholder activist Theo Botha, with the support of investor activism organisation JustShare. It is the first shareholder-proposed resolution on climate risks for any listed company on the Johannesburg Stock Exchange.

Last year the same coalition of shareholders and organisations submitted a similar resolution to the energy and chemicals company SASOL, South Africa's largest carbon

emitter. The company rejected the submission so no shareholder vote took place.

Tracey Davies, executive director of JustShare, said Standard Bank's acceptance of the shareholder proposal was a “ground-breaking step” for responsible investment in South Africa.

“This is the first time that they [South African investors] will have to make it clear to clients how serious they are about climate risk,” said Davies.

The resolution itself consists of two parts. Firstly, it asks the bank to assess and report the greenhouse gas emissions resulting from its investments, and the climate risks the bank is therefore exposed to. Secondly, it asks the bank to make its coal power financing policy fully public (currently only a media release is publicly available) and expand the policy to include coal mining.

Climate risk disclosure rests on the idea that investments in polluting industries are ultimately risky assets. Disclosing such risks is in the interest of investors who need such information to make sensible investment choices, as well as in the interest of transforming the global economy away from carbon intensive assets.

Shareholder interest in the idea has been gaining ground in recent years, not least through the establishment of the Task Force on Climate-related Financial Disclosures

(TCFD). The TCFD was established in 2015 and aims to “develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to investors, lenders, insurers, and other stakeholders”. It now boasts 580 supporting organisations.

### The vote and ICBC

The shareholder vote requires at least 50% of votes to pass. However, the groups behind the resolution account for less than 0.001% of the vote share. The one asset manager to announce full support for the resolution, Mergence Investment Managers, accounts for less than 0.4%.

With one-fifth of shares in the bank, ICBC is by far the largest shareholder. It has been signed up to the TCFD since June 2017 and is the only Chinese bank to be so. No South African banks are signatories.

JustShare and Mergence note that the resolution being tabled at Standard Bank’s shareholder meeting is aligned with the recommendations of the TCFD, which Mergence refers to as “global best practice” on climate risk disclosure.

“In signing this letter, we are proud to express our support for better disclosures of climate-related risks and opportunities and we urge other business leaders to do the same,” members of the TCFD, including ICBC, proclaimed in June 2017.

Via the China-UK TCFD Pilot Group, ICBC has also signed up to a timeline for its own climate risk disclosure, scheduled to start by the end of this year.

Lauren Huleatt, sustainable finance campaigner at Greenpeace East Asia, argues that in the spirit of its commitments on climate risk disclosure, ICBC should vote in favour of the resolution base. But she stresses that the bank has failed to match rhetoric with action. ICBC scored an F in the Climate Disclosure Project’s 2018 ranking on climate disclosure.


“ICBC have given plenty of public indications that they support climate risk disclosure, but now, when they are presented with a binding choice which would mandate disclosure, is when the bank will show its true hand,” says Huleatt.

### The likely outcome

The board of Standard Bank have advised their shareholders to vote down the resolution, arguing that shareholder concerns are already addressed by current environmental, social and governance measures and by obligations to report carbon to the South African government.

ICBC has given no public indication of its voting intent. However, JustShare’s Davies thinks the bank, which holds two seats on the board of Standard Bank, is unlikely to favour the resolution and may have influenced the decision to advise shareholders against it.

The vote is a test nonetheless, says Greenpeace’s Huleatt.

“ICBC has a chance in this vote to show that they understand how much disclosure of climate risks matters for environmental protection.” 

*Tom Baxter works on climate communications and research at chinadialogue.*

# “毒地”入市： 中国污染地块的治理难题

报告显示，中国主要城市多个污染地块未完成修复即被出让，存在环境安全隐患。

□ 王晨

**环**保组织绿色和平与南京大学近期联合发布的报告称，截至2018年10月，中国27个省会城市公布的174块受污染地块中，已有四分之一被出让，用于商用开发，学校、医院建设等。但已出让的污染地块中有四成还未完成环境修复，埋下公众安全隐患。

中国尽管出台了一系列土壤污染治理方面的法律和规则文件，但治理责任认定难、地方政府急于卖地等问题依旧是土地污染治理实践中的难点。

## 污染地块再利用

中国近年开始加速推进污染土地的防控治理以及安全再利用。

2016年的《土壤污染防治行动计划》（土十条）制定了“到2020年污染地块安全利用率达到90%”的目标。同年底，《污染地块土壤环境管理办法》要求地方政府建立“污染地块名录”，并对名录内地块的再利用实施管制。2018年通过的《土壤污染防治

法》又以立法的方式，加强了“名录”制度的法律效力。

绿色和平和南京大学（溧水）生态环境研究院对已经公布的污染地块名录进行了整理分析，并编写了《中国城市污染地块开发利用中的问题与对策》报告（《报告》）。《报告》显示，在174块已公布的污染地块中，有25%已经被出让，出让金额累计达1049.6亿元人民币。但在这些被出让的污染地块中，有约44%没有完成土壤修复。这些土地将主要被用于商住用地或学校、绿地、医院等公共用地的开发。这也意味着，如果在投放使用之前没有完成修复，这些“毒地”有可能带来新的环境健康风险。

《报告》指出，污染地块中最常出现的污染物是重金属、挥发性有机物和半挥发性有机物，约有41%的污染地块原址为废弃化工厂。再开发地块稍有不慎即可能导致二次污染，危害公众安全。

报告编者之一，绿色和平污染防治项目主任保航说，各省会城市

已披露的污染地块名录并不完整，“考虑到中国的城市土壤污染状况，实际情况可能更加严峻。”

## 土地财政

之所以出现污染地块在修复完成之前被重新推入市场，《报告》认为部分原因在于中国地方政府财政高度依赖土地出让。2015-2017年中国主要省会城市的土地出让收入占了政府收入的20%-52%。为了加速具有高商业价值的污染地块转让，以充实地方财政，修复治理上存在“赶工期”的问题。对“土地财政”依赖度更高的城市，污染地块的平均修复时间更短。

《报告》认为，土地使用权人出于尽快回收资金的考虑或开发工期的压力，压缩污染地块必要的修复时间，土壤修复的质量不能得到保障，甚至可能引发二次污染。

中国环境修复网执行主编高胜达说，为追求快速，中国的污染地块修复多使用耗时较短的异位修复方



广西省三合镇的村民在疑似污染的农田上

法，即将现有污染土壤移走处理，在原处填进新土，保障开发和修复一起进行，节约时间。

“整个过程产生二次污染的风险极高，”高胜达说，“因为污染土壤被翻起时就很有可能发生化学反应，产生危险的废气废水。”

## 谁来买单？

《报告》还发现，尽管《土壤污染防治法》和“土十条”中规定了“谁污染谁治理”的原则，在实际操作中，由于缺乏治理责任认定的标准和程序，以及由于污染者破产等原因无力承担修复费用，这一原则很难施行。政府和土地的新使用者成为污染治理责任的承担者。在已披露信息的污染地块中，有超过 65% 都是由当地政府或开发商治理。

保航认为，这种由政府为污染地块修复“买单”的模式虽然能加速土地资源再利用，但不利于对潜在污染者产生威慑。

《报告》同时也反映出目前污染地块修复信息公开不够的问题。在调查涉及的 174 块污染地块中，有超过一半的地块没有公开关键的土壤环境评估、治理修复和验收信息。

“其中最具代表性的上海，虽然公布的地块数量不少，却只有污染地块的名称信息，”保航表示，“而一些曾经的老牌工业城市如西安、哈尔滨和长春，仅公布了一块污染地块，显然无法代表当地的土壤污染与治理的实际状况。”

## 慢慢完善的制度

2019 年 1 月 1 日开始实行的《土壤污染防治法》有望解决上述部分问题。《报告》中的数据采集于 2018 年 10 月之前。而新的《土壤污染防治法》在多处明确规定，在未达到土壤风险控制目标之前，相关地块不能开工建设任何项目。尤其是用于住宅、公共管理与公共服务用地用途的地块，需要按规定进行污染情况调查。

但高胜达表示，新颁布的法律需要时间和现有的土地管理规则磨合。《报告》指出，现有的土地规划、转让和开发环节并不重视土壤环境状况的审核，土地管理部门在决策中也缺乏与环保部门的协调，造成未治理修复的污染地块也被顺利出让。

高胜达认为，随着《土壤污染防治法》的各个实施细则出台，污染地块治理会向积极、规范方向发展。他透露，生态环境部正在就污染地块修复的责任认定问题进行调研，以期能够制定出更加适合实践的细则。

“总体而言，现在业内对土壤修复的认识还比较粗浅，没有从系统的角度思考问题”。他认为，如果从土地规划阶段就开始综合考虑环境因素，整体的修复成本能大幅度下降。☺

王晨，中外对话编辑助理。



# China's polluted land sold off

Inadequate soil checks by local governments are allowing contaminated land to hit the market, risking public health

□ Wang Chen

China's polluted land is being sold off for the construction of commercial buildings, schools and hospitals, a report by Greenpeace and Nanjing University has found.

Between May 2016 and October 2018 inspectors identified 174 contaminated plots of land across 27 provincial Chinese cities. One quarter have been sold off and nearly 44% of those have not been fully remediated, putting public health at risk.

The two main causes are the difficulty with identifying the people responsible for remediation, and local government enthusiasm for making money quickly by selling land. Current regulations and laws are failing to ensure sure land is properly decontaminated before it reaches the market.

## Redeveloping polluted land

China launched its Soil Pollution Prevention Action Plan in 2016, with the aim of bringing 90% of contaminated plots safely into reuse by 2020. Later that year the State Council instructed local governments to

**“The entire process has a very high risk of secondary pollution.”**

keep a register of contaminated plots and their reuse. Then in 2018 a new soil pollution law made that system a legal requirement.

The authors of the Greenpeace report analysed the published registers of contaminated land. Nearly half of the plots are sites of former chemical plants. They are typically tainted with heavy metals and volatile or semi-volatile organic compounds. Local governments have earned 104.96 billion yuan (US\$15.19 billion) from selling off 25% of them.

The results of allowing polluted land to be redeveloped can be severe. In 2016, hundreds of children fell ill after attending school near a former fertiliser factory in Changzhou, Jiangsu province.

## Land-funded governance

The report blames the premature development of polluted land on local governments dependent on the money. Remediation is being rushed particularly in cities, where governments rely most heavily on land sales for income. Provincial capitals received between 20 and 52% of their income from land sales between 2015 and 2017.

Bao Hang, toxics campaigner with Greenpeace and one of the report editors, believes registers of polluted land are incomplete. “The real situation is likely to be even worse.”

Gao Shengda, editor of environmental remediation website *er-china*, said that restoring contaminated land in China most often involves replacing the polluted soil, because that allows construction to start sooner.

Gao explained: “The entire process has a very high risk of secondary pollution. It’s very likely that moving the soil will cause chemical reactions, creating dangerous gases or liquids.”

## Who pays?

Although the “polluter pays” principle is enshrined in the soil pollution law and the 2016 action plan, it is difficult to implement in practice. Processes for identifying polluters are not in place, and if they are identified, they may be bankrupt or unable to afford remediation costs, leaving the government and new landowner to bear the costs. Local governments or developers are only remediating 65% of the 174 identified plots.

Bao says that local governments may return land to development faster by stepping in but this discourages land users from taking measures to avoid pollution.

The report also complains of inadequate transparency over remediation efforts. Key soil assessments and information on remediation processes and completion were not available for over half of the plots.

“The best example of this is Shanghai, which has published details of plenty of contaminated plots of land, but only gives identifying numbers,” said Bao. “While

some former industrial cities such as Xi’an, Harbin and Changchun only list one contaminated plot, which obviously doesn’t reflect reality.”

## A slowly improving system

The new soil pollution law which came into effect in January aims to resolve some of these issues. It rules that no work may start on a site until soil pollution risks have been controlled. There are also specific requirements for pollution checks on land to be used for residential and public use.

But Gao says it will take time to bring soil management into line with the new law. As the report points out, little attention is being paid to checking the environmental status of soil during planning, transfer and development of land. Moreover, land management authorities are not coordinating policy decisions with the environmental authorities. This means contaminated plots can easily be sold off before any remediation work has taken place.

Gao thinks that the handling of polluted land will improve and become more standardised as rules on how the law is implemented are released. He also revealed that the Ministry of Ecology and Environment is attempting to identify responsibility for the remediation of polluted land, in the hope of putting a more practical approach in place.

“Overall, understanding of soil remediation in the sector is weak. It hasn’t been given much systematic thought.” ☞

*Wang Chen is one of our junior researchers on our Beijing editorial team.*

# 中国国有企业是否在退出煤炭业务？

国投集团宣布退出煤炭业务可能并非中国减煤信号。

□ 冯 灏



神华在内蒙古鄂尔多斯的一个煤矿

© Qiu Bo / Greenpeace

**2019**年3月，国家开发投资集团有限公司（国投）董事长王会生表示，国投目前已经完全退出煤炭业务，未来将主要投资新能源。这一宣布引发了业界对中国国有企业是否正在“抛弃”煤炭的讨论。然而专家表示，国投的“退出”，更像是中国

煤炭行业的一次“以退为进，”反映了中国要做大做强专业化煤炭央企的决心。

## 国投剥离煤炭资产

国投公司的主要业务包括电力、交通、矿产资源开发和金融及服务业

等。20世纪90年代，在国投成立之初，煤炭业务曾是其支柱产业之一。在2003年后的10年间，煤炭业务曾为国投创下了近280亿元的利润。

作为中国央企中最大的投资控股企业，国投的投资方向被认为具有市场导向作用。美国能源经济和金融分析研究所(IEEFA)认为国投

退出煤炭具有“全球重要性”，其能源金融主管蒂姆·巴克利 (Tim Buckley) 说，“这是中国一家大型企业首次大规模从煤炭业务中撤资，(国投) 与全球越来越多的重要金融机构一道，制定了类似的正式政策退出火力发电厂和燃煤发电厂”。

实际上，国投剥离出的煤炭业务并没有退出市场，而是主要以无偿划转的方式转移给了中国中煤能源集团有限公司(中煤)这一专业煤炭央企。被划转的资产包括以煤炭开采为主业的国投新集能源股份有限公司(“新集能源”)的股份。新集能源煤矿集中在东部的安徽。对主要煤矿资产集中在内蒙和山西的中煤来说，得到这部分资产使其距离东部沿海发达市场更近，可以优化自身的市场协调能力。据分析，完成划转后，中煤将总共从国投获得的新增煤炭产能 5000 万吨，超过其 2017 年产能的 30%。

## 国资委的使命

随着近年来中国煤炭行业产能过剩问题突出，行业形势低迷，很多涉足煤炭的央企面临亏损额不断扩大的问题，其煤炭业务严重拖累到其自身主业的发展。在 2015 年的行业低谷，国投煤炭业务亏损 34.79 亿元。而当年国投整体净利润为 41.43 亿元，煤炭业务严重拖累其整体表现。

在这一背景下，中国政府希望通过国有企业改革使一些国企退出“不挣钱的板块”。

在具体操作上，之所以可以实现煤炭资产在国投和中煤之间进行无偿划转，是由于国投和中煤作为“中央企业”，共同由国务院国有资

产监督管理委员会(国资委)履行出资人职责。

国资委是国务院直属特设机构，对于中国 97 家全民所有制的国有独资企业履行出资人职责，并负责监管中央所属企业的国有资产。其核心使命之一是监督国有资产的“保值增值”，使这部分被定位为对国民经济具有“主导作用”的资产做强做大。

2012~2015 年是中国煤炭行业低迷的几年。以新集能源为例，其业绩在这几年中大幅滑坡。利润从 2012 年的 13.4 亿元逐年下降到 2014 年的 -19.7 亿元和 2015 年的 -25.6 亿元。

也是从这一阶段开始，由国资委主导，以国投为代表的央企开始了剥离煤炭业务的进程。国资委在 2016 年 6 月召开工作会议，计划从 2016 年开始，用 5 年时间压减中央企业煤炭产能的 15% 左右。此举在为一些涉煤中央企业“减负”的同时，通过资产整合增强另一些专业煤炭企业。

## 更强的煤企

国投公司在 2016 年年中宣布推动其煤炭子公司转型，并于当年 8 月作为第一家剥离煤炭业务的央企，宣布将煤炭资产无偿划拨给中煤。

据相关人士对中外对话介绍，把主营业务并非煤炭的央企的煤炭资源划走，形成更具规模效益的煤炭央企集团公司，实际上释放了煤炭产能。

但煤炭资产的转移也并非一帆风顺。随着煤炭去产能的进行，煤炭供需关系得到改善，到 2016 年底，煤价开始上涨。由于一些涉煤企业的现金流得到大幅改善，因此有的企业对移

交煤炭资产表现不再积极。能源咨询机构汾渭能源煤炭分析师曾浩说，“一些大的煤炭资产的处理移交仍需要一个长期的沟通和谈判过程”。

国资委给中央企业煤炭资源整合定下的目标是 2019 年“力争再完成 2000 万吨产能整合任务”。

曾浩说，国家对于央企的调控，出发点并不是要减少煤炭，而是专业化。一家央企的主营业务如果不是煤或者电的话，基本都会逐步退出煤或者电的领域。

中国政府公开文件表示将通过兼并重组扩大煤炭企业平均规模，提高上下游产业融合度，到 2020 年底，争取在全国形成若干个具有较强国际竞争力的亿吨级特大型煤炭企业集团。

经过一系列重组，神华和中煤这两家最大的专业煤企将有望成为其他央企剥离煤炭业务的最大受益方，形成国内煤炭资源双“寡头”格局。随着煤炭新增产能的不断释放，煤炭产量有望进一步增加。根据中国煤炭工业协会调查，2019 年企业预计新增煤炭产量 1 亿吨左右。

国投等央企退出煤炭业务，给市场中的“巨无霸”型煤炭央企留出了更大的发展空间。

绿色和平气候与能源项目经理张凯表示，对煤炭资产进行整合固然能提升中国煤炭央企在经济上的竞争力。但相比于太阳能等可再生能源，煤炭无论在经济性和环保方面都将在不久的将来失去竞争力，更重要的是，继续新建煤炭项目也不利于全球在减缓气候变化上的共同努力。☺

冯灏，中外对话研究员



# State investment giant dropping coal hides reality

Mergers and restructurings aim to increase capacity and competitiveness, not to leave coal behind

□ Feng Hao

In March, the State Development and Investment Corporation (SDIC), which holds more than 1 trillion yuan (US\$200 billion) in assets under management, announced it had completed its withdrawal from the coal sector and would focus instead on low-carbon energy.

This led to industry chatter about whether or not state-owned enterprises (SOEs) are abandoning the coal sector. But experts say SDIC's "withdrawal" will in fact strengthen the sector, and reflects the government's desire for strong firms that specialise in coal.

## SDIC's coal divestment

Established in the 1990s, SDIC is involved in an array of sectors, including electricity, transportation, mining and finance. Its coal mines and power plants were some of its main assets and have been particularly profitable, generating 28 billion yuan (USD\$4 billion) in the ten years from 2003.

As SDIC is China's largest SOE investment holding company, and is seen as a guiding force in the market,

"The state is not trying to cut back on coal, but to concentrate coal assets in specialised firms."

the US Institute for Energy Economics and Financial Analysis described the coal divestment as "globally significant". The institute's Tim Buckley said: "This is the first significant divestment by a major Chinese company and it follows a growing number of significant financial institutions around the world making similar formal policies to exit the coal sector."

But the coal businesses SDIC has dropped are still operating. Most have been transferred, without payment, to China National Coal Group (CNCG), a state-owned enterprise that's supervised and managed by central government.

The transfer included shares in listed coal mining firm SDIC Xinji Energy, which owns mines in Anhui province in the east of the country. This brings CNCG, which previously owned mines mainly further west in Inner Mongolia and Shanxi, closer to the more developed markets of China's eastern seaboard, where it can more easily meet market demand. Analysts say that CNCG acquired an additional 50 million tonnes of annual coal output from the transfer, equivalent to more than 30% of its total output in 2017.

## Commission on a mission

Following a golden period between 2002 and 2012, China's coal sector struggled with overcapacity between 2012 and

2015. The coal interests of many SOEs have hurt their overall profitability. For example, SDIC Xinji Energy saw performance plummet, from a profit of 1.34 billion yuan (US\$200 million) in 2012 to losses of 1.97 billion yuan in 2014 and 2.56 billion in 2015. At the sector's lowest point in 2015, SDIC's coal business lost 3.4 billion yuan (US\$519 million), almost halving the corporation's net profits to 4.1 billion yuan.

The losses encouraged the Chinese government to restructure SOEs, moving some away from unprofitable sectors.

As SDIC and CNCG are "centrally-owned" SOEs, managed by the State-owned Assets Supervision and Administration Commission (SASAC), it was possible to arrange asset transfers from one firm to the other without exchanging funds.

SASAC is a special State Council body responsible for managing 97 SOEs and overseeing their state-owned assets. One of its core missions is to ensure the value of those assets is maintained and increased, and therefore continue to play their role in "guiding the economy."

It was during this overcapacity period that SASAC started to pull SOEs out of the coal sector, as exemplified by the changes at SDIC. In a June 2016 meeting, SASAC targeted a reduction of about 15% in coal production capacity by centrally-owned SOEs. This provided relief to some SOEs with loss-making coal operations, and strengthened other firms specialising in coal, by reducing supply.

## Stronger coal companies

In mid-2016, SDIC announced that it would be making changes at its coal subsidiaries, and that August became the first SOE to divest itself of coal assets, announcing their transfer to CNCG.

Sources told chinadialogue that transferring coal assets from firms with a diverse range of interests to a coal-focused firm would create economies of scale, strengthening CNCG and enabling more coal output.

But the uncompensated asset transfers did not run smoothly. With coal output being reduced and supply and demand better balanced, coal prices started to rise in late 2016. This boosted the balance sheets of some firms, which then became reluctant to lose their coal businesses. Zeng Hao, coal analyst with consultancy Fenwei Energy, said that: "Long-term discussion and negotiations will be needed before some larger coal assets can be transferred."

After SASAC met its 2016 target to reduce its coal capacity by 15% ahead of schedule, a new target for SOEs was put in place to have "completed the consolidation of another 20 million tonnes of capacity by 2019."

According to Zeng, the state is not trying to cut back on coal, but to concentrate coal assets in specialised firms. Any centrally owned SOEs which are not focused on coal or electricity will gradually be withdrawing from these sectors.

A government document indicates that mergers and restructurings will be used to increase the average size and vertical integration of coal firms, with the aim of creating internationally competitive coal conglomerates, each with output of 100 million tonnes a year or more.

Shenhua Coal and CNCG are set to be the largest beneficiaries, with a virtual duopoly on Chinese coal resources. And with more coal mines at their disposal, output may increase. According to a survey by the China Coal Industry Association, coal firms expect output to increase by about 100 million tonnes in 2019.

SOEs such as SDIC pulling out of the sector has left more room for the coal heavyweights.

Zhang Kai, climate and energy project manager for Greenpeace, said that the consolidation of assets will make China's coal firms more competitive. But regardless, coal will soon be unable to compete with renewables such as solar on economic terms. And more importantly, new coal projects will not help joint global efforts to combat climate change. ☹

*Feng Hao is a researcher at chinadialogue.*

# 协助中国海关查验 海洋生物制品的“鲸豚博士”

一位跨界海洋生物研究和海关执法鉴定的科研人员如何看待濒危海洋物种保护？

□ 中外对话



汕头大学海洋生物研究所的会议室成为了协助海关鉴定走私海洋动物制品的鉴定室

**郑**锐强大概是中国大陆 35 岁左右为数不多的专门从事鲸豚类研究的专家。作为汕头大学海洋生物研究所的博士后，他主要从事小种群中华白海豚的保育研究。2

年前，作为一个土生土长的广东潮汕人，他辞去了北京一家公益机构的工作，受邀回到自己的故乡海域从事研究。他亲眼看到了 7 年来才第一次出现的新生白海豚，又眼睁

睁看它在出生仅七天后死去。他一直担心，这个种群会在他的有生之年永远从故乡的那片海中消失。

他所在的团队除了进行海洋濒危物种研究之外，还作为农业部濒

危水生野生动植物种鉴定单位之一，协助海关进行走私野生动物制品物种鉴定和数量核算。作为一个站在研究与执法交界处的专家，郑锐强向中外对话分享了他参与走私物种鉴定的细节，以及他对物种保护和公众教育的思考。

**中外对话海洋（以下称“中”）：**你是怎么会受海关邀请去帮他们鉴定走私动物制品的？

**郑瑞强（以下称“郑”）：**2017年11月农业部颁布了关于涉及珍稀、濒危水生野生动物及其制品案件鉴定单位资格的相关文件。我所在的汕头大学作为广东地区唯一一家具有鲸豚类以及海龟鉴定资格的单位，开始协助海关、渔政等相关部门进行物种和制品的鉴定。鉴定团队中包括我本人以及汕头大学副校长刘文华教授。从日常的鲸豚研究工作中（包括搁浅救护以及解剖等），我们累积了丰富的识别鉴定经验，因此可以协助海关等部门进行鉴定工作。

**中：**能否介绍一下海关的基本情况？

**郑：**目前我们主要协助深圳地方海关进行不定期的鉴定工作。作为国内最大的口岸之一，深圳海关缉私科每年处理的走私动植物制品案件屡见不鲜。以我了解的深圳其中一个海关关口2018年初步统计的数据为例，走私珍贵动物包括来自东南亚的鳄鱼皮、南非的犀牛角（超10千克）、肯尼亚的鲸鱼牙，马来西亚的穿山甲鳞片（超10千克），玳瑁

（150千克），主要来自地中海和墨西哥湾的红珊瑚（超30千克）等。案件频发大大增加了海关缉私和我们的鉴定工作的强度。

**中：**涉及濒危物种的货物一般是以什么形式进入海关的？

**郑：**我们鉴定的案例中，几乎所有货物都是通过个人携带进入海关的。深圳的关口几乎是全中国人流量最大的关口，所以也成为走私的重灾区，因为可以浑水摸鱼。目前海关对于《华盛顿公约》（CITES）附录物种以及相关制品的稽查非常严格。无论是有预谋的团伙走私，还是不知情的个人携带，海关人员都会一一排查。

**中：**你对海关的技术支持主要以什么形式进行？可以描述一下你们合作中比较典型的场景吗？

**郑：**协助海关进行鉴定工作是我们研究工作的拓展。目前我们的鉴定工作主要是针对海关部门扣押的相关制品进行实验室实物鉴定。制品鉴定需要不同的设备、仪器以及较长的时间进行分析。在汕头大学，我们的鉴定室就是我们海洋生物研究所的会议室。

我们首先会将委托材料分别拆箱、去除杂质并与海关人员进行现场核算；然后对相关制品进行编号、形态测量、计数、拍照以及称重；最后，我们参考国内以及国际上的标准对制品进行物种鉴定。比如鲸目物种鉴定主要根据外部特征以及解剖特征，并主要根据CITES相关制品的鉴定方法进行鉴定；最后，我

们会根据对应物种的生物学特征进行年龄等级鉴定，并对制品的数量进行核算。

**中：**涉及鲸豚类的罚没物品主要有哪些？

**郑：**目前我们负责鉴定的鲸豚类制品基本上都是牙制品，它们在宗教制品、文玩、传统艺术品等中用得较多，来源包括抹香鲸、一角鲸以及其他少量海洋哺乳动物的牙齿，有时候也会混入一些河马或者其他的陆地动物的牙制品。

**中：**协助海关做走私鉴定，有什么让您印象深刻的事情？

**郑：**让我印象深刻的有几点。首先是消费市场的庞大。每一次海关的罚没制品的数量，多到几乎都会花掉我们2-3天的时间。目前走私动植物制品主要跟文玩市场、中药市场等有直接联系，如何对消费市场进行规范、对公众的价值判断进行引导、对相关行政流程以及法律法规进行完善等，都是需要关注的问题。

其次是法理与人情之间的矛盾。有一次深圳海关查没了约96公斤抹香鲸的牙齿，1400多个，我们一个一个拍照、称重、确认。从牙齿钙化和风化的程度我们发现，这些牙齿应该是有人从搁浅在偏远地方的动物遗体上收集，然后流入市场的，并非来自非法捕杀。但是在鉴定报告上，我们只负责物种鉴定与数量核算，而这种非确定性的细节我们不会在报告中体现。我们因此与海关缉私科的同事讨论过是否应该将一些能确认的特殊信息体现在鉴定工



作中。使执法在对于真正的非法人员严惩不贷的同时，能够考虑到更复杂的现实。

**中：**所以严刑峻法，有时候也并不适用？

**郑：**法律体系应该要考虑到物种贸易链条上的不同人群。他们有些是铤而走险的不法分子，但也有可能是无知的弱势群体。比如上述抹香鲸牙齿走私的案例，最后那个人走私金额多大？按照之前的核算体系，它的走私金额超过 120 万人民币，至少面临 20 年的刑期。但在这个案子中，几乎大部分的制品都是自然腐烂之后收集过来的，而在整个走私的环节中，最

后被查获的这个人扮演了什么具体角色也并不明确。目前农业部对《水生野生动物及其制品价值评估办法》也在 2018 年 11 月开始征求公众意见，相关法律法规的进一步完善以及解读，有助于提高执法的精确性。

**中：**您此前建议过用罚没品进行展示，来进行公众教育。为什么会有这样的想法呢？

**郑：**消费者基本上都是“被动”的。一个东西“值不值钱、好不好”，更有可能是被市场教育出来的，加上文玩、中药等等一系列传统文化的影响，海洋保育理念的推广几乎处处碰壁。

我们鉴定单位跟海关的同事也在讨论，结案之后如何处理罚没的制品？因为一般的流程都是直接销毁。我们建议把鲸鱼牙齿做成一个艺术作品，然后放在不同的社区、学校、公司，让人们知道这种东西背后的故事，让他每天都可以看得这些交易的不道德，他就不会去去买这种东西，进一步降低相关制品的在消费者眼中的“价值”。☺

中外对话海洋致力于研究、分析并帮助化解海洋所面临的危机

# The expert helping customs end endangered species smuggling

Zheng Ruiqiang explains how researchers work with customs to identify sperm whale teeth and other parts of vulnerable and endangered species

□ chinadialogue



*Sperm whale teeth examined by Zheng Ruiqiang and his team*

Zheng Ruiqiang, 35, is one of very few Chinese academics of his age to specialise in cetaceans – whales, dolphins and porpoises – particularly endangered species. Two years ago, he quit his job with a charity in Beijing and accepted an invitation to return home and take up a postdoctoral research post at Shantou University's Marine Biology Institute. He focuses on conservation of the small

remaining population of Indo-Pacific humpback dolphins, also known as the Chinese white dolphin. He witnessed the birth of the first white dolphin for seven years – and then saw it die just seven days later. He worries he may live to see the population here be lost forever.

As well as studying endangered marine species, his team is also designated by the Ministry of Agriculture to help the

customs authorities identify smuggled endangered marine animals and plants.

In this interview, Zheng shares his thoughts on the intricacies of such smuggling cases, and on conservation and public education. The discussion has been edited for clarity.

**chinadialogue (CD): How did you come to assist the customs authorities?**

**Zheng Ruiqiang:** In November 2011 the Ministry of Agriculture issued a list of bodies qualified to carry out assessments in cases involving rare and endangered species. My university, Shantou, was the only one in Guangdong listed for cetaceans and turtles, and we started assisting the customs and fisheries authorities with identification of species and products. Our team includes me and professor Liu Wenhua, deputy head of the university. Our ongoing research into cetaceans (which includes rescuing beached animals and dissections) has given us experience which we can use to aid customs authorities.

**CD: What does this involve?**

**Zheng:** Currently we do ad-hoc identification work for Shenzhen customs authorities. Shenzhen is one of China's biggest ports, and numerous cases of smuggling of animal and plant products are uncovered every year. I know of preliminary figures for 2018 from one Shenzhen customs post I can offer as an example: rare species smuggling cases included crocodile skin from Southeast Asia, over 10 kilogrammes of rhinoceros horn from South Africa, whale ivory from Kenya, over 10 kilos of pangolin scales from Malaysia, 15 kilos of hawksbill turtle, and over 30 kilos of red coral mainly from the Mediterranean and the Gulf of Mexico.

“We need to remind people how unethical the trade is.”

**CD: How are these goods usually brought through customs?**

**Zheng:** In the cases we've worked in, the goods are almost always carried through customs by an individual. Shenzhen is one of China's busiest border crossings so it's a popular choice for smugglers hoping to slip through with the crowds. But the customs authorities are carrying out strict checks for smuggling of CITES species. So whether it's an organised smuggling gang, or an unwitting tourist, the guards are on the lookout.

**CD: Can you describe a typical case?**

**Zheng:** Helping identify smuggled species is an extension of our research. Currently, we carry out laboratory tests on goods confiscated by customs to identify what they are.

The first thing we do is unpack the material being entrusted to us, remove any extraneous material and document it alongside customs officers. Then we assign serial numbers, measure it, count it, weigh it and take photos. Next, we identify the species, in accordance with domestic and international standards for this process. For example, cetacean species are usually identified by external characteristics and dissection, and in accordance with CITES identification methods. Then we assess the age of the animal and the quantity of the goods.

**CD: What types of cetacean products are confiscated?**

**Zheng:** The ones we see are almost all ivory, used in religious items, ornaments, traditional art. That ivory comes from the teeth of sperm whales, the narwhal (a small Arctic whale) and a small number of other marine mammals. Sometimes there's some hippopotamus ivory or other land mammals mixed in.

**CD: What's made the deepest impression since you've been doing this?**

**Zheng:** First is the size of the consumer market. Every case the customs authorities bring us involves goods that take two or three days to process. Smuggled animal products are either ornaments or Chinese medicine. We need to look at how to reduce that market demand by changing consumer values, and to improve administrative processes and laws and regulations.

Second is a tension between legal principles and unique circumstances. In one case, Shenzhen customs seized over 1,400 sperm whale teeth, weighing about 96 kilos. We photographed, weighed and confirmed the species. The calcification and weathering of the teeth told us these had probably been taken from the dead bodies of whales washed up on some distant shore, rather than from illegal killing of the animals. But we are only responsible for identifying the species and quantity, we don't include conjecture such as that in our report. So we've talked with our colleagues in customs about including other confirmed information in our report. That would allow harsh punishment for true law-breakers, but also give full consideration to more complex cases.

**CD: So sometimes a draconian approach isn't suitable?**

**Zheng:** The legal system should consider the difference between people at different points in the trade. Some are criminals who knowingly break the law, but some may be vulnerable and unaware. For example, in the case of the sperm whale teeth I mentioned earlier, the value of the goods

was assessed at 1.2 million yuan (US\$174,000), meaning a minimum of 20 years in prison. But the majority of the teeth had been collected after natural decomposition, and it wasn't clear what role the person arrested had actually played.

Also, in November 2018 the Ministry of Agriculture started soliciting views on methods for assessing the value of marine animals and marine animal products, and better laws and interpretations would help more precise law enforcement.

**CD: You've suggested displaying confiscated products to help educate the public. Why is that?**

**Zheng:** Consumers are basically passive. They're taught whether a product is worth spending money on by the market, or in the case of ornaments and Chinese medicine, by culture. Attempts to raise awareness of marine conservation almost always fail.

We've also discussed how to handle the products once a case has concluded. Usually they get destroyed. We've suggested using the whale ivory as an art exhibit to be displayed in communities, schools and businesses, telling people about the story behind it and reminding them on a daily basis how unethical the trade is. Then they'd be less likely to buy those products, which would be seen as having less value. ☺

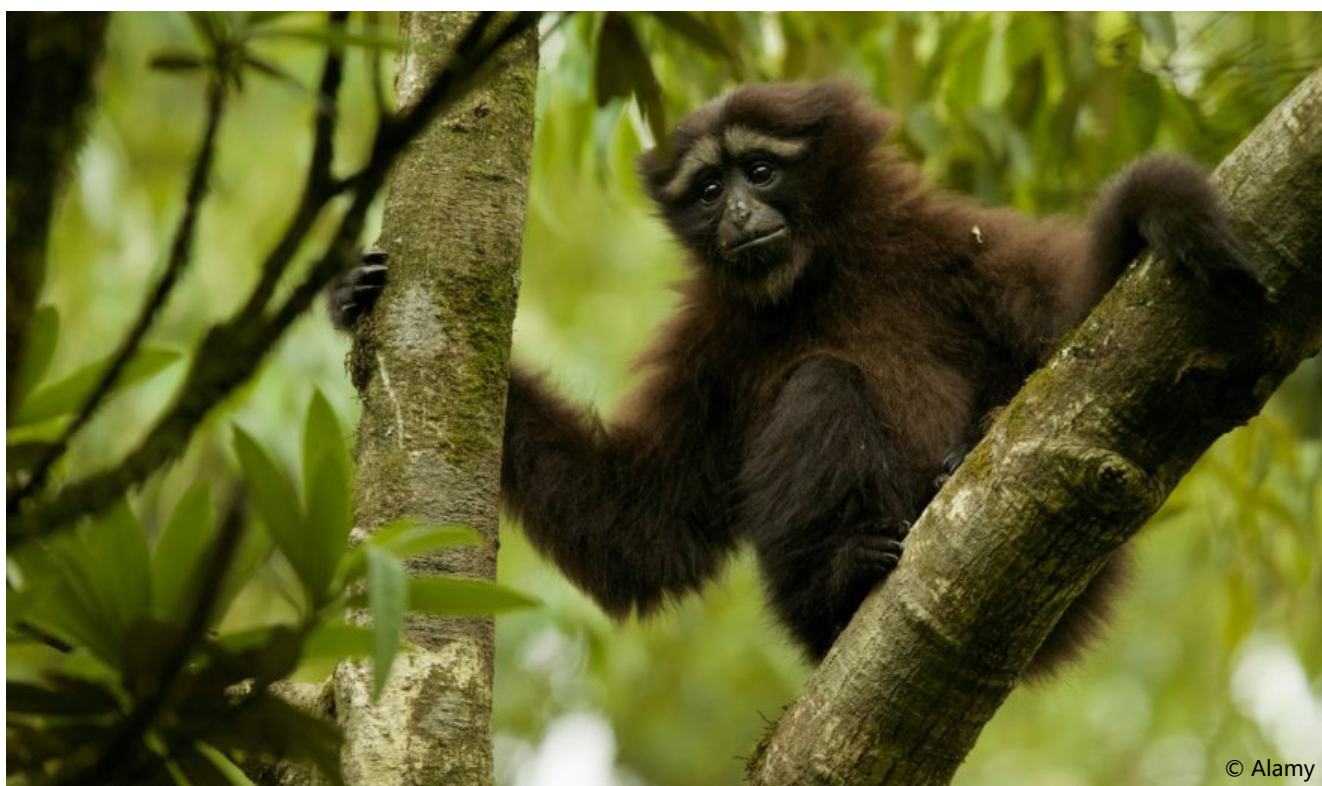
*Dedicated to illuminating, analysing and helping to resolve our ocean crisis.*



# 生物多样性谈判：“巴黎热”中的冷思考

《生物多样性公约》可以从气候变化领域借鉴哪些宝贵经验？

□ 李 硕



生活在云南的白眉长臂猿

**生**物多样性谈判正在经历一场“巴黎热”。

2020年中国将作为主席国举办《生物多样性公约》第十五次缔约方大会（CBD-COP15），力求达成全球生物多样性后2020年框架。在通往昆明的道路上，借鉴《巴黎协

定》经验已成为目前谈判中的趋势。《巴黎协定》作为新一代多边环境条约的历史地位，及其对其它环境进程的参考价值毋庸置疑。然而，在现阶段的谈判中，已然出现了一些对“巴黎精髓”的曲解。如不多加注意，有可能导致生物多样性进程仅

仅学到了巴黎之“表”，而不能汲取其“里”。

《巴黎协定》对生物多样性进程的参照应该至少表现在四个层面。

首先，《巴黎协定》为多边气候治理带来的不是小修小补，而是一次范式革新。《巴黎协定》汲取了既往“自

上而下”和“自下而上”模式的优势与不足，创新性地将全球长期目标、规则手册等“自上而下”的元素与“国家自主贡献(NDC)”的“自下而上”概念结合。在地缘政治深刻变化的当下，《巴黎协定》的执行情况还有待实践的检验。但应当承认，它赋予了国际气候治理格局一次重生。

2020年的昆明会议对于生物多样性进程的历史意义，类似于当年的巴黎气候大会，应当留下与之相匹配的政治遗产。这一遗产不应该局限于政治“化妆”，而应触及问题的根源，对生物多样性保护的症结开展有效的“手术”。在这一点上，生物多样性进程并非没有前车之鉴。2010年的“爱知目标”外表光鲜，但各国对这一国际目标却没有义务进行相应的“国内化”（通过国内的立法和政策制定使目标“落地”）。这无疑注定了“爱知目标”更多只是“愿景”，而无法被全面达成的宿命。让生物多样性进程在2020年之后获得如巴黎一样的“重启”应是昆明会议的重要使命。

其次，《巴黎协定》的重要政治贡献在于目标和机制的“双核”推动。在目标方面，《巴黎协定》在一定程度上冲破了政治束缚，第一次将雄心勃勃的1.5度温控目标写入多边进程。这在一定程度上是主席国政治魄力和各方外交努力的成果。在机制方面，《巴黎协定》也取得了摆脱旧有的发达国家-发展中国家二元对立的政治突破，并显著提升和丰富了多边机制中围绕“自主贡献”信息、透明度、适应、资金、力度提升机制、履约等各方面的规则。

现阶段生物多样性谈判则有一种“重目标、轻机制”的倾向，过多的精

力被用于设计目标的形式和结构，而对目标力度和涵盖议题(比如是否包含量化资金目标)的讨论还处在表层。在机制方面，各方还没有对后2020框架需要哪些机制进行有效、务实的甄别。更危险的是，各方在尚未清晰界定后2020年框架所包含的要素前就急于进入关于要素之间层级和结构的讨论，这与先定内容，再议结构的常规逻辑背道而驰。与巴黎目标、机制的“双赢”相比，昆明会议需要谨慎安排这两方面的讨论，防止既无法产出超越政治想象的目标，又在机制、资金等问题上裹足不前的情况。

第三，《巴黎协定》的谈判虽然不乏波澜，但对程序性问题的管控总体得当。多边进程中，程序性议题往往是决定进程成败的关键。目前阶段，生物多样性进程已经出现了一些程序性隐患，亟待解决。例如，《生物多样性公约》试图复制《巴黎协定》中“自主贡献”的概念，在2018年的第十四次缔约方大会(CBD-COP14)决议中采纳了“自愿承诺(voluntary commitment)”的概念。但《巴黎协定》在提出“自主贡献”概念后对其进行了缜密定义，才最终要求各国提交贡献。而《生物多样性公约》在没有对“自愿承诺”由谁提交、何时提交、包含内容等关键问题进行详细讨论并形成共识前，就植入了这一概念。更令人忧虑的是，作为国家执行公约的政策工具，生物多样性进程下已有“国家生物多样性战略与行动计划(NBSAP)”。在没有充分定义的情况下抛掷出“自愿承诺”概念，不仅不会健全公约的执行机制，反而可能产生不必要的误解。同时，如果没有足量国家认同“自愿承诺”的概念，昆明会议也可能面临甚少“自愿承诺”被

提交的“冷场”。最后，“从沙姆沙伊赫到昆明行动议程”与“自愿承诺”的关系也不甚清晰。如若二者为同一概念，那么目前为二者制定的条款并不统一，容易引起误解。如若二者为不同概念，那么用两个概念为昆明大会造势这一共同愿景服务则显冗余。

第四，《巴黎协定》的影响力还来自主席国对其遗产的长期推动。《巴黎协定》诞生伊始就面临使条约迅速生效、美国撤约、完成规则手册谈判等重要考验。法国作为第二十一次缔约方大会主席在条约达成后付出了延续性的政治努力，在国际气候进程遭受到挑战甚至挫折的情况下为《巴黎协定》注入了关键的政治韧性。

重大多边协定的达成如同育儿，决议呱呱坠地往往只是漫长育儿过程的起点。中国应该就会议成果和会后进程做好筹划。生物多样性进程中的很多问题积累多年，不能指望昆明会议一蹴而就、解决百病。因此，会后的“售后服务”应该与会议成果设计得到同等重视。主席国也应为此问题预留长期、充足的政治资源。

综上，各方对《巴黎协定》的价值及其对《生物多样性公约》的借鉴意义应该有全面、精确的理解。对症下药，而仅进行“复制-粘贴”式的仿效将事倍功半。中国作为昆明会议主席国，应将会议定位在针对生物多样性进程进行巴黎式的范式革新。这是对环外交的一次考验，但也是昆明成果历久弥坚的根基。☺

李硕，绿色和平东亚区全球政策高级顾问  
(气候与海洋方向)

# Conference on Biological Diversity: what Kunming can learn from Paris

Kunming 2020 requires a paradigm shift for biodiversity governance to ensure countries meet global targets

□ Li Shuo

In 2020, Kunming, the capital of Yunnan province in south-west China, will host the 15th Conference of the Parties (COP) to the Convention on Biological Diversity (CBD) – a key meeting with the goal of putting in place a post-2020 framework for biodiversity protection.

It's currently fashionable among biodiversity negotiators to talk about “replicating the success of the Paris Agreement on climate change.” However, without a full and accurate understanding of what exactly “worked” in Paris, CBD negotiations run the risk of adopting the appearance of the agreement, but not its true essence.

In order for the Kunming COP to succeed, China should aim for the conference to provide a Paris-style paradigm shift in governance for biodiversity. This will be a challenge for environmental diplomacy, but it would provide the foundations for lasting success. Solutions must be tailored to the problems of biodiversity protection – simply copying and pasting from the Paris Agreement will only mean more work for lesser results.

## Lessons from Paris

The historic status of the Paris Agreement for global environmental governance is unquestionable. It marked a

new generation of multilateral environmental treaties and has become a key reference for other environmental processes.

However, during the current biodiversity negotiations, there have been some misunderstandings of the essence of the Paris Agreement.

Firstly, the Paris Agreement did not make minor adjustments to multilateral climate governance. Instead, it crafted a new model, incorporating elements of both the “top-down” and “bottom-up” models – top-down global targets and rulebooks; bottom-up nationally determined contributions. We don't yet know how well the Paris Agreement will be implemented during these times of geopolitical change, but we should acknowledge how this new hybrid model has reinvigorated international climate governance.

The 2020 conference in Kunming is as important to the biological diversity process as the Paris meeting was to climate change. Therefore its outcomes should be able to match the weight of the historic occasion.

The conference must get to the root of biodiversity loss.

It should avoid political window-dressing and reboot the negotiation process, as happened in Paris, by getting to the root of biodiversity loss.

There are precedents to be wary of. The 2010 Aichi targets looked impressive but there was no obligation for countries to translate them into domestic legislation and policy. This doomed them to the status of a “vision”, never to be fully implemented.

Kunming needs to strengthen the connection between global targets and national implementation by asking countries to develop domestic plans that fulfil global targets and providing the necessary means of implementation.

Secondly, the key political contribution of Paris was its emphasis on being ambitious with both targets and mechanisms.

Political restraints were broken when the 1.5C warming target was written into multilateral documents for the first time. This was due both to the boldness of the host nation and the diplomatic efforts of all. A breakthrough on mechanisms came when the old antagonistic developing / developed nation division was set aside and the rules of transparency, adaptation, finance, ratchet-up mechanisms and compliance were introduced or greatly improved.

Ongoing biodiversity talks have a tendency to prioritise targets over mechanisms. Too much energy is expended on designing the form and structure of global targets, at the expense of careful consideration of the scope and level of ambition of those targets. For example, whether there should be a quantifiable funding target, and if so, at what scale.

Moreover, there has been no effective and rigorous examination of what mechanisms the post-2020 framework will require. Also, quite dangerously, there is a rush to discuss the “structure” of the post-2020 framework before the elements that will constitute the framework are clearly defined (for example, is an implementation mechanism part of the framework or not?). It would be better to determine the content of the framework first, and then decide how it is to be structured.

Paris saw success on both targets and mechanisms. The Kunming talks need to approach these two discussions

carefully or targets will be limited by political imaginations and no progress will be made on issues such as mechanisms and funding.

Thirdly, while the Paris talks were not lacking in turmoil, there was good control of procedural issues, in that the various components of the Paris package and their interlinkages were addressed in logical sequence. Rigorously managing such procedural issues determines the success or failure of multilateral talks, and there are procedural risks appearing in the biodiversity talks that urgently need to be tackled.

For example, the Conference on Biological Diversity (CBD) is attempting to copy the nationally determined contributions (NDCs) of the Paris Agreement, and at CBD-COP14 in 2018 the concept of “voluntary commitments” was adopted. What sets the climate and biodiversity processes apart is that clear modalities were developed for NDCs before countries submitted them ahead of Paris. As a result, questions such as who is supposed to submit NDCs; when and how they should be communicated; what information they should contain, were all clearly defined.

The CBD, on the other hand, has not defined these necessary modalities and does not enjoy the luxury of another COP before Kunming to set these rules out clearly. More worryingly, the process already has a policy tool for country-level implementation: the National Biodiversity Strategy and Action Plans (NBSAP). Throwing in the poorly defined concept of “voluntary commitments” does nothing to bolster implementation mechanisms and may lead to unnecessary confusion. If the idea is not widely accepted (which seems to be the case based on the latest submissions), there may be an embarrassing lack of such commitments being made in Kunming.

**China needs to escort the post-2020 framework through any turbulence and setbacks.**



Furthermore, the relationship between the “Sharm El-Sheikh to Kunming Action Agenda” and the “voluntary commitments” is also not clearly defined. If these are two different concepts, then the need for multiple instruments serving the same purpose of generating momentum for Kunming should be questioned. If they are the same concept, then confusion has been created by the not entirely identical criteria set respectively for them (see the modalities for the action agenda here, the modalities for voluntary commitments here).

Last, but not least, the impact of the Paris talks was also due to the host nation’s long-term efforts. As soon as the agreement was reached, it was faced with important tests: bringing the agreement into force quickly, dealing with the US withdrawal and with negotiations on the rulebook.

Throughout the years since 2015, France has made sustained political efforts, providing the agreement with political resilience in the face of challenges and even setbacks.

Major international treaties are like children: giving birth to one is only the start of a long process. Many problems within the biodiversity process have been building up for years. These problems will not be solved in one fell swoop.

If Kunming is to be another success story for multilateral environmental treaties, China needs to be ready for an extended period of “after-sale service” to escort the post-2020 framework through any turbulence and setbacks to come. ☞

*Li Shuo is a Senior Global Policy Advisor at Greenpeace East Asia.*

# 穿山甲： 从“片甲不留”到“濒危保育”

在国内外穿山甲保育尝试纷纷遭遇瓶颈的同时，对救护成功的穿山甲野放的科学探讨开始浮出水面，但实现科学野放仍阻力重重

□ 王妍



© 蒙海峰 / 金华救护中心金华动物园

浙江金华陆生野生动物救护中心的保育员与两只中华穿山甲“肉肉”和“团团”

“那天傍晚，我正在巡护路上走，突然一个圆忽忽的东西从左边山坡上滚到路前方，我当时很纳闷是什么，还没来得及过去

细看，它就开始慢慢移动到路右边的树丛中，然后爬上不远的那棵树上，这时，我才看清原来是一只穿山甲，爬上树去找白蚁吃的，”陆汉荣

指着不远处一株米老排树，饶有兴致地向来访的考察人员讲述发生在一年前，同一地点那个与野生穿山甲偶遇的场景。

这名广西防城港市十万大山国家级自然保护区的前护林员接着掏出手手机翻到一张当时拍摄的照片，照片显示在一片郁郁葱葱的林木间的一棵树的树干上盘踞着一只穿山甲，拍摄日期2018年4月10日。来访人员听闻陆汉荣的讲述都兴奋不已，又比对着照片找到那棵米老排树，唯一令人遗憾的是，当时拍摄的一段视频，据陆讲不小心被家里的孩子删除，因此没有保存。

“就我所知，这是近年来，广西第一次又发现了野生穿山甲，事实上，由于该物种的濒危状况，在全国范围都很难看到野生穿山甲了，”中国生物多样性保护与绿色发展基金会（以下简称“绿发会”）工作人员张思远在三月初向记者回顾了当时考察的场景。据张介绍，她今年2月底受广西林业部门邀请，参加了一次历时三天在广西地界内的穿山甲栖息地考察项目。同行的队员还包括广西林业的工作人员以及一位广西师范大学的蚂蚁研究专家。考察队员在当地林业部门的安排下，在广西崇左和防城港两市分别选取了四个野外地点。“此次考察的目的是从这四处选出合适的野放点，为下一步考虑野放救护成功的穿山甲做准备，”眼前的张思远，一边继续向记者介绍当时各个考察选点的情况，一边强调适宜穿山甲生存生境的几个要素：足够厚度的土壤方便穿山甲打洞，充足的蚂蚁供其食用，一定植被便于隐蔽，以及适宜温度保证其身体健康。现实中，穿山甲对自然生境要求并不苛刻，毕竟在其被过度捕杀利用之前，曾广泛分布于我国的南方各省。“我们希望通过这次选点，以及之后即将举行的野放研

讨论证会，能亲眼鉴证广西野放两只救护成功的中华穿山甲，以便为未来类似操作理清一套穿山甲野放的程序出来，”她继续道，眼神闪烁着明显的期待。

### 过度利用

如果你有机会见到穿山甲，这种身披铠甲、却胆怯温和的小型哺乳动物那忧郁的眼神定会令你产生怜爱。在过去的几十年间，由于无节制的猎杀及利用，全球8种穿山甲均被世界自然保护联盟（IUCN）物种红色目录列入濒危级别以上，其中中华穿山甲、马来穿山甲被列为极危，离灭绝一步之遥。

据绿发会统计，60年代前后，全国穿山甲年捕获量在17—18万只。自20世纪80年代初开始，穿山甲种群数量开始下降，并愈演愈烈，此后的10年间至少锐减了80%，至

90年代末，多数地区已无甲片可收。中国本土中华穿山甲几近灭绝导致东南亚以及非洲穿山甲的大肆猎杀及跨国贸易。据IUCN报告，截至2014前的十年间，由于来自亚洲，尤其是中国消费市场的需求，在全球范围内有超过一百万只穿山甲遭到野外捕获及非法贸易。为了挽救全球数量有限的穿山甲这一物种，最新濒危野生动植物种国际贸易公约（CITES）在2016年9月会议决定将全部8种穿山甲由CITES附录II升至附录I，即明确禁止其国际贸易，否则会导致灭绝。

据化学分析，穿山甲甲片的主要成分为角蛋白，类似于我们人类的指甲。在我国，传统中医认为它是一味重要的药材。“炮山甲辅以其他味中药，具有活血化瘀、软坚散结的功效，主要用于妇女产后催乳，也用于癌症治疗，”孙秀清，北京同仁中医堂一位副主任医师对记者表示。



2019年3月，在一家北京同仁堂药店内，这样的一袋穿山甲甲片售价180元



## 中国本土中华穿山甲几近灭绝导致东南亚以及非洲穿山甲的大肆猎杀及跨国贸易。

穿山甲在中国属国家二级保护动物，禁止捕杀和食用。按照 2007 年国家林业局、卫生部、工商总局、食品药品监督管理局、中医药局五部门联合发布的《关于加强赛加羚羊、穿山甲、稀有蛇类资源保护和规范其产品入药管理的通知》规定对穿山甲原材料进行严格监管，仅限于定点医院临床使用和中成药生产，并不得在定点医院外以零售方式公开出售。孙秀清医生在采访中也明确表示就她所知，由于该味药材管理严格，目前很少在临床中使用，取而代之以王不留行、穿山龙、通草等其他中药代替。该医院的另外一名中医师石雨也向记者表示穿山甲是二级保护动物，因此目前限制使用。

关注穿山甲走私问题的中科院西双版纳热带植物园助理研究员张明霞告诉记者，合法的中药穿山甲甲片售卖必须得到相关部门的许可，有包装并在最小销售单位包装上加载一个鹿头形状的“中国野生动物经营利用管理专用标识”后方可进入流通渠道。“没有包装的即为非法，而网络售卖更是违法的。”张补充道。但是在记者的调查中却发现，无论是实体药店还是网络渠道，没有包装的穿山甲片随处可见。在北京一家同仁堂门店，一袋炮山甲售价 180 元，21 克的醋山甲粉售价 420 元。在淘宝上记者尝试联系三家药材网店，店主均展示了未包装的炮山甲照片，

售价要明显低于同仁堂合法甲片，大约为每克 5 至 6 元。很显然，这些无包装的甲片均为非法售卖。一位不愿具名的杭州某医院负责中药材采购的药剂师向记者透露，在杭州无论门诊和药店都可以从有林业部门批准的药材供应商处采购穿山甲甲片售卖。“但是因为监管并不严格，授权药材供应商往往将非法的混入合法的批次中一起卖给我们，这种情况很普遍。”

“从每年的销量来说，我敢肯定市场上售卖的穿山甲甲片大量是非合法的，但是经销商往往会留一部分合法的库存，混合不合法的甲片一起售卖。其实只要拿去检测就可以证明，因为原则上只有库存的中华穿山甲甲片是合法，而大量非法售卖的都要么是马来穿山甲要么是来自非洲的其他种穿山甲，很容易辨别，”绿发会秘书长周晋峰在最近的采访中对记者说。事实上，2016 年前，每年国家林业局均下达穿山甲片的消耗控制量。根据 2008-2015 年这 7 年的数据显示全国总消耗控制量约为 186 吨，平均每年在 26.6 吨左右。但是自 2016 年起，林业部门没有再公布相关数据，而全国合法的穿山甲库存量也是谜一样的存在。采访中，国家林草局没有就目前全国穿山甲甲片库存量及每年的消耗控制量回复记者的采访问题，只表示下一步中国政府将继续做好穿山甲保护工作，包括“开展活体存栏和甲片库存调查与登记工作。”

“如果进行了有效的库存管理，非法的甲片就难以进入市场，很明显林业主管部门并没有做好管理，才导致目前容易伪造库存，”周晋峰说。

与此同时，非法走私穿山甲并未有效遏制。据绿发会最新统计数据，仅 2018 年全年，在其向深圳、南宁、上海、江门、广东、香港 6 个海关申请信息公开后得到的回复合计显示，在这一年罚没穿山甲鳞片 38.14 吨，意味约有 6 万只穿山甲个体惨遭杀戮。这个数字还仅仅是冰山一角。

## 人工保育

随着穿山甲数量的急剧减少，国际和国内穿山甲保护不断升级，中国从 2018 年 10 月起停止了商业性进出口穿山甲片及其产品的审批，而全国各地海关也加大了对走私穿山甲的打击力度。2018 年，湖南警方通过一年的跟踪摸排，摧毁了一个由境外走私到广西，由广西运输至广州市，再由广州向全国分销的跨国穿山甲非法贸易网络，收缴穿山甲实体 216 只、穿山甲鳞片 66 公斤。在穿山甲走私主要通道的广西重灾区，据新华社最新报道，其东兴海关在 2018 年共查获 23 起涉穿山甲走私案件，其中包括 90 只活体穿山甲以及 200 公斤穿山甲鳞片。

伴随这些为数可观的被海关或者公安机关查没而侥幸存活的活体穿山甲而来的问题是它们接下来如何救护。通常，活下的穿山甲会被直接送到当地省级野生动物救护中心进行救护和人工繁育。现实不容乐观的是，穿山甲在人工环境下很难存活，大多数快速死亡，只有少数



可以存活有限的时间。据国内一位不愿具名的穿山甲知名专家告诉记者：“穿山甲人工圈养最早始于八十年代。我自己开始在2010年前后尝试穿山甲人工繁育的研究，成活率都不高，少数个体可以存活两年以上。”在野生条件下，穿山甲的寿命可达20年。

这位专家表示尽管适宜的人工环境和合成食物可以使救护的穿山甲存活，但往往在数月内，最多不过两三年内仍会死于不可确定和无法治愈的胃肠道疾病和肺炎。“即使是穿山甲保育做的比较好的台北动物园也面临同样问题，目前对疾病治疗还没有解决办法，此外还没有实现完全繁育成功，”该专家补充道。

穿山甲救护成功率取决于动物当时状况、救护技术水平和救护条件，人工圈养和繁育穿山甲面临巨大挑战。历史上一些少有的成功救护个案也往往难以经得住时间的考验。三月初，浙江省金华市陆生野生动物救护中心（简称“金华救护中心”）前工作人员陈扬向记者回忆她曾经照顾过的两只中华穿山甲“肉肉”和“团团”。“我是畜牧兽医专业毕业，在2017年底去到救护中心的时候，这两只救护的穿山甲已能自己进食了，它们很胆小，只要有人经过，先会突然不动，之后用鼻子闻你，如果是熟人它们会爬过来，然后扒你的脚，如果不认识，它们会跑，如果你去摸，它会突然卷成球，”陈扬回忆说她特别喜爱这两只可爱的穿山甲，天气暖和的时候，她和同事会带它们两只去附近山上的竹林，一人跟着一只。“它们喜欢挖土，挖一会还会停下抬头看看你，山里蚊子特别多，但是我们看它们那么喜

欢挖土，就宁可自己被叮得满脚都是包也不想走。”

这两只中华穿山甲的成功救护曾经在2018年初被《中国国家地理》杂志报道，在既有的一些照片和影像资料中，可明显感觉到肉肉和团团在金华救护中心得到的细心照顾，以及它们与保育人员的亲密关系。然而，即使如此，它们的命运还是没有逃脱类似的魔咒。就在2018年开春，它们先后突然患病。“它们两个有一只开始不吃东西了，体温会有时突然升高，开始拉稀，然后就很快消瘦，随后身体也开始溃烂，水肿，免疫力开始下降，尽管患病期间请教兽医和专家给予了治疗并用了消炎针剂，最后还是死去了，随后另外一只也相继死去，”陈扬说她为此伤心得哭了两天，也因此提出了离职，为了避免再经历类似的生离死别场景。“我总是自责自己的能力不够，才没能更好地照顾它们，如果我自己更好（专业）的话，也许能救活它们。”陈扬说。

一份由金华救护中心提供给记者的穿山甲数量统计表显示，肉肉和团团分别于2017年7月和9月由常山县以及江山市市民发现并通过森林公安送至该中心进行救护，它们分别于救护后240天和206天因疾病而死亡。据了解，从2017年起，金华救护中心开始承担浙江省内穿山甲的救护任务，至今共接收了省内各森林公安送来的12只穿山甲。

三月中旬，当《中国新闻周刊》记者赶到坐落于金华动物园内的金华救护中心时，有两只活体穿山甲，其中一只于2018年7月由瑞安林业局送来的腿部受伤的中华穿山甲，另一只是于2019年1月底由江山市林业局送来的马来穿山甲。早春由于室外还有些寒冷，这两只穿山甲就被圈养在一间不足八九平米的小房子内，屋内空调和电暖器全天开启为了保证室温在25度上下。救护中心经理兼保育员王培为它们专门配置了由黑蚂蚁、面包虫干、蜂蛹、奶粉和微量元素调和的食物。

“通常刚被救护的穿山甲，开始要给它们提供它们在自然环境中熟悉的食物也就是黑蚁或者白蚁，等它们慢慢熟悉环境了，我就开始给食物中加入其他一些配料，因为蚂蚁资源毕竟有限，”王培说。在中心几位保育员的努力下几经周折，找到了适合的一种配方药膏，使其中一只受伤中华穿山甲后腿的伤口治愈。金华动物园园长蒙海峰告诉记者动物园也已经在近期帮救护中心对接了金华当地的白蚁防治机构，从而可以获得一定数量的活体白蚁作为穿山甲的食物补充。

“我们也在慢慢摸索如何更好的照顾它们。其实每一只穿山甲习性都不一样，有的和人亲近，有的就相对排斥，每一只喂食时候甚至有自己习惯的姿势，目前每天食量是一只150克，一只200克，一天吃一次，

“穿山甲救护成功率取决于动物当时状况、救护技术水平和救护条件，人工圈养和繁育穿山甲面临巨大挑战。”

## 穿山甲研究专家提醒对长期人工圈养的穿山甲进行野放前，需要进行野化训练，不宜操之过急。

目前还是灌食为主，天气暖和就可以引导它们自己进食了。”王培向记者坦言两年的救护中，穿山甲成活率很低，不过通常本地中华穿山甲比马来穿山甲要相对容易成活，因为马来穿山甲往往从东南亚走私入境，一路辗转，被发现时身体状况较差。“有的马来穿山甲被不法分子灌水或者其他东西增加体重，很多到了中心没几天就死了，”王培说，言语中透露着遗憾和惋惜。

“说实话，单靠我们一家的力量没有能力和资源把穿山甲养好，如果国家能像保护大熊猫一样保护穿山甲的话，我相信才能有真正的进展，”王培继续对记者道：“我们是开放的，希望能有机会和同行交流学习，这些动物都有灵性，你要呆的时间长，可以慢慢了解它们。”

据金华市野生动植物保护管理站副站长谢纯刚介绍，目前浙江省和当地金华市正计划投资480万元在金华动物园内建立总占地2000平方米的穿山甲室外仿生境保育中心，建筑方案设计已经出炉，资金到位即可开建。“我们期望能努力实现三个目标，第一穿山甲成功救护，形成一套科学救护方案，第二进行人工繁育，最终第三步是为了实现野外放生，但是目前我们还远不敢谈野放，主要就是第一步，提高救护成活率，”谢站向记者表示目前对穿山甲的救护的首要困难还是实验样本比较少，来源主要是当地百姓

的零星救护以及执法机关查处没收的。“对于健康的穿山甲，放其实很方便，但是放出去就怕被人逮到了。”由于穿山甲人工圈养成活率低和高昂的养殖费用，媒体报道，曾经在南方各省为数可观，管理混乱的穿山甲养殖场纷纷在近几年停止经营。据华南师范大学生命科学学院教授，IUCN物种生存委员会穿山甲专家组成员吴诗宝教授向记者透露日前全球二十多位穿山甲研究专家历时两年撰写的关于穿山甲商业化养殖思考的论文已经完成，期待发表后能为业界穿山甲的人工养殖提供指导性规范。“养殖应当对保护有利至少无害才能做，商业化养殖宜慎重，以保护为目的，人工圈养救护与繁育技术可以进行探索研究，”吴诗宝认为鉴于近几年都有野生穿山甲怀孕产仔的报道，说明穿山甲种群繁殖功能还没有丧失，还没有功能性灭绝，因此“还有希望可以挽救一个物种。”

## 野放举步维艰

国内外面临穿山甲人工养殖繁育的瓶颈，一些动物保护机构主张将健康穿山甲野放至其自然栖息地。据之前美国环境新闻网站Mongabay一篇2018年的报道，由美国六家动物园和保护机构联合发起的“穿山甲共同体组织”(The Pangolin Consortium)已经实现了较为成功的

穿山甲保育，即便如此，在美国国内仍有环境保护者对其做法提出异议，认为人工圈养为本已危在旦夕的穿山甲种群的存活雪上加霜。在国内，类似争论也是不绝于耳。绿发会是推动野放穿山甲的重要机构之一，并在近年来不遗余力地公开敦促湖南、广西等省份将罚没的活体穿山甲野放。

2019年1月底，国家林草局就穿山甲保护一事召集南方九省林业保护机构在京开会，当时邀请了绿发会成员参会，据当时参会的张思远回忆，在这个会议上，广西林业厅明确表示要准备野放两只穿山甲。”这也就有了文章开头提到的随后二月底开展的野放选点一事。就绿发会方面透露，广西林业厅在当时表示三月底即将在合适地点先尝试野放两只中华穿山甲，并安装追踪器进行跟踪。

然而，一切进展并不顺利。3月15日广西林业厅在南宁组织了一次闭门“穿山甲救护即放生专家论证会，”就目前健康穿山甲个体是否适合放生以及选点等问题进行讨论。绿发会受邀出席参加此会。据张思远介绍，在场专家最后形成三点主要意见，即第一，对放生的实施方案进一步完善细化操作步骤；第二，对放生穿山甲进行训练，增强野外能力；第三目前追踪器不适合穿山甲，需要科学的监测方式。“最终结论可想而知，就是现在不能放！”张思远对记者说：“广西林业厅方面请的专家并不是有野放穿山甲知识和经验的专家，而是很多利益共同体的专家，比如接受广西林业厅穿山甲寄养的单位代表，因研究工作需要，有求于广西林业厅为其提供活体穿山

甲种源单位代表，以及类似广西林业厅面临类似问题的兄弟单位代表，因此这里存在种种利益关系，这些专家没有尊重科学伦理，没有实话实说。在广西林业厅的支持主导下做出了违法的建议。”

“事实是，广西曾经在近年来救护的大批穿山甲因病死亡，并未获得成功人工保育。有鉴于此，我们很担心海关移交给广西林业厅接受救护的那些穿山甲的生存状态，才力推进行野放尝试，”张思远告诉记者彼时绿发会诉讼广西林业厅要求其依法公开2017年8月接收救护的32只穿山甲在不到三个月时间就全部死亡一事相关情况的案子也正待开庭审理。

采访中，穿山甲研究专家也提醒对长期人工圈养的穿山甲进行野

放前，需要进行野化训练，不宜操之过急。据了解，台北动物园在过去的十年间有相对成功的穿山甲保育经验，台湾屏东科技大学野生动物保育所穿山甲研究团队的孙敬闵博士告诉记者就他所知，台北动物园确实成功繁育中华穿山甲，但是目前为止，繁育个体尚未尝试野放。吴诗宝教授表示野放穿山甲应该慎重，“可以做些放生探索研究，等积累了相关经验再做决定。”

至此，尽管野放穿山甲的科学探索以及具体实施尚无定论和时间表，采访中，科研和动物保护组织却一致呼吁国家相关部门应尽快仿照禁用虎骨和犀牛角的做法，将穿山甲片从《中华人民共和国药典》移除，毕竟只有这样才能彻底禁其入药，有效遏制这一濒危物种面临的伤害。

国家林草局没有回复《中国新闻周刊》就全面禁止穿山甲甲片入药等贸易情况的采访问题。不过在采访中，一位不愿具名的林草局人员在向记者证实穿山甲的保护级别有望于今年从目前的国家二级保护动物提升为一级。

“我希望国家能专门为穿山甲设立一个保护区或者国家公园，穿山甲能在那里和我们不期而遇，”张思远对记者说：“这是我的一个梦想。”

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# The plight of the pangolin in China

While conservationists in China try to rescue and breed the shy creature, the booming trade in pangolin scales for traditional medicine is pushing it to the brink

□ Wang Yan

Ranger Lu Hanrong pointed to an evergreen tree. “I was on patrol, when something round fell off the slope onto the dirt road in front of me. Before I recognised it as a pangolin, it started to move slowly to the other side of the road and climbed up that tree looking for termites.” Lu was speaking to a captivated group of visitors to a remote forest reserve – Shiwan Dashan (a Hundred Thousand Mountains) – in Guangxi Zhuang Autonomous Region near the Chinese border with Vietnam.

He held up his phone, which had a blurry photo of the reclusive and highly endangered mammal, which he had taken in April 2018. The visitors, local forestry bureau staff, an animal scientist and a member of a domestic NGO dedicated to pangolin preservation were excited to hear Lu’s tale, since their mission, in late February, was to find a suitable natural habitat to rewild pangolins.



*Two pangolins at the rescue centre in Zhejiang*

“This is the first time a wild pangolin was found in Guangxi in recent years as far as I know. It’s almost never seen in the wild in China now. We tried to explore the area to find any burrows of that living pangolin, but we ran out of time,” said Zhang Siyuan from the China Biodiversity Conservation and Green Development Foundation (CBCGDF), a domestic non-profit public



“The main component of pangolin scales is keratin, similar to human fingernails.”

foundation. “We can tell this is an ideal habitat for pangolins: thick soil, proper forest coverage. And most importantly plenty of ants and termites to meet the species’ unique dietary needs but not much human activity to disturb them,” he said.

### Overexploitation

All eight species of pangolins found in Asia and Africa are listed as “endangered” or worse on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. The Chinese pangolin (*Manis pentadactyla*), once prevalent in most parts of southern China, was classified as “critically endangered” in 2014 due to overconsumption for medicinal purposes.

In the 1960s, 170,000-180,000 pangolins were captured annually in China, according to statistics collected by CBCGDF. By the late 1990s, the annual catch was only a few hundred kilograms. Official statistics indicate the average annual consumption of pangolin scales was around 26.6 tonnes between 2008 through to 2015.

In reality the species, often described by wildlife NGOs as the most trafficked animal in the world, is on the verge of disappearing in the wild in China. According to the IUCN, in the decade up to 2014, more than one million pangolins across the globe were poached and illegally traded to satisfy demand from consumers in Asia, particularly China. The crisis led to pangolin species being moved in 2016 from Appendix II to Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), which indicates the species is threatened with extinction and is prohibited from any form of international commercial trade. China has ratified this treaty.

### Medicinal use poorly regulated

Pangolins are reclusive mammals with protective keratin scales covering their skin and long, sticky tongues that enable them to eat ants and termites. Throughout history, pangolin scales have been used in traditional Chinese medicine. “Roast pangolin scales are used, combined with other traditional material, to promote blood circulation, dispel clotting or swelling, and it is used more often on women who want to stimulate lactation after giving birth or on people who suffer from cancer,” said Sun Xiuqing, a senior traditional Chinese medicine doctor at Jingshun hospital in Beijing.

The sale and purchase of pangolins is prohibited under China’s Wild Animal Protection Law, except if used for scientific research, captive breeding, exhibition or other special purposes, such as in traditional Chinese medicine.

In 2007, the then State Forestry Administration (SFA, now National Forest and Grasslands Administration) established a special marking system to regulate the medicinal use. The system limits the legal use of pangolin scales to verified stockpiles from the SFA or other legal sources in licensed hospitals and authorised pharmaceutical companies. Sun admitted that with the tightening control and regulation, as well as the increasing price of pangolin scales, doctors use them less often.

“There are some alternative substitutes for pangolin scales though the medicinal effects are not comparable,” said Shi Yu, another doctor from Jingshun hospital. “But the doctors in our hospital are aware of the protected status of the animal, so we rarely prescribe them.”

Pangolin scales, like rhino horn, in fact have no proven medicinal value. “According to chemical analysis, the main component of pangolin scales is keratin, similar to human fingernails. As each capsule contains such a small amount of pangolin scales, it is difficult to see that it has any medicinal effect,” stated a CBCGDF report on the overexploitation of pangolins published in July 2016.

At a conservation event organised by WildAid in Hong Kong in September 2018, some traditional Chinese medicine experts urged the use of alternatives.

“Many herbal medicines have very similar functions to pangolin scales,” said Lao Lixing, director of Hong Kong University’s School of Chinese Medicine, the South China Morning Post reported.

Lao listed six substitutes including cowherb seeds and earthworms which can be used to treat certain conditions instead of pangolin scales.

## Legal cover for black market

Zhang Mingxia, an assistant researcher from Xishuangbanna Tropical Botanical Garden, said that legal pangolin scale products should be packaged with an official logo of a deer head. “If pangolin scales are not packaged when they’re sold, then it’s illegal for sure,” Zhang said.

However, during research carried out by NewsChina on the availability of pangolin scales, both at traditional Chinese medicine pharmacies and on e-commerce websites, packs of scales without the official logo were readily available.

At a branch of Tong Ren Tang, a major producer of traditional Chinese medicine, a pack of scales with the official logo was retailing for 180 yuan (US\$27). Powdered



A packet of pangolin scales sells for 180 yuan (US\$27) at a Tong Ren Tang outlet in Beijing, March 1, 2019

scales are more expensive, costing 420 yuan (US\$63) for 21 grams. But three retailers on e-commerce site Taobao, operated by Alibaba Group, offered unpackaged pangolin scales for around five yuan (US\$0.5) per gram, almost certainly illegal.

A pharmacist called Zhu from Hangzhou, capital of Zhejiang province, disclosed to the reporter that hospitals purchase pangolin scales from authorised medicine wholesalers, but due to lack of regulation, wholesalers often mix illegally sourced pangolin parts with legal ones.

“A huge quantity of the sold pangolin scales are illegal, since wholesalers can easily mix legal scales with trafficked pangolin parts to escape supervision,” said Zhou Jinfeng, secretary-general of CBCGDF. Indeed, since 2016 the Chinese government has not published data on pangolin scale quotas. The national legal stockpile of pangolin scales also remains a mystery. The National Forest and Grasslands Administration (NFGA) did not respond to NewsChina’s inquiry on the current status of stockpiles of pangolin scales and the annual allocated consumption quotas. Instead, the NFGA only stated in a vague written response that it vows to “continue its efforts in the registration of live pangolins and scale stockpiles.”

“A well-managed stockpile system would effectively prohibit the sale of illegal pangolin scales, but now it is clear that the NFGA does not have control over the stockpile, so it cannot give us any statistics on that,” Zhou said.

Meanwhile, international trafficking of pangolins continues. In 2018 alone, according to the CBCGDF, authorities seized 38.14 tonnes of illegally traded pangolin scales from six domestic custom offices, including Shenzhen, Nanning, Shanghai, Jiangmen, Guangdong and Hong Kong, which means at least some 60,000 pangolins were killed.

An updated version of China’s Wildlife Protection Law in 2017 clearly prohibits consumption of pangolin meat and the sale of illegally sourced scales. Yet wildlife authorities are in a constant battle to crackdown on the trade in pangolins.

In late 2018, police from Central China’s Hunan Province identified a large pangolin trafficking ring involving over 200 suspects after a year-long investigation.

According to the Hunan Provincial Forestry Bureau, “The pangolins were trafficked into Guangxi from overseas, and then sold to suspects in Guangzhou province, from where they were distributed to other parts of China.”

Arrests were made in six southern provinces. According to China’s Wildlife Protection Law, people involved in the trade in endangered wild animals face more than 10 years in prison, plus fines.

### Captive breeding

As China cracks down on the illegal trafficking, surviving pangolins are sent to rescue centres. However, despite decades of efforts, pangolins do not adapt well to life in captivity.

“Captive breeding of pangolins started as early as the 1980s in China, yet without significant success. I started my pangolin breeding research in 2010, and they only survive an average of two to three years in human care,” said a domestic pangolin expert who spoke on condition of anonymity. In the wild, a pangolin can live up to 20 years.

Many rescued pangolins often die within a few months or at most a few years due to a so-far-unidentified gastrointestinal disease or pneumonia. “So far there are no successful conservation breeding programs for pangolins, and so we need further scientific research for the purpose of pangolin species conservation,” the expert said.

Due to the high mortality rate, successful captive breeding remains elusive. At the Jinhua Wildlife Rescue Centre in Zhejiang province, former keeper Xiao Chen said she really missed two pangolins, Rou Rou (meaty) and Tuan Tuan (chubby) she had taken care of for several months. “When I first saw them in December 2017, they would eat a prepared diet by themselves,” Xiao said. “They were very timid and would stop and sniff when you came to them.” She adored the creatures, and when the weather was warm,

she and the other staff would take them to forage around in the nearby clumps of bamboo.

But in April 2018, the two pangolins suddenly fell ill and died. Xiao Chen cried for two days and left the job with a broken heart. “Although we didn’t know why they died, I still felt so responsible for not being capable or professional enough, otherwise I might have saved their lives,” said Xiao.

Since 2017, forestry authorities have sent all 12 pangolins found in Zhejiang to Jinhua for rescue and breeding.

But in mid-March, when NewsChina visited the rescue centre inside Jinhua Zoo, there were only two pangolins still alive, one wounded Chinese pangolin rescued in July 2018 and a Sunda pangolin (a species from Southeast Asia) sent over in late January 2019.

Wang Pei, manager of the rescue centre, prepares a diet of dried ants, bee larvae and other protein and vitamins. “At first, I tried to feed them with their familiar diet of ants and termites so they could acclimatise to the new environment, and then I slowly added other ingredients,” Wang said.

“We are learning gradually how to take care of them. Each rescued pangolin has a unique temperament, so you need to know that well,” Wang said, admitting the survival rate of rescued wounded pangolins has been low during the two years he’s been trying to rear them.

Wang said that it was not possible for a single rescue centre to successfully breed endangered pangolin species, but if China were to put the same amount of effort in as it has with the giant panda, there will be progress.

“These pangolins are naturally friendly, and the key to making them approachable is loving them when you take care of them,” Wang said.

Xie Chungang from Jinhua Forestry Bureau Wildlife Protection Department said that Zhejiang provincial and local city government are to invest 4.8 million yuan (US\$718,358) to set up an open artificial habitat covering 2,000 square metres at Jinhua Zoo to improve living conditions for rescued pangolins.

“After we achieve the successful rescue and breeding of pangolins, our ambition is to rewild healthy ones in the long

“Each rescued pangolin has a unique temperament.”

term,” Xie said. “But right now, we are just taking baby steps to ensure their survival.”

Due to the low survival rates and high cost, pangolin breeding and farming, which used to be prevalent in southern provinces, has dwindled in recent years. A research paper on guiding and regulating practitioners’ breeding activities has been written by more than 20 international experts from the IUCN Pangolin Specialist Group according to Wu Shibao, a member of the group and a professor at South China Normal University. “Captive breeding should only be performed when it is good for preservation of the species, while commercial utilization and farming of pangolin should be restricted,” Wu said.

“But there is still hope to revive the Chinese pangolin before it is functionally extinct.”

## Rewilding attempts

Both inside China and internationally some conservationists advocate a strategy of rewilding healthy pangolins into natural habitats. But pangolin experts like Wu Shibao argue scientists need to do more research first.

In late January 2019, the NFGA organised a meeting inviting forestry department representatives from nine southern provinces in China where pangolins used to range to discuss future preservation measures. During the meeting, Guangxi Forestry Bureau revealed a plan to rewild two healthy Chinese pangolins, said Zhang Siyuan from CBCGDF who participated in the meeting as an observer.

However, there has been little progress on the ground.

From a pangolin expert’s point of view, rewilding

also requires preparation and should not be done hastily. Despite successful captive breeding of pangolins in the Taipei Zoo over the previous decade, Professor Ching-Min Sun from the National Pingtung University of Science and Technology in Taiwan said rescued surviving pangolins or their offspring from the Taipei Zoo have never been released.

## Ban medicinal use before it’s too late

Both domestic researchers and conservationists are calling for urgent increased preservation efforts and a complete prohibition of the use of pangolin scales in traditional Chinese medicine, imitating the ban on tiger bones and rhino horn, adopted as early as 1993.

The NFGA did not respond to repeated inquiries on when pangolin scales would be removed from the Chinese Pharmacopoeia, an official compendium of drugs, and be banned from all medicinal use. A source from the NFGA only admitted that the pangolin’s protection status in China would be reclassified from a Class II to a Class I Key Protected Species within this year.

“I hope there will be a designated reserve or national park for pangolins in China someday in the future, and that I can see the wild pangolins in nature,” said Zhang Siyuan. “This is a dream of mine.”

*This is an edited version of an article first published in NewsChina magazine, where Wang Yan is a journalist and editor.*

*Wang Yan is editor and journalist at NewsChina Magazine, the English edition of China Weekly, covering environment issues.*



# 巴西石油计划 威胁南大西洋生物多样性

巴西不顾环境机构建议，允许在海洋保护区附近开展石油勘探。

□ 曼努埃拉·安德列奥尼

**当**巴西环境和可再生自然资源管理局 (Ibama) 官员谏言反对拍卖海洋保护区附近的石油勘探区时，该机构负责人爱德华多·比姆的回应是“会再考虑”。在环境部执行秘书告知其该议题具有“战略意义”后，比姆撰写了一份报告推翻手下的观点，允许进行拍卖。

新的勘探区位于阿布洛霍斯国家公园内，该公园是南大西洋海洋生物多样性最为丰富的区域，有着独特的珊瑚物种，并且是座头鲸和绿海龟的育幼地。

这一消息给巴西环保主义者带来了又一次打击。去年 11 月，极右翼政治家雅伊尔·博尔索纳罗当选国家总统，他认为巴西为保护环境做出的贡献已经超出了自己的本份。上台以来，博尔索纳罗的团队不仅削减了环境部的预算，还任命卡多·萨勒斯为环境部长，这些都让环境部的工作受到了冲击。萨勒斯曾是一名律师，对待环境违规企业比自己员工还亲切。

巴西气候变化专家小组“气候观察站”执行秘书卡洛斯·里特尔

称此次石油区拍卖事件是“残暴且不负责任”的表现。

“政府发出的信号是，一切有待保护的环境都要让路，”他说，“这是在鼓励不惜一切代价促进经济活动。”

## 争议可能会让投资者不安

Ibama 必须要批准国家石油管理局提议的所有石油区的拍卖。在 10 月份的这次拍卖中，Ibama 的技术人员曾反对将石油管理局列出的 36 个待拍石油区块中的 7 个纳入拍卖名单。

上个月美联社和巴西圣保罗州报获得的文件表明该裁定遭到了否决。文件显示，Ibama 的一项支持最初决定的研究警告称，即便最近的石油区离阿布洛霍斯公园有 300 公里之远，可一旦有某块石油区发生泄漏，还是会破坏这座保护公园。

国家石油管理局没有透露是否已有公司有意参与这些石油区的竞



阿布洛霍斯国家公园的绿海龟

标,但行业观察家认为此次拍卖将吸引壳牌、雪佛龙、中石油等在巴西有业务活动的跨国公司。这些石油区块的估价为接近于10亿美元。

中国一直以来都是巴西石油部门最高产的投资者之一,在管道建设和石油换贷款合同等项目上投了近400亿美元。

但直到最近,勘探海上石油区才成为中国公司在巴西的一个目标。2010年巴西宣布在海底盐结壳下发现巨大的石油储备后,中国开始投资巴西的石油部门。5年过去了,中国注资的三家公司:中化巴西石油公司、雷普索尔中石化和巴西石油已然跻身巴西十大石油和天然气生产公司之列。

5月初,中国海油巴西有限公司总裁盛建波表示公司希望扩大在巴西的生产。

然而,最新的争议可能会让投资者感到不安。拍卖过后,购得勘探权的公司仍需获得Ibama的环境许可证才能继续投资。萨勒斯在国会回答针对此事的提问时称,Ibama仍有可能会拒绝发放许可证,这将带来投资损失。

“如果Ibama说不行,那就是不行,”他说,“那么买到勘探权(的公司)就要自认倒霉。”

瓦加斯基金会大学金融学教授、石油行业专家拉菲尔·施奥泽表示,该事件将影响公司对政府的信任,质疑政府是否有能力为其提供合法安全的环境。

“当国家石油管理局提出拍卖的时候,所有的竞标参与方都觉得一切没问题。但是,显然找不到石油的地质风险是存在的,但环境许可证相关的风险应该是在在此之前解决了的,”拉菲尔·施奥泽说。

施奥泽表示,官方建议被推翻给石油企业增加了一层风险,所以如果没有投资者竞标阿布洛霍斯附近的石油区,他也不会惊讶。

## 巴西相关环保部门面临的压力

巴西近年来一直在加强对海洋生物多样性的保护,并于去年3月宣布将把海洋保护区扩大16倍,并建立新的海洋保护单位,以便限制捕鱼和保护鱼类种群。

就在3月,萨勒斯本人也强调了保护海洋生物的必要性。“海洋是环境保护和保育的新前沿,”他在内罗毕联合国环境大会上的演讲中说。

但对“气候观察站”的特里尔来说,这明显是句空话。他担心Ibama会面临巨大压力,会违背技术人员的判断,发放环境许可证。

“这说明Ibama只是个摆设。”他说。

博尔索纳罗就任以来,Ibama一直遭到猛烈的攻击。1月,先是预算被削减,新闻办公室被裁撤,紧接着其前任负责人辞职。过去几周里,政府开始提前发布有关Ibama防止森林砍伐活动的信息。批评人士认为,这种做法极有可能会导致Ibama活动的失败。

环保主义者认为,阿布洛霍斯可能只是开始,其他保护区附近也有石油和天然气储备。去年12月Ibama就曾否决道尔达公司在亚马逊河口勘探石油和天然气的提案。☞

曼努埃拉·安德列奥尼,中拉对话巴西板块编辑

# Oil exploration threatens Brazil's Abrolhos marine park

Brazil allows auction of oil fields near marine protected area against advice of its environmental agency

□ Manuela Andreoni

When officials from Brazil's main environmental protection agency, Ibama, advised against the auction of oil exploration blocs near Abrolhos national park, they were told by their boss, Eduardo Bim, to think again. Bim had been informed by the executive-secretary of the Ministry of the Environment that the issue was of "strategic relevance" and so wrote a report overruling his own staff and allowing the auction to go through.

Abrolhos national park is the richest area of marine biodiversity in the South Atlantic Ocean, home to endemic coral species and a nursery for humpback whales and marine turtles.

The news came as yet another blow to environmentalists in Brazil. Last November, voters elected president Jair Bolsonaro, a far-right politician who believes the nation has already done more than its fair share to protect the environment. Since coming into power, his team has undermined the Ministry of the Environment by slashing its

budget and appointing as minister Ricardo Salles, a lawyer who appears to be more friendly to businesses that commit environmental irregularities than to his own staff.

Carlos Rittl, the executive secretary of the Climate Observatory, a Brazilian panel of climate change specialists, called the oil blocs episode a show of "atrocious irresponsibility."

"The signal the government is sending is that whatever environment there is to be protected will be run over," he said. "It's an incentive of economic activities at all costs."

## Controversy may spook investors

Ibama is tasked with the approval of any oil blocs proposed for auction by the National Petroleum Agency (ANP). In this case, Ibama's technical staff ruled against the inclusion of seven of the 36 blocs listed by ANP for an October auction.

The overruling of that decision was revealed in documents obtained by the Associated Press and Brazilian newspaper O Estado de São Paulo last month. They show that one Ibama study that backed the original decision warned of the potential for an oil spill in one of the blocs to destroy the Abrolhos park, even though the closest bloc is 300 kilometres away.

The episode will undermine the trust companies have in the government's ability to provide a legally safe environment to operate in.

ANP did not disclose whether any companies have already showed interest in bidding for any of the blocs. But industry observers believe it will attract many of the multinational companies that work in Brazil, such as Shell, Chevron and Petrochina. The blocs are estimated to be worth just under \$1 billion.

China has been one of the most prolific investors in Brazil's oil sector, with nearly \$40 billion directed to projects such as building pipelines and oil-for-loan contracts.

But exploring offshore oil blocs hasn't been a target in Brazil for Chinese companies until recently. Its investments in the field started in 2010, after Brazil announced the discovery of huge oil deposits beneath a thick layer of salt crust on the ocean floor. Five years later, three companies with Chinese capital were already among the top 10 players in Brazil's oil and gas production: Sinochem Petróleo, Repsol Sinopec and Petrogal Brasil.

In early May, Sheng Jianbo, head of Chinese state-owned firm China National Offshore Oil Corp in Brazil, said his company wanted to expand production in Brazil.

The latest controversy may, however, spook investors. After the auction, the companies that buy the right to explore the blocs will still have to get an environmental permit from Ibama to go forward with their investment. Questioned in Congress about the episode, Salles said Ibama could still refuse the permit, which would mean a loss of investment.

"When ANP auctions a bloc, whoever is making a bid feels assured everything is OK. Obviously, there is the geological risk [of not finding oil], but the risk regarding the environmental permit should already be resolved," he said.

Schiozer said the overruling of official advice effectively adds another layer of risk to oil ventures. He said he would

not be surprised if no investors were to bid for the blocs near Abrolhos.

## Pressure on Ibama

Brazil had been improving its protection of marine biodiversity in recent years. In March last year, it announced it was multiplying its marine protected area by 16 times, creating new marine conservation units which aim to restrict fishing and protect fish populations.

As recently as March, Salles himself had stressed the need to protect marine life. "Oceans are the new frontier for environmental protection and conservation," he said in a speech to the United Nations Environmental Assembly in Nairobi.

But from the point of view of Rittl, from the Climate Observatory, it is now clear that this was an empty statement. He fears the pressure will be great on Ibama to approve environmental permits, even against the judgment of its technical staff.

"This is a sign Ibama is merely decorative," he said.

Ibama has been under intense attack under Bolsonaro. The former head of the agency resigned in January when the attacks started, its budget has been slashed and its press office has been extinguished. In the past weeks, the government has taken to announcing the agency's operations to stop deforestation before they happen, which, critics say, could seriously undermine their success.

And environmentalists believe Abrolhos could be only a first, as other protected areas have oil and gas near them. In December last year, Ibama blocked a proposal by Total to drill for oil and gas at the mouth of the Amazon river. ☺

*Manuela Andreoni is Diálogo Chino's Brazil editor*



# 我们是否在见证 “洋垃圾”时代的终结？

最近修订的《巴塞尔公约》能否改变中国和世界对待塑料的方式？

□ 唐大旻

**马**来西亚瓜拉冷岳县小镇仁嘉隆，彻夜不熄的塑料垃圾焚烧炉令人无法入睡，咳嗽不止。村民们没有想到，蜂拥而至来发展“环保产业”的外商，带来的是一堆堆垃圾。

在中国宣布拒收绝大部分废塑料后，马来西亚迅速成为了世界第一大废塑料进口国，面临着严峻的环境压力，而临近的泰国、印尼、越南也面临相似状况。

不过，近日《控制危险废物越境转移及其处置的巴塞尔公约》（《巴塞尔公约》）修订案的通过，有可能彻底终结“洋垃圾”全球倾销时代。

## 中国拒收之后， “洋垃圾”去哪儿了

根据绿色和平东亚分部统计，在中国大陆 2017 年实施“洋垃圾禁令”后，马来西亚的每月废塑料进口量，由 2016 年的 2 万吨，飙升至 2018 年初的 11 万吨。泰国则由每月



© GAIA / Adam Dean

2019年1月，在马来西亚瓜拉冷岳县的一座刚刚被政府勒令关闭的废品回收场，进口垃圾堆积如山

进口少于 1 万吨废塑料，增至 8 万吨（2018 年 4 月）；越南在 2018 年收紧废塑料入口前，每月进口量多达 6 万吨，比 2016 年增逾一倍。

事实上，用于出口的废塑料往往是回收价值不高而环境危害较大的品类。在中国向世贸组织提出拒收“洋垃圾”之前，世界上绝大多数的废塑料都卖到了中国大陆，这其中有四成

## 全球塑料垃圾 历史数据

塑料垃圾：63亿吨

回收利用：9%

焚烧：12%

垃圾填埋场或其他地方：79%

都没有经过正规处置而沦为污染物。如今，越南、印度、泰国、马来西亚等国也纷纷出台限制性政策，例如马来西亚宣布将在三年内停止接收所有种类的废塑料。

压力之下，一些出口国正在抓紧时间提高本地处置能力，但即便通过加大填埋、焚烧比重等方式来紧急应对，由于本地回收产业难以迅速壮大，回收处置的压力依然居高不下。日本政府2018年对102个市级政府做了调查，发现约四分之一都出现了垃圾堆积无法消化的问题。在英国，送入焚烧炉的塑料有所增加。在澳大利亚，墨尔本最大的垃圾场一度无力接单，导致原本可回收的废塑料只能进入填埋场。

根据绿色和平东亚分部对世界21个最大的塑料进出口国的贸易数据的梳理，2017年一年之中，这21国废塑料出口量从每月110万吨跌落到50万吨。这一方面说明了中国禁令的威力，另一方面也显示出，发

达国家仍在通过出口来转移本地处置压力。

## 《巴塞尔公约》修订案意味着什么

2019年5月10日《巴塞尔公约》修订案的通过，则将进一步降低出口这一选项的可行性。《巴塞尔公约》于1992年生效，其原则是危险废弃物应就地处理而非越境转移，目的就在于应对有毒有害废弃物在全球范围内寻找监管洼地这一困扰全球的问题。今年通过的修订案，对其附件中有毒物质的清单进行了修改，将原先不在附件内的大部分废塑料纳入其中。从2021年1月开始，向公约缔约国出口废塑料的企业，必须事先获得进口国监管机构的许可。目前《巴塞尔公约》已有187个缔约国，涵盖了包括中国在内的绝大多数国家。

虽然监管洼地总会存在，但全球绝大部分国家都将对废塑料的进

口进行事前审批，无疑将显著提高废塑料跨境贸易的门槛。废纸贸易的变化显示了事前审批机制的威力。早在“洋垃圾禁令”颁布之前，中国就已要求对进口固体废物行使报批程序。废纸的进口量随之一落千丈，导致国内废纸价格飙升，倒逼国内造纸和用纸企业寻找和扶持本土废纸回收企业。

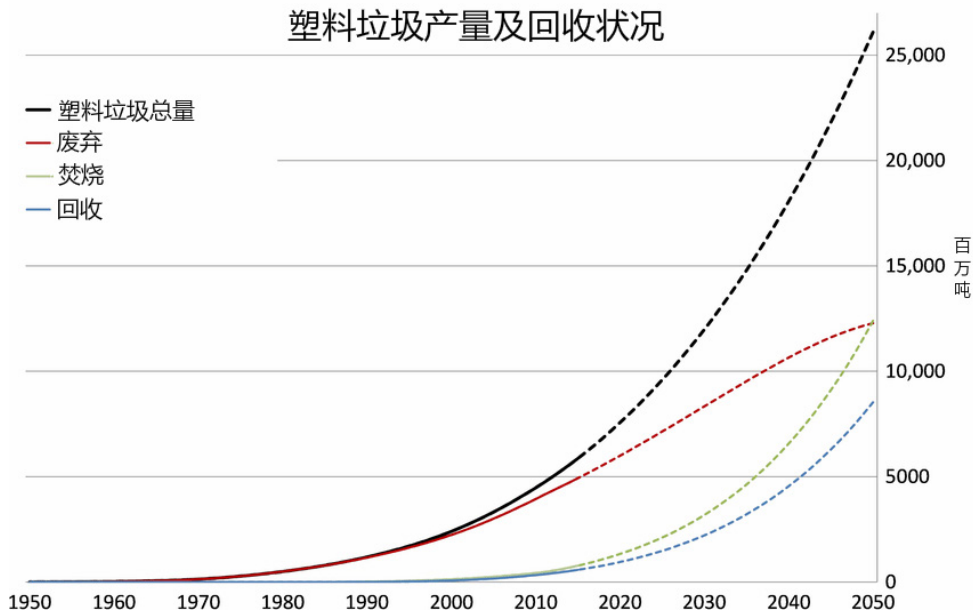
此外，由于世界第一大废塑料出口国美国尚未通过该公约，根据其于OECD国家的协议，在2021年后将只能与OECD国家进行少数几类废塑料的交易，而无法再向广大发展中国家合法出口废塑料。有理由相信《巴塞尔公约》会对全球废塑料的流通套上紧箍咒。

## 塑料危机的解决之道

值得注意的是，提出了本次《巴塞尔公约》修订动议的，并不是饱受“塑料围城”之苦的发展中国家，而是作为发达国家和废塑料出口国的日本和挪威。而这一动议得到包括中国在内的全体发展中国家的支持，充分映射出国际社会对于全球性塑料危机的切肤之痛。

有学者估算，在全球过去百年间生产的63亿吨塑料垃圾中，得到回收再利用的仅为区区9%，另有12%被焚烧，剩下的接近八成塑料，最终或被丢弃，或被填埋，最终滞留在了环境中，大部分随着雨水和河流到达大海。艾伦麦克阿瑟基金会2016年

塑料垃圾产量及回收状况



实线代表1950年至2015年间的历史数据，虚线代表到2050年的趋势预测。

来源：“塑料的生产、使用及命运” - Scientific Figure on ResearchGate

发布的报告称，如不扭转塑料生产的增长速度，到 2050 年，全球海洋中漂浮的塑料垃圾重量将超过鱼类。而破碎为微粒的“微塑料”，甚至会在被海洋生物误食后，通过食物链再次回到人类体内。

显而易见，仅靠《巴塞尔公约》从贸易角度控制废塑料的跨境转移并不能解决塑料垃圾带来的环境危机。我们需要改变的是深深嵌入当代生活的一整套“丢弃文化”。如果不能扼住即用即弃的塑料包装的泛滥之势，同时提升全球各国对塑料垃圾分类、回收、再生的能力，那么就算废塑料百分百在本地处置，也只不过是把问题从发展中国

家又拉回发达国家，从根源上于事无补。

目前，一些国家和地区已经开始面对废塑料全球流通时代的落幕，力图以更彻底的解决办法从源头减少塑料垃圾的产生。例如欧盟于今年 3 月投票通过了一项法规，规定 2021 年起不可使用一次性塑料吸管、刀叉等产品，而 2029 年起，塑料饮料瓶的回收率要达到 90%。

而最早掀起拒绝“洋垃圾”大潮的中国也在尝试重塑本国塑料经济：2017 年国务院推出生产者延伸责任制（EPR）推行方案，计划在包含饮料包装等四个行业中推广从产品设计到末端回收，覆盖产品全生命周期的循环

经济变革。一些地区还在尝试更为强势的方案，海南省就于今年 3 月宣布，到 2020 年 12 月全岛全面禁止列入名录的一次性不可降解塑料制品的生产、销售和使用。

可以说，《巴塞尔公约》修订案打消了全球各国对于用“保守疗法”治疗塑料危机的最后一丝幻想。不过，还有一年半就要生效的《巴塞尔公约》到底是会造就一个又一个无法自理的塑料孤岛，还是成功倒逼出一场全球塑料革命，新的变革才刚刚开始。☺

唐大旻，自由撰稿人，此前曾任中外对话资深编辑

# Developing countries turn away from plastic waste imports

An amendment to the Basel Convention will staunch the global flow of plastic waste

□ Tang Damin

Plastic waste burns all night in the small Malaysian town of Jenjarom, causing locals to cough and lose sleep. Businesspeople came to the area promising to develop an “environmental protection industry”. Instead they brought piles of waste for incineration.

Malaysia is the world’s biggest importer of plastic waste. It replaced China after the country announced a ban on the trade in 2017. But like nearby Thailand, Indonesia and Vietnam, Malaysia is now facing its own environmental pressures.

A recent amendment to the Basel Convention may help end the practice of richer countries exporting their plastic waste to less developed nations where environmental regulations and waste management processes are unable

to cope.

The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal came into effect in 1992.

It established the principle that harmful waste should be dealt with domestically to prevent it flowing into regions with lax oversight. The amendment has added most types of plastic waste to the hazardous wastes already covered.

## What’s happened since the China waste ban?

After China informed the World Trade Organisation that it would no longer accept plastic waste shipments, imports to Thailand, Vietnam, and Malaysia grew significantly.

Malaysia’s monthly imports of plastic waste rocketed from 20,000 tonnes in 2016 to 110,000 tonnes in 2018, according to a Greenpeace East Asia report. Thailand was importing less than 10,000 tonnes per month but in April 2018 that figure reached 80,000. Vietnam imported up to 60,000 tonnes each month in 2018, twice as much as in 2016, until restrictions were put in place in 2018.

The plastic waste that countries choose to export is usually more hazardous and of lower value. As nations struggle to deal with it, they have also started to restrict imports. Malaysia has announced a complete ban on plastic waste imports within three years.

The restrictions are pressuring exporting countries to invest in domestic waste-handling capacity. But as such investments take time, they are also turning to

## The global history of plastic waste

Produced: 6.3 billion tons

Recycled: 9%

Incinerated: 12%

Landfill or elsewhere: 79%



## Plastic crisis

emergency measures such as landfill and incineration. The UK is incinerating more waste and has released its first waste strategy in a decade. Melbourne's largest waste-handling site could not cope with demand this year, so recyclable plastic was landfilled.

Greenpeace East Asia found that of the world's 21 largest importers and exporters of plastic waste, exports dropped from 1.1 million tonnes a month to 500,000 tonnes over the course of 2017. Though China's ban has had an impact, developed countries continue to export in large quantities.

### How has the Basel Convention changed?

The amendment to the convention will severely limit the global flow of plastic waste by making transfer across borders more difficult. From 2021, companies will need pre-approval to export plastic waste to any of the 187 countries signed up to the convention, which includes China.

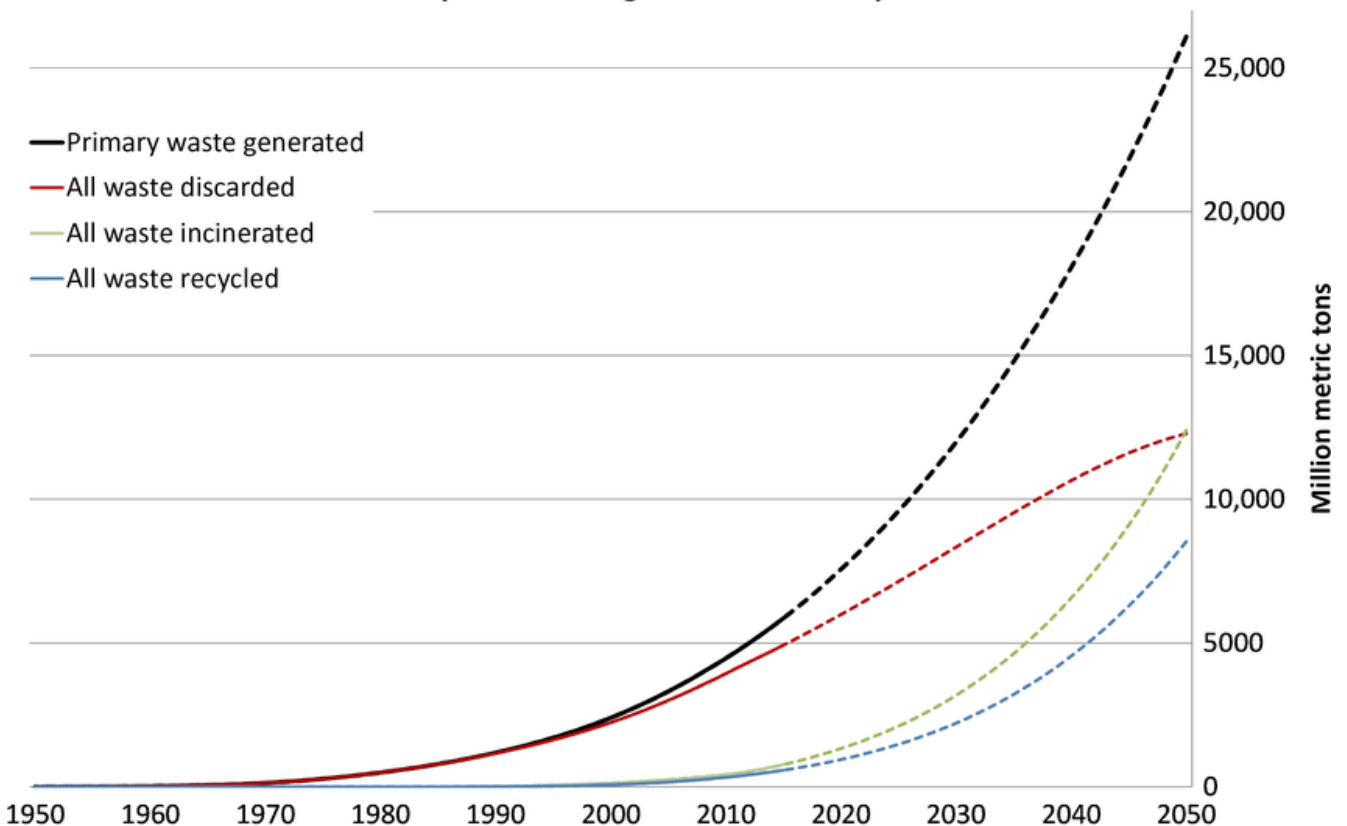
The world's largest exporter of plastic waste, the United States, has not signed up to the convention so from 2021 it will be unable to legally export any to developing nations. And with OECD nations it will only be able to trade a limited range of plastic waste.

Wastepaper offers an interesting example of the effect that limiting imports can have. Before China banned plastic waste imports it was already refusing some types of solid waste such as wastepaper. This caused imports to plummet and prices to rocket, incentivising papermakers and consumers to use and improve paper-recycling facilities.

### Solving the plastic crisis

The amendment was not proposed by plastic-choked developing nations but by Japan and Norway, two plastic waste exporters. However, the fact it received support from

**Cumulative plastic waste generation and disposal**



Solid lines show historical data from 1950 to 2015. Dashed lines show projections of historical trends to 2050.

Source: "Production, use, and fate of all plastics ever made" - Scientific Figure on ResearchGate

all developing nations, including China, shows just how troubled countries are by the plastic crisis.

Academics estimate that since the invention of plastic the world has produced 6.3 billion metric tons of plastic waste. A mere 9% of that has been recycled. Twelve percent has been incinerated and 79% has ended up either in landfill or elsewhere in the natural environment. Once carried into the ocean by rain and rivers plastics degrade into microplastics, which marine life consumes, sending it through the food chain and into our bodies.

But relying on the Basel Convention to control the cross-border transfer of plastic waste will not solve the crisis. Instead, the culture of disposability that is a feature of modern lifestyles must be addressed. If we cannot stop the overuse of disposable plastic packaging and boost global sorting and recycling capacity, then all that will be achieved is a slight shift of the problem back from developing nations.

Some countries are facing up to the end of the trade in plastic waste and working towards reducing production at

the source. The EU will ban single-use plastic straws and cutlery from 2021, and require 90% of plastic drinks bottles to be recycled by 2029.

China, the first to decline imports of plastic waste, is also trying to restructure its plastics economy. In 2017, the State Council published plans for an “extended producer responsibility” system to cover the entire product lifecycle, from design to recycling. Some parts of China are going even further. The island province of Hainan will ban the production, sale and use of all single-use non-biodegradable plastics by 2025.

The amendment to the Basel Convention has dispelled the notion that plastic waste can simply be exported away. When it comes into force in 18 month’s time some countries may be forced to reckon with their own inability to manage their plastic waste. It may also force a revolution in how plastics are used. ↻

*Tang Damin is a freelance environmental writer and former Beijing senior editor for chinadialogue.*

# 上海迎接垃圾分类“大考”

上海自7月开始强制垃圾分类，引发全民热议。  
中国第一个对垃圾分类“较真”的城市面临哪些挑战？

□ 武毅秀

7月1日早晨，上海的雨不小。然而，在我所居住的小区，两位身披雨衣、穿着雨鞋的志愿者阿姨一早就已经站在小区的垃圾投放点，对每一位前来扔垃圾的居民进行确认：“西瓜皮？湿垃圾扔这边”。早起上班的小区住户们意识到，扔垃圾，不再是一件随心所欲的事。

从这一天起，《上海市生活垃圾管理条例》正式施行，上海人进入了“强制垃圾分类”的时代。

中国从2000年起就在包括上海在内的8个大城市试点垃圾分类。但由于缺乏对居民分类习惯的培养和后续收集处理措施的不匹配，近二十年的试点大都不了了之。直到2017年，在中国推广“生态文明”的大背景下，发改委、住建部发布《生活垃圾强制分类制度方案》，中国城市才再次开始大力推行垃圾分类。2018年11月，正是在上海，国家主席习近平在视察时表态“垃圾分类就是新时尚”。上海成为中国垃圾分类先行先试的“排头兵”。

正式分类实施的前几周，有关上海实施垃圾分类的讨论已经达到



7月1日起，强制垃圾分类正式在上海实施。图为上海闵行区一小区新建投入使用的垃圾分类厢房

了全国关注、全网参与的热度。上海市政府在各个场合表态：“分垃圾，我们是认真的。”上海的强制垃圾分类，担负着为全国城市探路，并成为表率的重任。

## 破解“垃圾围城”

当前中国已超过美国，成为全

球产生垃圾最多的国家。而上海与全国的大多数城市一样，也面临着“垃圾围城”的威胁。2018年，上海市每天生活垃圾清运量接近2.6万吨。这意味着，平均不到16天，上海的垃圾就可堆出一座金茂大厦的重量。大部分的生活垃圾都被填埋或者焚烧。上海的老港垃圾处理场是亚洲最大的垃圾处理场，日处理

## “ 上海的强制垃圾分类，担负着为全国城市探路，并成为表率的重任。”

垃圾 2 万吨，肩负着上海市 70% 的生活垃圾处理任务。

一直以来，中国生活垃圾最主要的构成部分是厨余垃圾（“湿垃圾”）。在上海，厨余垃圾在生活垃圾中占比达到 60%。如此高比例的厨余垃圾，为垃圾的末端处理制造了“根源性”的困难。传统的垃圾处理方式，如焚烧、填埋，在遇到“湿垃圾”时效果都会打折：填埋易引发渗滤液和沼气的二次污染，而焚烧则因湿垃圾热值低易产生二噁英等有毒污染物，导致近几年垃圾焚烧项目在中国屡因“邻避”而受阻。将干、湿垃圾从源头有效分开，可降低进入填埋和焚烧环节的垃圾总量，也将提升这些环节的处理效果；而单独分出的厨余垃圾，则可以通过堆肥和产沼的方式进行资源化利用。

然而，从源头把垃圾干、湿分开，看似简单，推广起来却并不容易。上海从 2011 年开始新一轮的垃圾分类试点，一直到 2019 年全市推进分类，尽管已经走过了 8 年时间，民众的动员仍是一个巨大的挑战，此次的垃圾“新政”也不例外。

### 看不懂的分类指引

学习过上海垃圾分类规则的人，难免不会为垃圾的类别名称所困惑。干燥的鸡骨头是“湿垃圾”，而湿漉漉的纸尿裤却属于“干垃圾”？临近

7 月 1 日，有关“这是什么垃圾”的讨论让很多人摸不着头脑。

有不少业内人士指出，上海垃圾分类指引中的“干”、“湿”垃圾之分，确有不够清楚之处。如果从垃圾分类之后的具体流向与用途来理解分类规则，可能会对公众更为有用。所谓“湿垃圾”是指易腐性的菜叶、果壳、食物残渣等有机废弃物，便于之后进行堆肥等生物处理。而“干垃圾”则属于不易腐、非有害、且不可回收的其他垃圾。

“上海生活垃圾分类中的湿垃圾与其他城市垃圾分类中的‘厨余垃圾’基本接近”。专门解决垃圾回收问题的社会企业“R 立方”创始人张淼表示，“干、湿的提法，容易产生概念的混淆和困惑。如果想让居民更好理解分类，需要让大家了解不同类别的垃圾会怎么处理，这样公众也更容易配合。”

商业生态工作室的创始人孙海燕也认为，在宣传分类知识的时候，让公众知道“我扔的垃圾去了哪儿了”是重要的。“公众需要知道，我做的分类是有价值的，”她说。

### 分好的垃圾去了哪儿？

前端垃圾分类后，在收集阶段却又被混在一起，形成“先分后混”的情况。这是很多中国垃圾分类试点伤害居民分类积极性的“罪魁祸首”。

值得一提的是，多位在上海从

事垃圾分类研究和宣传工作的人士均表示，上海自从 2011 年开始实施新一轮的垃圾分类以来，即开始逐步推行“全流程分类”，这意味着分类投放、分类收运、分类处置已经进行了一段时间，如今在城区内已经基本建立了全程分类系统。在 7 月 1 日《上海市生活垃圾管理条例》生效之前，上海的干、湿垃圾日处置量已基本匹配“产量”。

上海市静安区绿化市容管理局副局长尤文坚介绍，目前静安区的湿垃圾基本能够达到百分之百的无害化处理。“静安区与两家企业建立了政府购买服务合作，将湿垃圾收回，制成肥料基质用于林业堆肥。7 月 1 日之前，他们都已基本是全天候在工作。”

与此同时，可回收物主要通过全市 3000 多个“两网融合”回收服务点进行回收。两网融合，是指打通垃圾分类网络和可再生资源回收网络。尤文坚介绍，“对于高附加值的可回收物，我们遵从市场原则，鼓励小区环卫服务人员自己去卖掉；对低附加值的可回收物，政府承担托底的责任，通过补贴专业的第三方来回收，使其不至于亏本。”

但是，在垃圾分类全面施行之后，垃圾回收处置能力的紧张确实存在。尤文坚表示，“强制垃圾分类之后，垃圾处理能力肯定是有缺口的”。这一说法也得到了上海市政府层面的证实。上海市政府副秘书长黄融在接受采访时表示，目前上海“湿垃圾分出量已达到每天 6164 吨，而当前的湿垃圾资源化利用能力在每天 5050 吨左右”。垃圾分类后，如何确保末端处置能力跑赢前端的产量，面临的挑战仍然很大。



对此，上海静安区爱芬环保科技有限公司咨询服务项目总监郝利琼表示，“后端处理能力确实在不断建设中，而后端也要求居民在前端分出更纯净的垃圾，这两者是相互促进的关系。”

### 动员难题

上海不仅明确了生活垃圾分类投放，还提出了“定时定点”、“撤桶并点”的要求。具体来说，垃圾桶集中放置在指定点位，居民只有在固定时间段内前往这些点位，才能投放垃圾。此外，条例规定，个人违规可处以人民币 50 元以上 200 元以下罚款，企业违规最高可被罚款 5 万元。

强制手段在新条例实施的第一天就已经显示出威力。7 月 1 日当天，上海出动执法人员 3600 人次，检查了居民小区、酒店、商家等企事业单位 4216 个，并开出 623 张整改通知单。处罚“动真格”是“新政”与此前试点的最大区别。

但强制分类的执行成本高昂。在垃圾分类实行的初期，一些社区必须安排专人在垃圾桶 / 垃圾房边

进行监管，以保证居民分类、投放准确。因此，只有在监督者到位的情况下，垃圾桶才能开放，减少了居民投放的便利性。所以，有社区代表呼吁，希望有更多的小区居民能够作为志愿者参与到这项工作中。

为此，郝利琼表示，“垃圾分类绝不能只看法律。这事根本上还要有两个力量。一个是公民的自觉，一个是靠社区的支持和监督。”

### 公众参与

因为垃圾分类，上海的 NGO 和各种社会力量，广泛的参与到了宣传和推进之中。郝利琼带领的爱芬团队进行垃圾分类的社区宣传和动员十几年，而他们的经验显示，在中国的社区里做垃圾分类的推广，最为核心的成功因素，是来自社区的人际互动。

“研究结果表明态度积极的志愿者要比宣传展板有效，”复旦大学环境科学与工程系博士后李长军博士说。他所在的复旦大学可持续行为研究课题组从 2012 年起研究影响居民长期实行垃圾分类的因素。他们的研究显示，在社区里敦促居民进

行有效垃圾分类的主要因素，是与居民进行大量人际互动的优秀志愿者。对比而言，之前为了鼓励和推广居民进行垃圾分类而探索的经济鼓励政策，如积分奖励等，对于垃圾分类行为没有显著影响。

该课题组的带头人玛丽·哈德 (Marie Harder) 教授也认为，推进垃圾分类应该有惩罚之外的方法。“如果居民对垃圾的投放时间和地点有顾虑，或者对分类有新的建议，他们与社区之间应该进行对话”。

之前也有媒体通过走访发现，大多数垃圾分类成功的小区，无不具备良好的社区氛围，居民具有参与社区的意识和热情。“垃圾分类是个公共议题，而不应该是一个监督和被监督的关系。”孙海燕认为：“它最终应该通过推动社区共建来实现，提升的是社区的自治能力。”

按照中国目前的垃圾分类路线图，到 2020 年底将有 46 个城市建成基本的垃圾分类处理系统，并在 2025 年扩展到大部分主要城市。上海的经验与教训，必将为中国其他城市提供样本和参照。<sup>9</sup>

武毅秀，中外对话气候传播项目负责人

# Shanghai's compulsory waste sorting begins

This month, fiercely debated obligatory sorting comes into force in Shanghai. How can the first Chinese city to take the issue seriously succeed?

□ Wu Yixiu

It was raining heavily in Shanghai on the morning of July 1. But two volunteers, women clad in raincoats and rubber boots, were up early to stand by the bins and talk to the residents dropping off their rubbish: “Watermelon peel? Wet waste goes over there.” It was clear nobody was going to be able to continue dumping their bags in whichever bin was closest.

This was the day new rules came into effect in Shanghai, marking a new era of compulsory waste-sorting.

Since 2000, waste-sorting systems have been trialed in eight cities across China. But a failure to cultivate the habit among residents and to maintain the separation of waste after collection have brought those trials to nought.

Then in 2017, with China promoting its “ecological civilization” concept, the government issued plans for compulsory waste-sorting and a new push started. In November 2018, Xi Jinping said on a visit to Shanghai that “waste-sorting is the new fashion.” The city has become China’s waste-sorting pioneer.

Recyclable waste is collected via 3,000 recycling points.

In the weeks before 1 July there was debate nationwide about the new rules, and the Shanghai municipal government made it clear they should be taken seriously. The city’s compulsory waste-sorting system will inform and guide other cities.

## Breaking the landfill siege

China has already overtaken the US to become the world’s biggest producer of waste. And like China’s other large cities, Shanghai is at risk of becoming encircled by landfill sites. In 2018, 26,000 tonnes of domestic waste were collected from the city every day. The bulk of that domestic waste goes to landfill sites or is incinerated. Shanghai’s Laogang Waste Processing Site is Asia’s largest, handling 20,000 tonnes of waste a day, 70% of the city’s total.

China’s domestic waste has always mainly been kitchen or “wet” waste. In Shanghai it accounts for 60% of the total, and that creates fundamental difficulties. Traditional disposal methods, such as burying or incineration are less effective with wet waste: in landfill it causes secondary pollution from leachate and methane; when incinerated the moisture content creates toxins such as dioxins, which means nobody is willing to have new incinerators built

in their backyard. Separating wet and dry waste at the source can reduce the amount landfilled and incinerated, and make both those processes more efficient. Separated kitchen waste can then be turned into resources such as compost or methane.

But while separating wet and dry waste may sound simple, it has proved harder to do in practice. Shanghai started a new round of trials in 2011 and eight years later bringing locals on board remains a huge challenge. The same will go for the new rules.

### How clear is the guidance?

Anyone who has looked at Shanghai's rules for sorting waste could be forgiven for feeling confused. A dried-out chicken bone is "wet waste", a soaking-wet nappy is "dry waste"? The run-up to July 1 saw numerous discussions about how certain items should be classified.

Industry insiders say that Shanghai's wet/dry distinction isn't clear enough, and that it would be more useful to explain to the public how the different types of waste are used. Wet waste refers to organic waste which will rot – such as vegetables, nut shells, leftover food – and can be composted. Dry waste refers to what will not rot, is not toxic and cannot be recycled.

"The wet waste category used in Shanghai is close to the kitchen waste category used in other cities," said Zhang Miao, founder of Rcubic, a social enterprise working to solve recycling issues. "The wet/dry terminology can easily create confusion ... we should explain how the different types of waste are handled, and then residents will be better able to cooperate."

Sun Haiyan, founder of Business Ecology, thinks it is important to tell people where their rubbish ends up when publicising the scheme. "The public needs to know their waste sorting is useful," she says.

### So where does it go?

Sometimes sorted waste ends up mixed together when it is collected. This is why residents have proved unenthusiastic about many of China's waste-sorting trials.

The scheme does not rely on totally new ideas or infrastructure. Shanghai has been gradually rolling out "end-to-end separation" since the new round of trials started in 2011. That means the city's waste has for some time been kept separate when deposited, transported and processed. And the capacity needed to deal with the amounts of wet and dry waste produced was mostly in place before the new rules came into effect.

You Wenjian, deputy head of Jing'an District's Landscaping and City Appearance Bureau, says almost all the district's wet waste is properly handled. "We signed government services procurement contracts with two firms, which take the wet waste to make a fertiliser base for use in forestry. That was working prior to July 1."

Meanwhile, recyclable waste is collected via 3,000 recycling points placed alongside the collection points for wet and dry waste. You Wenjian explained: "We encourage local sanitation workers to collect and sell off high-value recyclable waste. The government takes responsibility for



*Vehicles for collecting food waste have been at work in Shanghai for years*

low-value recyclables, offering subsidies to make collection and recycling profitable for third parties.”

But there will be capacity shortages once sorting begins. You Wenjian said “shortages of capacity are inevitable once sorting becomes compulsory.” This has been confirmed by the municipal government: Huang Rong, the city’s deputy party secretary, said in an interview that Shanghai “produces 6,164 tonnes of wet waste per day, and can convert about 5,050 tonnes into resources.” There are still huge challenges to make sure waste-processing capacity can keep up with the city’s waste output.

Hao Liqiong, project director with Jing’an Aifen Environmental Consulting Centre, commented that “waste-handling capacity has been expanding, but residents need to do the sorting. The two processes are complementary.”

## Getting people on board

People in Shanghai don’t just have to sort their waste – it also needs to be deposited in certain places at certain times, and the number of bins available has been reduced. Bins are now kept at particular locations, which are only open at certain times. People can now be fined between 50 and 200 yuan (US\$7-30) for breaking the rules, while companies can be penalised up to 50,000 yuan (US\$7,300).

Those sanctions were needed on the very first day. On July 1 Shanghai officials made 3,600 visits to check on 4,216 neighbourhoods, hotels and businesses, with 623 warning notices issued. The risk of actual punishment is the biggest difference with earlier trials.

But enforcing waste sorting is expensive. Initially some neighbourhoods will have attendants watching the bins to ensure waste is properly sorted and deposited, with the bins locked when no attendant is present. This is inconvenient for residents, and community representatives have called for local volunteers to come forward.

As Hao said: “Waste sorting isn’t just about the law. There are two other forces at work: conscientiousness on

the part of the residents, and support and monitoring by the neighbourhood.”

## Public participation

Shanghai’s NGOs and other social groups have been involved in promoting waste sorting. Hao’s organisation has been encouraging waste sorting in neighbourhoods for over a decade. Their experience has shown the most important factor in success is interaction between residents.

“Research shows that engaged volunteers are more effective than posters,” said Li Changjun, a post-doctoral student at Fudan University’s Department of Environmental Science and Engineering. He is a member of a team that since 2012 has been looking into what brings about long-lasting waste-sorting behaviours. Their research has shown volunteers encouraging other residents to sort waste to be the most important community-level factor. Policies offering material rewards, such as points-based systems, don’t have any significant impact.

Professor Marie Harder, head of that research team, thinks that there should be a move away from thinking only about punishments. “If some people feel uncomfortable with the specific time or place, or have new ideas about the waste separation, they should have a discussion with their community.”

Media street interviews have found that neighbourhoods where waste is successfully sorted always have a high degree of community awareness and enthusiasm. “Waste sorting is a public matter, rather than a case of monitors and the monitored,” said Sun Haiyan. “Ultimately it should be realised through community building, by improving the capacity of self-governance.”

China plans to have waste-sorting systems in place in 46 cities by the end of 2020, and in most major cities by 2025. What happens in Shanghai will guide that process. ☺

*Wu Yixiu is team leader of chinadialogue's Strategic Climate Communication Initiatives.*



# 垃圾分类：一份官民之间的环境契约

与其抱怨被强加的垃圾分类责任，  
公众应该把握住政府承诺的垃圾处理责任，让自己的分类努力不被枉费

□ 蒋亦凡



7月的第一周，中国的媒体和社交网络被一件“琐事”主导了，那就是垃圾分类

7月1日，地方法规《上海市生活垃圾管理条例》生效，让这座2000万人的特大城市进入强制垃圾分类时代。居民的垃圾被要求分为可回收物、有害垃圾、湿垃圾

（生物质垃圾）和干垃圾（其他垃圾）四种。在实施中，似乎绝大多数社区都撤除了原来分散在楼道的垃圾桶，而在小区内少数位置设置集中投放点，并设置早晚两个投放时

间。《条例》中“逐步推行生活垃圾定时定点分类投放制度”的表述在现实中一步到位，引起了巨大的争议。网络上充满了对错过垃圾投递的抱怨，有人预言这项政策必然

将使乱扔垃圾成风；有人调侃坐地铁去外地扔垃圾更方便；有人算了一下，发现如果每人每天花五分钟分类垃圾，那么每天相当于耗费36万个全职工作量，认为这是巨大的浪费。

数不清的文章使用了“被垃圾分类逼疯的上海人”的表述，来表达对它的复杂、严苛和推行的急促的不满。一些知识分子认为，它是缺乏社会共识、缺乏程序正义的长官意志的产物，必然走向失败。由于对近年来“环保风暴”铁腕关停企业记忆犹新，这种说法得到了广泛的认同。继上海之后，更多城市也即将进入垃圾强制分类时代，2025年前全国地级及以上城市要基本建成垃圾分类处理系统，这让上海这个先行者的做法受到格外严格的审视。

## 垃圾分类，太急还是太缓？

事实上，“垃圾分类”政策在中国一点也不急促，而恰恰是一场漫长的停滞。2000年，中央政府选取了8座城市开展试点，各地陆续将垃圾分类纳入地方法规，有时还提出雄心勃勃的目标，比如北京在2008年奥运前提出“生活垃圾分类收集率达到50%，垃圾资源综合利用率达到30%”，但是19年来，收效甚微——公众不知道被分类投放的垃圾将被如何处置，事实上，它们经常是被混合收运、混合处理。

一个重要原因，是过去的这些地方法规不具有强制性，充满了建议性的语言，而且方案也不够系统，缺乏监督体系，也缺乏对后端处理

“这无疑是又一次自上而下的环保政治运动，受到有关“强硬”、“草率”的批评，但是，它和过去的每一场运动都有一个关键的不同——它涉及到每一个家庭。”

设施的部署。地方政府更感兴趣的，是建造投资高昂的垃圾焚烧厂。相信可以用“烧”来解决垃圾，化解了源头减量和垃圾回收的紧迫性。

但是，垃圾焚烧厂却成为“邻避运动”的对象。2009年，广州爆发了一场声势浩大的邻避运动，抗议在近郊番禺建设焚烧厂。当地居民包括大量年轻的中产阶级，其中包括媒体从业者和律师。他们知道垃圾焚烧厂的“技术乌托邦主义”承诺背后，是仍然无解的二噁英、重金属等污染问题，将危害他们的健康。广州市政府以开明姿态应对这场运动，最终放弃了原来的选址，运动取得了胜利。

但是，广州的“垃圾围城”问题已经十分严峻。2011年起，广州市政府开始加强垃圾分类推广，甚至提出了当年实现“50%分类收集率，16%垃圾资源综合利用率”的目标。垃圾分类可以显著减少焚烧量，并减少焚烧物含水量，是应对焚烧厂扩张和焚烧有害物排放的根本解决之道。但是，它在广州却没有得到社会的广泛响应，广州的垃圾分类至今停滞不前。

更为讽刺的是，在番禺的选址被取消之后，广州并没有停止垃圾焚烧厂的建设。6座垃圾焚烧厂在别处建了起来，那里都没有密集的中产阶级社区，项目消失在公众视线之外。6月

初，广州市公告将再新建5座垃圾焚烧厂和5个填埋项目。

## 被遮蔽的污染

不过，番禺的这场中产阶级邻避运动也留下了环保主义的遗产。一部分成员发现在抗拒焚烧厂建在自己家门口的同时，必须回答“那应该建在哪里？”的问题。这让他们意识到，只有源头减量和分类回收，才能让反对焚烧厂的运动不只是“击鼓传花”。其中一些成员在邻避运动成功后注册了环境NGO，探索推行源头减量与分类回收的方式，或对垃圾焚烧厂开展监督。他们和一小批其他环保组织，成为中国推广垃圾分类回收坚定的民间力量，并在一定程度上影响了如今正在推行的垃圾分类政策制定。

而另一方面，这种真正的环保主义却没能获得大众响应。因为，大众的环境意识需要建立在污染信息透明的基础上，而在中国，这通常被权力遮蔽。中国社会也缺乏自我组织和动员的能力，缺乏环境运动的成长空间。邻避运动由于捍卫切身利益迫切性和其“去政治化”的诉求，因而具有难得的动员力和运作空间。但如果缺乏超越邻避运动的环境保护运动，环境污染依旧对大多数人来说和自己无关，那么垃



圾分类在中国不可能仅仅因为政府“鼓励”而得到大众的积极响应。

### “天上掉下”的垃圾分类

19年，就这么过去了。直到上海市政府终于把垃圾分类强加给社会。

上海的《生活垃圾管理条例》可以说是一套严肃的环保制度，有助于显著增进公共利益。它明确立法的目的的是“生活垃圾减量化、资源化、无害化”，而不仅仅是让垃圾离开城市。为此它提出实行“区域生活垃圾处置总量控制制度”，各区都要制定自己的垃圾处理总量控制计划，里面要包括垃圾减量 and 资源化利用的措施。它规范的对象也远远不止是居民，它要求相关企业不得混合收运和处置垃圾，为此提出要建立“生活垃圾全过程管理信息系统”，并建设对不同种类垃圾进行分类处置和资源化利用的设施，并指定仅干垃圾可以采用焚烧处理，而湿垃圾则用于堆肥等资源化利用，回归土壤，用于绿化和农业，这有助于减少化肥污染，减少填埋场温室气体(甲烷)排放，并弥补土壤的有机质赤字。除了要求对垃圾进行分类，它还要求企事业单位、政府机关，尤其是电商、快递、餐饮和旅馆业减少一次性产品的使用，从源头减少垃圾的产生。

这无疑是一次自上而下的环保政治运动，受到有关“强硬”、“草率”的批评，但是，它和过去的每一场运动都有一个关键的不同——它涉及到每一个家庭。每个家庭的

亲身参与，在他们和环境议题之间建立起一座桥梁，让他们作为每天付出劳动去对垃圾进行分类的利益相关方，对政府的垃圾管理政策产生监督意识并获得监督的道德正当性——正如现在每个人都觉得自己有权批评官方的强硬草率，因为这牵涉到自己的利益，只不过，这种批评中还缺少环境观和公共利益观。

### 环境契约

那些批评政府单方面将政策强加给社会的人们没有看到的是，这一次，上海市政府通过推行一套涉及千家万户的“激进政策”(考虑到环境和气候危机的严峻性，其实恰恰是务实)，自己也承担起了格外大的责任。它在限制民众丢垃圾的方便的同时，也需要确保人们所付出的劳动不被枉费，它所承诺的“生活垃圾减量化、资源化、无害化”目标被切实贯彻，垃圾焚烧和填埋应得到控制。

换句话说，不同于以往的“环境风暴”是政府以公共利益之名牺牲少数人，这次是与所有人签订了一份社会契约，彼此让渡一部分权利，来确保从根源上解决垃圾泛滥和污染问题。这个方案来自于对垃圾问题本质的理解，其中有民间的贡献。

与其抱怨“被强迫”，社会此时应该抓住这份契约所提供的机会，去：

1. 监督政府确保分类收运和处置，不枉费民众垃圾分类成果，制订积极进取的方案推进生活垃圾的

“减量化、资源化、无害化”目标，据此来限制焚烧和填埋能力的盲目扩张；

2. 推动社区自治，让制度的实施方式更加符合本地实情，体恤不同人的状况，并实施有效而无需过分诉诸于强制的监督，增进社区环境意识，从而让垃圾分类行为从被动服从变成主动的公民行动；

3. 关注回收产业的发展，倡导积极的扶持政策，既包括前端的收运，也包括后端的再利用处置。在收运环节，探讨如何将曾经长期承担废品回收工作的数十万的非正规回收业者纳入“两网融合”(指生活垃圾分类收运体系和再生资源回收体系的融合，通常表现为政府指定企业进驻小区设置回收点)，既避免造成非正规部门的大量失业，也避免少数企业垄断回收渠道。

正当上海垃圾强制分类铺开的时候，新一期垃圾焚烧项目在距离市中心60公里的浦东老港镇落成，使这里成为全球最大的垃圾焚烧厂。与此同时，武汉郊区阳逻的一场反对建设焚烧厂的邻避运动也正在公众关注之外孤独地进行。但垃圾强制分类时代已经到来，个人与垃圾这个不断被隐匿的社会产物的关系已经变得不同。能否把握住这个机会建立一种新的环境伦理，去直面问题的根源，去承担污染的个人和集体责任，见证“环境公民”的诞生，带来一场新的环境运动？这需要我们的决心和创造力。☺

蒋亦凡，生活在上海的媒体人

# Waste sorting: an imposed “social contract” with potential

Jiang Yifan argues that rather than complain about obligatory waste sorting, the public should seize the opportunity, and ensure the government does not let their efforts come to nothing

□ Jiang Yifan

The first week of July saw China’s media outlets and social media dominated by what might seem like a trivial issue. New rules came into effect in Shanghai making waste sorting compulsory for the megacity’s 20 million residents.

Waste must now be sorted into recyclables, harmful waste, wet (organic) waste and dry (other) waste. The vast majority of apartment buildings have removed waste bins from corridors and replaced them with a few centralised waste collection points, accessible only in the morning and evening.

The requirement to “gradually implement a system for collection of sorted domestic waste at specific times and places” was rolled out in one fell swoop – and to great controversy. Commenters online complained of having missed waste drop-off times, while others predicted an epidemic of fly-tipping. Jokes were made about it being easier to take the subway out of the city to get rid of your rubbish.

Numerous articles described Shanghai residents as driven crazy by changes they feel are complex, overly strict and hastily implemented. Some say the system is bound to fail, as it is the product of top-down decision-making and lacks social consensus or procedural justice. With memories of factories being shut down as part of

“environmental crackdowns”, that is a view many agree with. Waste sorting is set to become compulsory in other urban areas in China, with cities of local-level and above needing systems in place by 2025. This has meant particular scrutiny for Shanghai’s approach.

## Too soon, or too late?

Waste sorting policies in China have in fact been anything but rushed. After the central government identified eight trial cities in 2000, the local governments put regulations in place and some set themselves ambitious targets. Beijing, for example, aimed to have 50% of collected waste sorted in 2008, with a 30% reuse rate. Nine years later, those trials have done little good. The public does not know what happens to waste they have sorted, except that it is often mixed up again during transportation and disposal.

A key reason is that those local regulations were more suggestions than binding rules, and lacked oversight mechanisms and provision for the proper handling of sorted waste. Local governments were more interested in building expensive incinerators, as a more immediate solution to the problem than cutting waste produced and boosting recycling.



The new rules instruct businesses to cut down on single-use products, reducing waste at the source.

But nobody wanted incinerators in their backyard. In 2009, huge protests broke out in Guangzhou against an incinerator in nearby Panyu. Young members of the middle-class, including lawyers and media professionals, formed the core of the protest. They knew the truth behind the technological utopian promises, and that dioxins and heavy metal pollution would be a threat to their health. The Guangzhou city government took an enlightened approach and eventually abandoned the planned site – a victory for the protestors.

Guangzhou remains at risk of being encircled by landfill sites. In 2011, the city started promoting waste sorting, and set a target of having 50% of collected waste sorted with a 16% reuse rate. Waste sorting can significantly reduce the amount of waste sent to incinerators and cut the amount of moisture in that waste – meaning fewer incinerators and less harmful emissions. But the people of Guangzhou did not rise to the call and little progress has been made.

Ironically, Guangzhou continued to build incinerators after the Panyu project was cancelled. Six have been built elsewhere, away from middle-class residents and the public eye. In early June, Guangzhou announced it would build five more, as well as five new landfill projects.

### Hidden pollution

Those middle-class protests in Panyu have left an environmental legacy. Some who took to the streets realised they needed an answer when people asked “so where should incinerators be built?” They saw that only by reducing the amount of waste produced, and then sorting and recycling it, could they stem the need for more incinerators. This led to the registration of new environmental NGOs, some looking at how to achieve that, others monitoring the expansion of incinerators. These groups, and a small number of

other NGOs, have become a powerful civil society force promoting waste sorting and influencing the policies being rolled out.

But it remains true that the public has not heeded these environmental calls. Public environmental awareness needs to be founded on transparent pollution data, which in China is often opaque. Chinese society also lacks the capability to organise and mobilise itself, and there is no space for environmental movements to grow. Because “nimby” campaigns protect the interests of those involved and are “depoliticised”, mobilisation and growth is easier. But unless we have environmental campaigns that go beyond our own backyards, the majority of people will not see pollution as their concern – and government advocacy of waste sorting will not be enough to get them on board.

### Waste sorting from above

And so for 19 years not much happened, until Shanghai’s city government decided to impose a waste-sorting system.

The new rules could be described as a tough but green system which will significantly enhance the public good. It makes its aims clear: reduce waste, reuse waste and cut pollution from waste. It is not just about getting waste out of the city. It includes requirements for each district to come up with plans for controlling waste-handling capacity, including measures to reduce and reuse waste.

And it does not merely apply to citizens. It instructs companies not to mix previously sorted waste during transportation or processing and calls for computerised management of the entire domestic waste system and separate facilities to handle and reuse the different types of waste. It also orders that only dry waste can be incinerated. Wet waste must be composted or used otherwise. It can then be used in parks or farms, returning organic material to the soil and reducing pollution from chemical fertilisers and methane emissions from landfill.

Alongside the waste-sorting system, the new rules instruct businesses and organisations – in particular online retailers, delivery firms, restaurants and hotels – to cut down on single-use products, reducing waste at the source.

There's no question this is another environmental initiative enforced from above, and it has been criticised as "heavy-handed" and "rushed". But unlike past initiatives it affects every household, and that participation can build environmental awareness. The residents sorting the waste become stakeholders, with a legitimate interest in overseeing government waste policy. Shanghai locals already feel entitled to criticise the new system, as it is affecting them. However, those criticisms do not yet take into account the environment or the public good.

## An environmental compact

What those criticising the government don't see is that by imposing a "radical" (actually entirely practical, given the gravity of the environmental and climate crises) policy on everyone in Shanghai, the government has taken on a great responsibility. Having made life more difficult for residents, it now needs to make sure their extra efforts do not come to nothing, and if its aims of reducing and reusing waste are achieved, the quantities of waste sent to incineration and landfill will be brought under control.

In other words, rather than the government sacrificing the interests of a minority during an environmental crackdown, on this occasion a social compact has been signed with all residents. Each party gives up a little in order to resolve waste and pollution issues. This approach arises from the nature of the waste problem. The people must do their part.

Rather than complaining of being forced to sort their waste, the public should seize the opportunity offered. The key steps to take are:

1. Ensure the government keeps waste separate during transportation and disposal, and comes up with vigorous

measures to meet waste targets and so halt excessive expansion of landfill and incineration facilities.

2. Promote community self-governance. The system needs to be implemented in the most suitable style for each location and overseen in non-intrusive ways that raise community environmental awareness, so that waste sorting becomes a voluntary public action, rather than enforced behaviour.

3. Pay attention to the recycling industry and advocate for supporting policies, including the collection and processing of recyclables. The tens of thousands of workers in the informal recycling sector need to be brought within the new system, which sees collection of domestic waste and recyclables handled by government-designated firms. This will prevent large-scale job losses and the monopolisation of recycling by a small number of firms.

Just as Shanghai's new waste-sorting rules were coming into effect, the world's largest incineration facility was being completed 60 kilometres outside the city, in Laogang. Meanwhile residents of Yangluo, on the outskirts of Wuhan, were continuing their lonely and largely unseen protest against a new incinerator.

Thankfully, the era of waste sorting is here, and our relationship with the waste that was once hidden from us has changed. Can we seize this opportunity to create a new environmental ethics, to face up to the root causes of our problems, to accept our individual and joint responsibilities for pollution? Will we see "environmental citizens" launching new environmental movements? We will need both determination and creativity. ☺

*Jiang Yifan is a journalist based in Shanghai.*

# 联合国海洋特使： “我们有办法让人类存活下去”

现在保护海洋还来得及，联合国特使彼得·汤姆森说道

□ 伊莎贝尔·希尔顿

**联** 联合国海洋问题特使彼得·汤姆森是个身负使命的人，这个使命就是拯救海洋这一全球最大的生态系统。这是一项艰巨的任务：30年来，海洋的所有健康指标都在稳步下降——大多数情况下甚至是急剧下降。例如汤姆森也承认，1974年全球90%的渔场都处于可持续捕捞的状态，但到2013年，这一比例已降至略高于68%。

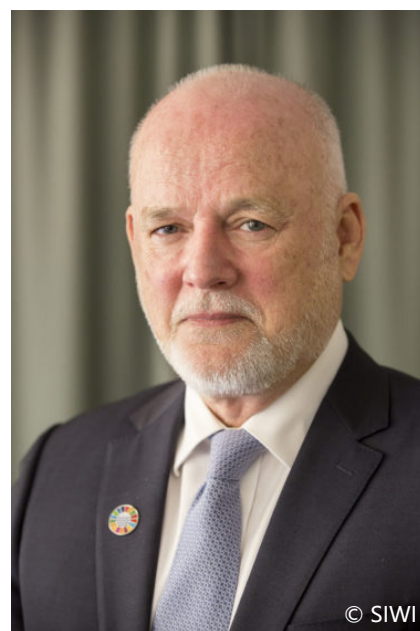
与此同时，人为污染的负面影响也有所增加，加剧了对生态系统的破坏。全球海洋吸收了过去30年间人类活动产生的大量热量。随着碳排放量急剧攀升，海洋也吸收了大量二氧化碳，打破了海水的酸碱平衡，而海水的酸化让贝壳类海洋生物的生存变得更加困难。海水变暖和酸化对水下生命的影响是灾难性的。发展和污染让许多国家的沿海生态系统遭到严重破坏，而这些生态系统是很多海洋生命的繁衍生息的地方。塑料污染如今无处不在，甚至在海洋最深处也能发现它们的身影。

彼得·汤姆森与联合国早有合作：2016-17年间曾担任第71届联合国大会主席，此前任斐济常驻联合国代表，现在作为联合国海洋问题特使，他自然要强调联合国可持续发展目标，尤其是目标14（保护和可持续利用海洋和海洋资源以促进可持续发展）的重要性，这也是他工作的基础。

## 全球海洋危机

汤姆森解释说，他的工作主要是推动实现可持续发展目标14，力求在目前海洋保护水平较低背景下，找出海洋气候影响、酸化、富营养化和过度捕捞等这些日益严峻的问题的解决方案。

全球趋势并不乐观。目标14要求全球在2020年之前强化沿海生态系统，并在2025年之前减少废弃物和营养物污染。但根据联合国数据，土壤中营养物质过剩造成的污染和富营养化正导致沿海水域持续恶化。最典型的土壤化肥渗出导致海洋中植物生长过密，海洋动物因缺



彼得·汤姆森

氧而无法存活。联合国评估的大型海洋生态系统中，16%的生态系统处于沿海富营养化的“高”或“最高”风险类别，其中包括大部分中国沿海水域。

过度捕捞的情况同样令人担忧。现在的目标是在2020年之前终止非法、无管制和未报告的捕捞活动（IUU捕捞），同时取消有害的渔业





江苏连云港的渔民在晒鱼干

补贴,并通过科学的管理规划有效监管捕捞活动。汤姆森指出,目前海洋保护区仅覆盖了国家管辖范围内13.2%的海洋环境(距海岸200海里以内),而国家管辖范围之外,仅0.25%的海洋环境得到了保护,占全球海洋总面积的5.3%。渔业补贴,特别是燃料补贴仍然存在,而这正是中国远洋船队能够在全球海域作业的根源所在。

## 可持续发展是有可能的

汤姆森承认仍有许多工作要做,但也坚持认为这方面的努力必须继续,可持续发展目标的框架至关重要。“我相信气候变化和海洋变化,气候行动和海洋行动是21世纪的重大任务。”他告诉“中外对话”海洋。“海洋是地球生命的起源,而它正处于危险中。”

“可持续发展目标的意义是什么?人类要想以公平的方式在地球

上重现昨日的辉煌,有两条路,追根溯源就是2015年达成的两项协议:《巴黎协定》和可持续发展目标。这两项协议来之不易,而且也不像通常认为的那样,是由官僚、政客或者业界制定的。它是各国及联合国194个成员国经过多年谈判,最终在巴黎和纽约达成的共识。把二者结合起来,就是我们人类在地球上生存下去的秘诀。”

“这两项协议必须结合在一起实施,”汤姆森继续道,“否则我们说话就没有底气。我相信,也是最早相信的人中的一员,只要这两项协议得到了忠实的执行,我们就有自信的理由。”

但可持续发展目标的存在究竟如何促成改变呢?

“可持续发展目标是由具体目标组成的,”汤姆森解释说,“目标14下面有10个具体目标,主要是激励国际社会实现这些目标。我们对自己问责——就像期末考试一样。”

“就目标14而言,10个具体目标中有4个要在2020年完成。说实话,我们目前在冲刺。这4个都是可以实现的,但最困难的是其中的第4条,即结束IUU捕捞和过度捕捞:这是一项非常艰巨的任务。另一个是到2020年海洋保护区的面积至少达到全球海洋面积的10%。现在我们已经达到了7.4%,所有我对这个目标相当有信心。改善沿海和生态系统管理方面也开展了大量工作。第4个目标是结束有害的渔业补贴:世贸组织有责任取消这些补贴,我们正为此努力——燃料、造船补贴和产能过剩。他们给我们设定目标,我们必须坚持达成。”

为了确保这4项2020年目标的实现,联合国正计划在明年举行一次海洋会议,强行对进展情况进行审查。

## 未来的重大挑战

“我们现在走上正规了吗?如果没有,我们要怎么办?”汤姆森说。



“这些目标不是纸上谈兵，也不是随意制定的，它们是可以实现的，我们如果不去做，那就真的危险了，可持续发展是不可能的了。”

他说，IUU 捕捞和过度捕捞仍是最大的挑战。

“33% 的鱼类种群遭到过度捕捞，”汤姆森说，“看到这个数据我很震惊。如果我们继续现在的做法，它们就会灭绝。在短期内结束这种状况对渔业社区而言是一个巨大的挑战，但我们必须让他们明白，不能杀鸡取卵。”

“但要说我们会终止 IUU 捕捞，就像说我们会消灭犯罪一样，总会有人在背地里偷偷做坏事。全球每年有价值 30 亿美元的非法渔获出现在餐桌上，消费者和供应链没法拒绝。”

汤姆森说，有一些非常有效的治理措施，包括粮食和农业组织的

10 年前通过的《港口国措施协定》(PSMA)，其目的是杜绝非法渔获通过港口进入市场。“如果我们能够在 2020 年之前让所有国家都加入 PSMA，我认为这将是巨大的成功。它是我们打击 IUU 捕捞活动最好的武器，但大多数政府还没签署这项协定。我的主要工作是让各国政府了解其法律要求，帮助他们在 2020 年之前加入。”

汤姆森除了试图说服中国等大国加入协定，还认识到一些可能感兴趣的小国需要不同类型的支持。

“我正在鼓励慈善机构和非政府组织与有意加入、且需要资金来安排检查员在码头上工作的小国合作。对于一个小岛屿国家来说，为新设立的职位发放工资是一件大事。所以我就想，为什么不合作呢？资助和培训当地人从事这一工作，很快就能在接下来的几年里看到成

果。PSMA 是终止 IUU 捕捞的关键部分。”

汤姆森说，可追溯是打击 IUU 捕捞的另一个关键因素。“这是第 4 次工业革命，我们应该能追踪到所有鱼的来源。这应该是短期可以实现的，确保消费者去市场不会买到非法捕捞的鱼。”

目前，汤姆森正在为明年启动联合国“海洋科学促进可持续发展十年”计划做准备，该计划旨在加强科学研究和技术创新，支持各国实现海洋的可持续发展。

我们从这项计划中收获的知识至关重要，汤姆森说。“现在人类只了解不到 5% 的海洋，我们希望在 2030 年之前彻底了解它，以便做出正确的决策。”

伊莎贝尔·希尔顿，中外对话的首席执行官及总编

# UN oceans envoy: 'We have a recipe for humanity's survival'

There is still time to protect the ocean, says Peter Thomson ahead of World Oceans Day

□ Isabel Hilton

Peter Thomson, the United Nations special envoy for the ocean, is a man with a mission: to save the global ocean, the world's largest ecosystem. It is a daunting task.

In the past three decades, all the indicators of ocean health have turned steadily – and in most cases steeply – downwards. In 1974, for example, as Thomson acknowledges, 90% of global fishing grounds were sustainably fished. By 2013 that had dropped to just over 68%.

At the same time, negative impacts from man-made pollution have risen, compounding the damage to ecosystems. The global ocean has absorbed large amounts of the heat that human activity has produced in the last three decades. As carbon emissions have climbed steeply, the ocean has also absorbed enough CO<sub>2</sub> to change its pH balance. This acidification makes life more difficult for shell-forming sea life.

The effects of heat and acidification will be catastrophic for life below water. Coastal ecosystems, where much of marine life originates and lives, are also deeply damaged in many countries by development and pollution. Plastic pollution is now ubiquitous, found even in the deepest part of the ocean.

Peter Thomson has a history of UN engagement. He served as the 71st president of the General Assembly from 2016-17 and previously as Fiji's permanent representative to the UN. Today, as the UN's special envoy for the ocean, he naturally stresses the importance



*Peter Thomson*

of the UN Sustainable Development Goals, in particular SDG 14 (Conserve and sustainably use the oceans, seas and marine resources for sustainable development), which is the foundation of his work.

## A global ocean crisis

Much of his job, he explains, is to push for the achievement of SDG 14, an ambition that demands solutions to each of the growing problems of ocean climate impacts,

acidification, eutrophication and overfishing, all in the context of low levels of ocean protection.

Global trends are not encouraging. Under SDG 14, the goal is to strengthen coastal ecosystems by 2020 and to reduce debris and nutrient pollution by 2025. But according to the UN's data, coastal waters continue to deteriorate due to pollution and eutrophication. Characteristically, this is caused by fertiliser run-off which triggers plant growth in the ocean so dense that it starves animal life of oxygen. Sixteen percent of the large marine ecosystems the UN has assessed are in the high or highest categories for coastal eutrophication, including most of China's coastal waters.

On overfishing, the picture is equally daunting. The ambition is to end illegal, unregulated and unreported fishing by 2020, eliminate harmful fishing subsidies and effectively regulate harvesting with science-based management plans. Currently, Thomson points out, marine protected areas cover only 13.2% of the marine environment under national jurisdiction (up to 200 nautical miles from shore). Beyond that, only 0.25% of the marine environment is protected, making a total of just 5.3% of the total global ocean area. Fishing subsidies, in particular the subsidies for fuel that make it possible for China's distant water fleet to operate in the global ocean, remain in place.

### Sustainability is possible

He acknowledges that much remains to be done, but insists that the effort must continue, and that the framework of the Sustainable Development Goals is essential. "I believe that climate change and ocean change, and climate action and ocean action are the high callings of the 21st century," he told chinadialogue ocean. "It's what life exists in on this planet. And it is all in peril."

"What is the point of the SDGs? There are two ways humanity will revive on this planet in an equitable way, and it goes back to the two agreements that were made in 2015. One being the Paris Agreement and the other the SDGs. They were not arrived at easily, or devised by bureaucrats or politicians, or business interests. This was not the usual



*Clearing algae from a beach hit by eutrophication in Qingdao, Shandong province*

suspects. Every nation and the UN's 194 countries were negotiating for years to reach consensus in Paris and New York. If you put the two together, we have a recipe for humanity's survival on planet earth."

"They have to be implemented with integrity," he continued, "or we can't say we have certainty. I am confident, and I am a grandfather, that with those two agreements faithfully implemented, we can have that confidence."

But how, exactly, does the existence of the SDGs effect change?

"The SDGs are made up of targets," Thomson explains. "SDG 14 has 10 targets and basically they galvanise the international community to meet those targets. We hold ourselves to account – they are like exams at the end of the school year."

"In the case of SDG 14, four of the 10 targets mature in 2020. Honestly, we are in a sprint here. They are all achievable but the most difficult is 14.4 – ending IUU fishing and overfishing. That's a really hard task. Another is that 10% of the ocean should be marine protected areas by 2020. We have reached 7.4% so I am reasonably confident on that. On the better management of coasts and ecosystems, lots of work is being done. The fourth is ending harmful subsidies: the WTO [World Trade Organisation] has the responsibility of removing those and we are working on that now – fuel, shipbuilding subsidies and overcapacity. They set us targets and we have to hold ourselves to it."

To try to ensure the four 2020 targets are met, the UN is working to hold an ocean conference next year, to force a review of progress.

## Big challenges ahead

“Are we on track, and if not what are we going to do about it?” he says. “These are not paper targets and they were not arrived at idly. They are achievable and if we don’t do them we are really in jeopardy. We do not have sustainability.”

IUU and overfishing remains, he says, the biggest challenge.

“I was shocked,” he says, “to see that 33% of populations are being overfished. If we carry on with present practices, they will be extinct. Ending that 33% overfishing in a short period of time is a huge ask of the fishing community. We have to convince them that there is no point in killing the goose that lays the golden egg.

“But to say we will end IUU fishing is like saying we will end crime. There will always be some guy sneaking out the back and doing the wrong thing. We have three billion dollars of illegal fish hitting the tables around the world. Consumers and the supply chains can’t just say no to that.”

Thomson says there are some very effective governance measures, including the Food and Agriculture Organisation’s 10-year-old Port State Measures Agreement (PSMA), designed to ensure illegally caught fish never enters the market through ports. “If we can get everybody signed up to [PSMA] by 2020, I shall regard that as a great success. It is the best weapon we have


against IUU fishing, but the majority of governments have yet to sign. Much of my work is getting governments to understand the legal requirements and to get them across the line by 2020.”

In addition to trying to persuade large powers like China to sign up, Thomson recognises that small states which might be enthusiastic require a different kind of support.

“I am trying to encourage philanthropy and NGOs to get alongside small countries who want to sign and would need inspectors on the wharf who have to be funded. For a small island state, funding a couple of new posts is a big deal. So I am saying why not partnership? Funding and training local people to take on the role. It can bear fruit quickly over the following years. PSMA is a critical part of ending IUU.”

Thomson says that traceability is the other key element in tackling IUU. “That is the fourth industrial revolution. We should be able to trace the provenance of all fish. It should be achievable in the short term that when you go to the market to buy a fish, you don’t end up buying stolen goods.”

For the moment, Thomson is gearing up for next year’s launch of the UN Decade of Ocean Science, which aims to bolster scientific research and tech innovation to support countries in the sustainable development of the ocean.

The knowledge we will harness from this initiative is vital, Thomson says. “Less than 5% of the ocean is known now. By 2030 we want to know it all so we can make the right decisions for the ocean.” 

*Isabel Hilton is CEO and Editor of chinadialogue.*



# 犯罪冲突、鱼类进口和气候变化阴影下的尼日利亚渔业

从非洲到中国再回到非洲，尼日利亚餐桌上的鱼一半以上来自进口。

□ 诺斯莫特·巴达莫西

## 渔业社区无鱼可捕

尼日利亚有一个著名的马科科贫民窟，被称为“世界上最大的漂浮贫民窟”。在这里有一个传说，但凡有新生命降生，孩子的父亲就会把婴儿扔到拉各斯泻湖中以示庆祝。这孩子若能在水中漂浮起来，就会被大家接受，若溺水而亡，那么这个孩子就不会被承认，孩子的母亲也必须被社区驱逐。“但所有的婴儿都是浮着的。”这是你常听到的一句话，说话人往往带着调皮的微笑。

这传说虽然骇人，但也明确地表明泻湖作为马科科人生活的基石，它存在的重要性。尼日利亚首都拉各斯是非洲人口最多的城市，拥有约 2000 万居民，而马科科的居民们依靠从这座城市中蜿蜒而过的污浊不堪的水道艰难谋生。

在一个多云的上午，20 岁的雅各布·洛顿备好船，准备开始在水面上 12 个小时的劳作。作为一名出生在马科科的渔民，洛顿从 9 岁就开始了这样的日常工作。

那时候，洛顿和父亲外出回家时会捎回许多鲶鱼和一大堆小杂鱼，

除了留几条煮胡辣汤外，其余的就拿到早市上卖。

“现在我们没鱼可抓了，鱼都跑到更远的地方去了。”洛顿坐在一条没有安装舷外发动机的独木舟里说道。驾着这条船，他根本追不上这些鱼。

“买一个发动机大概需要 50 万奈拉（1390 美元）。”洛顿耸耸肩说——比他月收入的三倍还多。

洛顿的困境指明了尼日利亚 1.9 亿人口面临的一个更大的问题。这个沿海国家盛产海鲜，但那里供应的鱼超过一半都进口自荷兰等国，以及越来越多地来自中国。

越来越多的证据表明，海水变暖导致鱼类逐渐远离西非海岸。尼日利亚等发展中国家的渔场目前是亚洲和欧盟远洋渔船最为活跃的区域之一。当地渔业投入不足让问题变得更加复杂。

## 掠夺尼日利亚的海洋资源

2018 年尼日利亚海军宣布称，中国拖网渔船在尼日利亚海域的非法捕鱼活动每年给其造成 7000 万美



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元的损失。另一方面，2017年中国向尼日利亚出口了价值约4200万美元的鱼类，同比增长超过一倍。

尼日利亚是全球第四大鱼类进口国。预计到2050年尼日利亚的人口将超过3亿，而进口鱼填补了200万公吨的鱼类供应缺口。

“沿海社区不仅在和非法捕捞或者过度捕捞作斗争，还得承受气候变化的影响。”伦敦国王学院海上安全研究员艾菲斯纳齐·奥卡菲尔-亚尔伍德说。

“中国、欧盟等远洋捕鱼国并没有与尼日利亚达成正式的捕鱼协议，但却因为和（附近的岛国）圣多美和普林西比有协议，然后就借机在边界，甚至是尼日利亚水域进行非法捕鱼。”她解释说。约有34艘渔船根据圣多美和普林西比与欧盟签署的渔业合作协议在该国水域捕捞金枪鱼。两年前，该国与中国签署了第一份渔业协议。

海外发展研究所的一份报告利用卫星跟踪监测了在塞内加尔到尼日利亚之间水域从事捕捞活动的外国船队使用的捕鱼方法，发现这些渔船通常会把渔获转移到其他船只上以规避配额限制。他们还会利用监管较松的集装箱船运输渔获。经查证，这些船只来自中国、荷兰和西班牙。

2015年，奥卡菲尔-亚尔伍德对尼日利亚的渔业进行了研究。“尼日利亚渔业部门没有（有效的）巡逻艇，无法参与追捕。”她说。他们船只的航行范围最多200海里。

“海军尽力了，但他们的船都破破烂烂的……然后你会发现腐败分子在拿回扣，在一些问题上放水。”包括用网眼更小的网来捕捞更多的鱼。

据当地媒体《新电讯报》报道，2018年12月，尼日利亚政府批准渔业部门购置两艘巡逻舰“用于监控中国船只的未报告、不受管制和非法捕鱼活动”。但奥卡菲尔-亚尔伍德担心

这些船只将由海军驻守，他们并不具备收集渔业犯罪证据的专业知识。

## 从鲜鱼到冷冻鱼

19世纪，马科科还是拉各斯这个不断增长的贸易中心里的小渔村。来自尼日利亚沿海各州和邻国的人怀揣着发财梦来到这里寻找财富，但因为土地昂贵而转战水上。

如今有超过10万人口在这片水域安家。他们高高架起的棚屋虽然证明了当地人的创造力，但被政府认定为是违法建筑。

马科科贫民窟旁边是阿色日拉·马科科鱼市。周四傍晚，太阳还没有落山，游客、女商贩和学生都在这里采购晚餐用的食材，老远就能听见鼎沸的人声。

黄花鱼、鲭鱼、罗非鱼、还有牙齿尖尖的梭子鱼被随意地堆放在塑料桶里。



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渔妇们一边等着买家上门，一边把丈夫早前捕来的鱼切片分段，时不时有推着独轮车的男孩在人群中穿梭，叫卖着车上摆放的各种分割好的肉。

这些来自附近海域的鱼捕获后，被分割成一块块，然后被拿到阿色日拉市场上卖掉，其中大部分都会被炖成一锅具有尼日利亚特色的鲜鱼汤（obe eja tutu）。

但 18 岁的珍妮特·胡努康没有新鲜的鱼可以料理，她更关心的是如何把顾客招揽到她在市场内的摊位上。她的摊位在一条水泥铺就的小巷里，冷藏柜里装满了冻鱼。

养殖的中国罗非鱼比当地捕获的鱼更便宜，所以很受欢迎，利润也因此更高。“卖冻鱼更赚钱。”胡努康说，“8500 奈拉（24 美元）买进一箱鱼可以卖到 1.2 万奈拉（33 美元）。”

在一个缺乏稳定电力供应的国家，鱼类保鲜往往意味着亏本出售，而 27 岁的阿格妮丝·本托斯是个精明的人，她知道自己也要多元化。

她的摊位上有半打待售的鱼，看起来卖相很差。“他们出海打鱼，但却什么都没有打到。”她谈到给自己供货的当地渔民时说，“这个时候他们通常已经回来了。”

本托斯和她高祖母一样，靠贩卖鲜鱼为生。“我妈把我生下来的时候，我环顾四周，看到的第一样东西就是鱼，他们说这就是我要干的工作。”她说。

尼日利亚依托石油、金融和制造业成为了非洲最富有的经济体，但这并没有惠及所有人。渔民日均收入 3 美元，全国有一半人生活在国际极度贫困线以下，也就是每天的生活费还不到 1.9 美元。

尼日利亚全国有 79 万渔业人口。而如今，这个传统行业正面临气候变化和过度捕捞的威胁。

### 伊乔拉的“冰王”

从马科科驱车向南半小时就到了拉各斯的伊乔拉·奥罗帕冷冻食品市场，里面有序排列着一排冷藏柜。

顾客们在泥泞的小道上四处搜寻，希望可以在进口鱼和本地鱼激烈的竞争中找到价廉物美的产品。

22 岁的鱼贩索迪克·奥卢耶德把一大条罗非鱼重重地摔在木头墩子上，然后迅速分切成一块块，方便那些讲究的顾客购买。

“罗非鱼的进口量很大。”他说。尽管尼日利亚的罗非鱼和水产养殖开发商协会一直在呼吁彻底禁止罗非鱼进口以保护当地水产养殖业，但情况没有变化。“整个市场上都在卖进口罗非鱼。”

罗非鱼是一种原产于非洲的淡水鱼，但根据农业部的统计数据，2016 年中国养殖罗非鱼的产量为 186 万吨，占全球总量的三分之一。

如今，伊乔拉市场上销售的冷冻罗非鱼大多来自中国这个全球最大的海产品出口国。2017 年，中国向尼日利亚出口了价值超过 200 万美元的冷冻罗非鱼。

“假如你在筹备一个生日聚会，需要一大箱鱼，买本地鱼要 3.5 万奈拉（97 美元），进口鱼更大，只要 2 万奈拉（55 美元）。”奥卢耶德说。

29 岁的奥莫托什·拉扎克在等国外客户的间隙，把一条巨大的梭鱼放到了工作台上。拉扎克是少数几个从出口贸易中受益的人之一。“我有来自中国的老客户会来卖鱼，然后再卖到德国等地。”他笑着说，“我们既卖给中国人也卖给当地人，价格都是一样的，但中国人买得多。”

### 出口再进口的周折

从市场出来往后走几个街区，穿过这座城市七扭八拐的高速公路网络，就到了伊乔拉的封闭式冷藏





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设施，渔妇们耐心地坐在那里，等着批发商的出现。

茱丽叶·奥扎拉格巴担任奥比特·安戈洛出口公司的仓库经理已有5年。“罗非鱼大多来自中国，但实际上其中大部分都是尼日利亚罗非鱼，它们在中国包装好，又卖回给我们。”她说。大多数人都会觉得这逻辑不对，但因为中国对机械化设备的投入，把鱼运往中国进行加工是全球普遍的做法，美国渔业也不例外。

还有一个问题是，谁捕鱼，捕了多少。“要我说，尼日利亚只有约10%的渔业公司是真正由尼日利亚人所有的。”奥扎拉格巴说。她认为这几年来政府未经核查就发放捕鱼许可证是造成这一局面的根源。“他们发放了很多许可证，尤其是给外国公司。”奥扎拉格巴坐在办公桌前，一边把交易登记在一本超大的账本上，一边说。“过度捕捞也很严重……很多人都停业了。”

走进奥扎拉格巴的冷库，零下28度的房间里，垒起的纸箱子像

一面墙一样，里面装着冷冻鲱鱼和鲭鱼，上面贴着俄罗斯和爱尔兰的邮票。

尽管尼日利亚2017年正式宣布禁止进口鲭鱼，但情况没有变化，来自俄罗斯、冰岛和爱尔兰的鲭鱼源源不断地进入这个国家。

“政府要做的事情，是行不通的。”奥扎拉格巴的同事雅各布·艾莉森谈到进口限制时说：“不可能一刀切全部停，你得慢慢来。”艾莉森认为，过度捕捞意味着一些鱼种已经完全消失，这又给进口提供了空间。

“(尼日利亚)水域是不受任何人控制的，人们只要坐船来，想拿什么就拿什么。”他说。

约61种原产于尼日利亚的物种被研究机构FishBase列为脆弱或极度濒危物种。英属哥伦比亚大学研究员迪希亚·贝拉比卜多年来一直在研究西非的非法捕鱼问题，他说“船太多鱼太少”。“中国最醒目，所以责怪中国很容易…但不只有中国的渔船。例如蓝鳍金枪鱼是一种不

应该捕捞的濒危物种，但欧盟的船队还在捕捞这种金枪鱼。”

## “水域属于我们”

从伊乔拉市场驱车往南再走半个小时就可以看到横跨利物浦街的廷坎-阿帕帕立交，那下面就是阿帕帕食品市场。市场入口的阴凉处是一群摩托男孩，聚在一起聊着闲话。但走过一排排卖苏格兰软帽辣椒和鱼干的摊位，你就会发现大声叫卖珍贵冷冻产品的渔妇们。

这是一个周三下午，从早上7点开始就热热闹闹的新鲜渔获市场早就回归平静，但仍可以看到零星几个喝着冰啤酒的渔民，街头流浪的孩子则成了搬运工，带着各种蔬菜和肉类飞快地跑来跑去，帮等不及的买家送货。根据尼日利亚海洋学和海洋研究所的数据，阿帕帕市场本地鱼的日均利润约为3500美元。

以前形势好的时候，给阿帕帕市场供货的渔民每周也只会去一次公海。如今，“海里全是拖网渔船，”利物浦阿帕帕渔民协会会长叶库布·泰沃·德格贝因介绍说。“你得走上4个多小时才能下网。”

德格贝因目前有5名船员，每次出海只挣11美元。他们赖以生存的海洋每天提供的东西越来越少，出海的距离也越来越远。

“以前我们出海可以(抓到)近120公斤的鱼，但现在40公斤都很难了。”他说，并补充说协会成员的船外发动机都是共享的。

发动机的成本已经很高了，再加上2012年尼日利亚联邦政府取消燃料补贴，许多个体渔民无力再维



持船只的运行。根据 2015 年的一份报告，这导致尼日利亚远洋捕鱼活动日益减少。

“我们这里有资源，水域是属于我们的。”德格贝因说。他希望尼日利亚民众可以投资商业捕鱼，打破外国船只在市场上的主导地位。“其实就是看政府，他们有钱买拖网渔船——但不买。我们(有钱)的大人物有钱买拖网渔船——他们也不买。”

### 不断减少的回报

企图与外国拖网渔船竞争的愿望导致当地渔船使用破坏性更大的捕鱼方法，给尼日利亚渔业带来了压力。

“他们会去一些限制进入的地方，包括在(石油)管道所在的海域捕鱼，这显然可能会导致管道爆裂，而且这个循环一直在继续。”伦敦国王学院研究院奥卡菲尔·亚尔伍德说。

尼日利亚石油工业和在沿海地区挖掘泥沙用于大体量项目建设带来的污染只是导致鱼类远离的一部分原因。

2019 年发表在《科学》杂志上的一项研究显示，随着海洋变暖，鱼类数量正在减少。全球温室气体捕获的热量有 93% 被海洋吸收了。“我们提到缓解气候变化的时候，其实很多……都是关于农业的，很少是关于如何支持沿海国家的。”奥卡菲尔·亚尔伍德说。

据联合国一名官员称，包括尼日利亚在内的萨赫勒地区(非洲南部撒哈拉沙漠和中部苏丹草原地区之间)是应对气候变化斗争中的“原爆点”。2012 年的一项研究预测了气候变化可能对 14 个西非国家渔业产生的影响。最坏的情境下，到 2050 年尼日利亚的渔获着陆量将下降 52%，相当于损失 8700 万美元。

“因为气候变化，现在尼日利亚沿海水域里长出了一种名为‘马尾藻’的水草。”拉各斯州立大学渔业教授阿内特克哈·马丁斯·埃格努马说。“马尾藻长出来的时候，渔民无法捕鱼，它会破坏渔网，钻到渔网里……我们必须为即将发生的事情做好准备。”

为了降低对进口的依赖，尼日

利亚政府已经将水产养殖列为高度优先事项，并取得了一定成功。尼日利亚目前是非洲最大的养殖罗非鱼生产国之一。

但当地养渔户担心自己无法与廉价的外国商品竞争。“如果允许进口不受监管，最终会扼杀刚兴起的本地渔业。”马丁斯·埃格努马解释说。“如果让市场中充斥着低质鱼，而且比本地鱼更便宜，那本地的生产活动就难以为继。”

### 抗击非法捕捞

彼得·哈姆施泰特是反非法捕捞渔船鲍勃·巴尔克的船长，目前代表保护组织“海洋守护神”在西非水域巡逻，还有一件事让他担心。

“我们必须以海洋安全为大背景审视非法、未报告和不受管制的捕捞活动。”他说。类似“雷霆号”这样臭名昭著的海盗拖网渔船的活动就是该背景的一部分。

雷霆号对外宣称的船籍至少有 8 个不同国家，其中就包括尼日利亚。近 10 年来，该船一直在全球各地的海洋肆意掠夺。早在 2013 年，国际刑警就从尼日利亚和多哥收集了该船的信息。据称雷霆号也曾悬挂过多哥共和国的船旗。

2015 年，在被追赶了 3 个半月后，“雷霆号”船长在圣多美和普林西比水域自沉船只，目的是掩盖起诉的证据。截止船员被捕时，该渔船已通过非法捕捞获利 6000 万美元，尼日利亚在“雷霆号”被起获前不到一个月就已经注销了其船籍。

“非法经营者试图通过不断更换船名和船旗，增加当局追踪船只动向的难度。”哈姆施泰特说。



除了“雷霆号”，国际刑警组织头号通缉团伙“强盗6号”的两艘船只在没有携带任何尼日利亚船员的情况下悬挂了该国国旗。

几内亚湾的沿海国家往往是重灾区，原因在于这些国家对于距其海岸200海里以外水域缺乏法律监管。“很多情况下，缺乏对公海船只的控制，没有捕捞许可证限制条件或报告要求，是船只运营方选择在这些国家登记的原因”前国际刑警环境安全小组的刑事情报官员阿里斯塔尔·麦克唐奈尔说，“纵观历史，这在全球范围内很常见，也是一些国家必须做出重要改进的方面之一。”

## 面临威胁的海龟

2017年，“星虾25号”被利比里亚海岸警卫队捕获。该船未经授权就在利比里亚水域捕鱼，且没有使用法律规定的帮助濒危的海龟从渔网中脱逃的装置。

这艘船的东家是尼日利亚大西洋虾公司。该公司隶属于荷兰渔业巨头荷兰远洋集团，旗下拥有一支由70艘渔船的大型船队，其捕捞的高价值虾类拥有出口欧美市场的认证。

“有趣的是，‘星虾25号’上安有海龟排离器，但被捕时没有使

用。”哈姆施泰特说。“海洋守护神”的工作人员登上这艘船时发现一些虾已经装盒准备出口希腊。

非法捕捞为经验丰富的企业带来的利润是可观的。“根据船只大小，一次出航可以捕捞300到500万美元的渔获。”麦克唐奈尔说，“而且，洗白问题也很严重。如果非法、未报告和不受管制捕捞所得的鱼类与合法鱼获混在一起加工，就很难加以区分。”

## 犯罪和冲突的滋生地

西非水域每四分之一渔获物都是非法的。奥卡菲尔-亚尔伍德指出，中国船只常常夜间在近岸水域徘徊找虾。“那里是繁殖地，”她说，“这时候他们就很可能和渔民起冲突。根据渔业部门的数据，尼日利亚每年出口虾的收入约为2900万美元，非法捕虾带来的损失差不多也是这个数。”

渔获量的减少加剧了当地渔民之间的紧张关系。2017年，97名尼日利亚渔民在邻国喀麦隆因300美元的捕鱼税纠纷死亡。在官员们看来，非法捕鱼和随之而来的进口是“无害”的，而不是影响其社区的严重罪行。

“腐败是主要问题，”Enact团体的区域有组织犯罪观察站协调员艾

格尼斯·艾博说，该团体得到欧盟支持，旨在加强非洲对有组织跨国犯罪的应对措施。“我无法想象（邻国喀麦隆的）杜阿拉港或者拉各斯港务局仅仅因为批准了一项协议就禁止一艘载着500吨渔获的船只停靠。”她指的是《港口国措施协定》，旨在通过拒绝可疑船只进入港口来打击非法、未报告和不受管制的捕捞活动。

艾博还说：“还有一个机构应该更加仔细地研究渔业，那就是几内亚湾委员会，但这几乎没有可能。”

几内亚湾委员会成立于2001年，近20年过去了，还未能为该地区各国制定一个具有法律约束力的框架来解决非法捕鱼问题。面对我们一再提出的采访请求，委员会工作人员未作回应。中外对话还联系了尼日利亚政府，包括渔业局和海事管理及安全局，请其发表评论，也未得到回应。

据艾博介绍，了解船队规模和每年发放的许可证数量对大多数非洲国家来说都很困难。

“这就可以看出，腐败这样的事情对一个国家的资源造成的破坏可以严重到什么程度。”奥卡菲尔-亚尔伍德说。☞

诺斯莫特·巴达莫西，报道西非地区新闻的自由撰稿人

# Nigerian fishers hit by criminals, imports and climate change

From African waters to China and back again, over half the fish on Nigerian tables is imported

□ Nosmot Gbadamosi

## Makoko: the fishing community running out of fish

There is a legend about the neighbourhood of Makoko. It holds that birth in the “world’s largest floating slum” is celebrated by the father throwing his newborn into the Lagos lagoon. If the infant floats it is embraced by all. A baby that drowns is illegitimate and its mother must be banished from the community. “But all babies float,” is a refrain you hear, often accompanied by a mischievous smile.

Although a terrifying myth, it defines the lagoon’s importance as the linchpin of life in Makoko, where

residents eke out a living from the polluted waterway snaking through Africa’s most populous city of around 20 million people.

On a cloudy Monday morning, Jacob Lodun, 20, readied his boat for a 12-hour slog on the water. A fisher born in Makoko, this has been Lodun’s daily routine since he was nine.

Back then he and his father would return home from a trip with scores of catfish and a heap of smaller species. Some would be cooked up in pepper soup while the rest went to early morning markets.

“Now we don’t get any fish to kill,” he said. “The fish are running further away.” Sat in a dugout canoe with no outboard engine, he is unable to chase them.

“To buy a motor is around 500,000 naira (US\$1,390),” Lodun shrugged – more than triple his monthly income.

Lodun’s predicament points to a much bigger problem facing Nigeria’s 190 million people. The coastal nation is marine-rich but over half the fish served there are imported from countries like the Netherlands and, increasingly, China.

At a time when growing evidence suggests warming waters are pushing fish further from the West African coast, the fishing grounds of developing nations like Nigeria are today some of Asia and the EU’s most targeted.



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Lack of investment in the local fishing industry has compounded the problem.

### Looting Nigeria's seas

In 2018, the Nigerian navy declared the country was losing US\$70 million annually to Chinese trawlers fishing illegally in its waters. Going in the other direction, China exported roughly US\$42 million worth of fish to Nigeria in 2017, more than double the year before.

Nigeria is the fourth largest importer of fish. Foreign imports plug a 2 million metric tonne supply gap to a growing population predicted to exceed 300 million by 2050.

“Coastal communities are fighting not only illegal fishing or overfishing, they also have to suffer from the impact of climate change,” said Ifesinachi Okafor-Yarwood, a maritime security researcher at King’s College London.

“Officially Nigeria does not have any fishing arrangements with distant fishing nations such as China or the European Union. But they are able to fish in Nigerian waters illegally because maybe they have arrangements with [the nearby island nation of] São Tomé and Príncipe

so they have a reason to be at the border,” she explained. Around 34 ships fish for tuna in the waters of São Tomé under a Fishing Partnership Agreement with the EU. Two years ago, the nation signed its first fisheries agreement with China.

A report from the Overseas Development Institute used satellite tracking to monitor the methods of exploitation used by foreign fleets within the stretch of water from Senegal to Nigeria. It revealed fishing boats commonly transfer catches to other vessels in order to flout quota regulations. Catches are also transported via container ships that are subject to less stringent checks. Vessels from China, the Netherlands and Spain were identified.

Okafor-Yarwood studied Nigeria’s fisheries in 2015. “The department of fisheries cannot engage in pursuit because they do not own [an effective] patrol vessel,” she said. Their vessels have a range of no more than 200 nautical miles.

“The navy are trying, but their vessels are derelict... Then you find corrupt personnel taking backhanders to let certain things slide.” This includes fishing with finer-mesh nets to catch more fish.



In December 2018, the Nigerian government approved the purchase of two patrol boats for the department of fisheries “to monitor unreported, unregulated and illegal fishing by Chinese vessels”, according to local media outlet the New Telegraph. But Okafor-Yarwood is worried that the vessels will be manned by the navy, which has no expertise in collecting evidence of fisheries crimes.

### Fresh fish being frozen out

In the nineteenth century, Makoko was a tiny fishing village in the growing trading hub of Lagos. Economic dreamers from Nigeria’s coastal states and neighbouring countries journeyed to the area in search of wealth. But short on affordable land, they expanded onto water.

Today, more than 100,000 people call this stretch of water home. Their stilted shacks, a testament to Lagosian ingenuity, are considered illegal by the Nigerian government.

Located by the side of Nigeria’s most famous slum is Asejere Makoko fish market. On a Thursday evening, before the sun sets over Third Mainland Bridge, the ringing of commerce in this sprawling market can be heard from afar as journeymen, businesswomen and students buy their evening meal. Croaker, mackerel, tilapia and sharp-toothed barracuda are piled unceremoniously in plastic buckets.

Fishwives on the lookout for buyers slice and dice fish caught earlier by their husbands, while wheelbarrow boys carry assorted livestock parts, hollering their presence as they carve a path through the crowds.

Many of the fish caught, filleted and sold in Asejere, are destined for a stockpot of obe eja tutu (Nigerian fresh fish stew) and have come from the nearby ocean.

But 18-year-old Janet Hunukon has no fresh fish to flog. She is more concerned with enticing customers down a concrete alley nestled in the market’s belly where her ice block coolers sit full of frozen fish.

Farmed Chinese tilapia is popular because it is cheaper and more profitable than locally-caught fish. “We make more money from frozen,” said Hunukon. “If you buy a carton for 8,500 naira (US\$24) you can sell it for 12,000 naira (US\$33).”

In a country lacking constant electricity, keeping fish fresh often means selling at a loss. And Agnes Bentos, an astute 27-year-old, knows she too will have to diversify.

Her stall has a dismal half-dozen fish for sale. “They’ve gone out to sea but they haven’t seen anything,” she said about the local fishers who supply her trade. “Usually they are back by now.”

Bentos has made a living from the fresh fish business just as her great-great-grandmother did. “When my mother gave birth to me and I looked all around, fish was the first thing that I saw and they said this is where your work is,” she said.

Nigeria is Africa’s wealthiest economy, a status built on oil, finance and manufacturing. But this has not reverberated to all its citizens. Fishers earn US\$3 a day, and half the country lives on less than US\$1.90 a day – the international measure of extreme poverty.

Fishing, an industry employing 790,000 Nigerians, is a tradition now under threat from climate change and overfishing.

### The ‘ice kings’ of Ijora

A half-hour drive south from Makoko, the Ijora Olopa frozen food market in Lagos is an orderly line of refrigerated coolers.

Buyers navigate muddy paths in search of a bargain where the competition for foreign over local fish has become intense.

Fishmonger Sodiq Oluyede, 22, was energetically hacking up beefy tilapia on wooden blocks, before swiftly



chopping it into more manageable chunks for a well-heeled customer.

“Tilapia is imported plenty,” he said, this despite Nigeria’s Tilapia and Aquaculture Developers Association calling for an outright ban to protect the local aquaculture industry. “It is the one that is all over the market.”

Tilapia is a freshwater fish native to Africa. But according to statistics from its Ministry of Agriculture, China produced 1.86 million tonnes of farmed tilapia in 2016 – one third of total global output.

Today the majority of frozen tilapia sold whole and filleted in Ijora comes from China, the world’s biggest seafood exporter. In 2017, China exported more than US\$2 million worth of frozen tilapia to Nigeria.

“Let’s say you are doing a birthday party and you need a large crate of whole fish. For that you will pay 35,000 naira (US\$97) for local fish, while the imported fish is bigger and is 20,000 naira (\$55),” said Oluyede.

Omosho Razak, 29, heaved a giant barracuda onto his workbench as he waited for clients from abroad. Razak is one of a few benefitting from exports. “I have regular customers from China who come and buy and sell to places like Germany,” he smiled. “We sell it to Chinese men the same as locals. It is a fixed price. But the Chinese buy more.”

## From Nigeria to China and back again

Walk a few blocks behind Ijora’s market, crossing the city’s sprawling network of motorways, to Ijora’s gated cold storage facilities, and fishwives sit patiently waiting for a glimpse of wholesale sellers.

Juliet Ozalagba has worked as warehouse manager at Orbit Agro Exports for the past five years. “Tilapia is mostly coming from China, although a lot of it is actually

**61 species native to Nigeria are listed as either vulnerable or critically endangered.**

Nigerian tilapia. It is packaged in China then they sell it back to us again,” she said. Most would bristle at the logic. But because of China’s investment in machinery, it’s a common practice globally, including for fisheries in the United States, to ship fish to China for filleting and processing.

Then there is the problem of who fishes and how much they catch. “I would say only about 10% of fishing companies in Nigeria are owned by Nigerians,” added Ozalagba. She blames unchecked government fishing licences doled out in previous years. “They gave a lot of licences, especially to foreign companies,” said Ozalagba, as she sat at her desk registering transactions into an oversized ledger book. “There was a lot of overfishing... a lot of people went out of business.”

Stepping into Ozalagba’s cold room, primed at 28 degrees below zero, a walled fortress of cardboard boxes packed with frozen herring and mackerel bears Russian and Irish stamps.

Despite an official ban on imported mackerel in 2017, levels remained constant, with Russia, Iceland and Ireland continuing to export.

“What the government was trying to do, it cannot work,” Ozalagba’s colleague Jacob Alison added about import restrictions. “You cannot say everything stop. You have to reduce it gradually.” Alison believes overfishing has meant some species have entirely vanished, creating a gap filled by imports.

“Since the water is not controlled by anybody, people just come with their boats and take whatever they want,” he said.

Around 61 species native to Nigeria are listed as either vulnerable or critically endangered by research institute FishBase. There are “too many boats fishing for too few fish” said Dyhia Belhabib, a researcher at the University of British Columbia, who has been studying illegal fishing in West Africa for years. “China is easy to blame because it’s the one that is most visible ... but they are not the only ones. Bluefin for example are an endangered species that should not be caught, but it’s still caught even by the EU fleet.”



### The water belongs to us'

Drive another half hour south from Ijora and the Tincan-Apapa flyover curves across Liverpool Street. Underneath, the Apapa food market takes refuge. At the entrance, motorcycle boys convene for shade and gossip. But head past the rows of stalls selling *ata rodo* (scotch bonnet chillies) and curled dried fish, and you'll find fishwives loudly hawking their prized frozen goods.

On a Wednesday afternoon, the fresh catch market that springs to life at 7am was long over. But a few fishers could still be seen drinking iced beer as street children employed as porters whizzed past carrying pans of assorted vegetables and meat to impatient buyers. Around US\$3,500 worth of profit in sales of local fish is made daily at Apapa market, according to the Nigerian Institute for Oceanography and Marine Research.

When times were good, the fishers who bring their catch here only ventured to the open sea once a week. Now, "trawlers have scattered the water" according to Yekub Teiwo Degbeyin, president of the Liverpool Apapa Fishermen Association. "You can go more than four hours before you set your net."

At present his crew of five make just US\$11 on each trip. Each day the ocean they rely on is offering up less and further out.

"Formerly when we go we can [catch] almost 120 kilograms of fish, but these days it is very hard for us to see 40 kilograms," he said, adding that their outboard engines are shared amongst association members.

In 2012, already burdened by inflated costs on motors, many artisanal fishermen could not afford to keep their vessels running after Nigeria's federal government removed fuel subsidies. This diminished distant-water fishing by Nigerians, according to a 2015 report.

"We have resources here, the water belongs to us," said Degbeyin. He wants Nigerians to invest in commercial fishing to address the market dominance of foreign-owned vessels. "It is only our government. They have the money to buy trawlers – they did not buy. Our [wealthy] big men have the money to buy the trawlers – they did not buy."

### Diminishing returns, destructive measures

The desire to compete with internationally-owned trawlers is putting pressure on Nigeria's fisheries by increasing the incentives for local boats to use even more destructive catch methods.

"They go to areas that have been restricted to them, including where [oil] pipelines are, to fish, and obviously there is a risk of bursting the pipeline and the cycle continues," said King's College London researcher Okafor-Yarwood.

Pollution from Nigeria's oil industry and coastal sand dredging for megastructure developments are just part of a grim puzzle keeping fish away from local fishers.

There are fewer fish as oceans warm, according to a 2019 study in the journal *Science*. Oceans have absorbed 93% of the planet's heat trapped by greenhouse gases. "When you hear about climate mitigation, a lot of the things... are about agriculture and farming and much less on what they can do to support coastal states," said Okafor-Yarwood.

The Sahel region, which includes Nigeria, is "ground zero" in the battle against climate change, according to one UN official. Nigeria stands to see a 52% drop in landed fish catches by 2050 in the worst-case scenario predicted in a 2012 study on the possible impact of climate change on fisheries in 14 West African countries. That's equivalent to a loss of US\$87 million.

"Because of climate change in Nigeria, now along our coastal waters there is a weed that has come in called

sargassum,” said Anetekhai Martins Agenuma, a professor of fisheries at Lagos State University. “During the period that it is around, the fishermen are unable to go fishing, it destroys their nets, it creeps into their nets... We must be prepared for what is coming.”

To reduce reliance on imports, the Nigerian government has made aquaculture a high priority, with some success. The country is one of the top producers of farmed tilapia in Africa.

But local fish farmers worry they cannot compete against cheaper foreign goods. “If you allow importation to take place unregulated you will end up killing the local industry that is just coming up,” Martins Agenuma explained. “If you flood the market with fish of lower quality, and it’s cheaper than what is produced locally, then local production cannot go on.”

## Battling illegal fishing

Something else worries Peter Hammarstedt, captain of anti-illegal fishing ship the Bob Barker currently patrolling West African waters on behalf of conservation group Sea Shepherd.

“We must see illegal, unreported and unregulated [IUU] fishing within a broader maritime security context,” he said. The activities of pirate trawlers like the notorious Thunder are part of this context.

Claiming to belong to at least eight different nations, including Nigeria, Thunder pillaged the world’s oceans for almost a decade. As far back as 2013, Interpol gathered information about the trawler from Nigeria and Togo, another country it supposedly flew the flag of.

In 2015, Thunder was chased for three and a half months before its captain sank the vessel in São Tomé and Príncipe’s waters, aiming to obscure evidence for prosecution. By the time crew members were arrested, it had earned more than US\$60 million from illegal fishing.

“This is how badly something like corruption can ruin a nation’s resources.”

Nigeria had de-registered the vessel less than a month before it was caught.

“By changing name and flag constantly, illegal operators try to make it more difficult for authorities to track the movements of their vessels,” Hammarstedt said.

Including Thunder, two ships in Interpol’s most-wanted group “The Bandit 6” flew Nigeria’s flag without carrying any Nigerian crew members.

Coastal nations in the Gulf of Guinea are often targeted because they have no laws to cover waters beyond 200 nautical miles off their shores. “In many cases the registries have been chosen by the operators because of this lack of control of their vessels on the high seas, with no licence conditions or reporting requirements,” said Alistair McDonnell, a former criminal intelligence officer, part of the environment security team at Interpol. “Historically this has been a common occurrence globally and is one of the key corrections that have had to be made by several countries.”

## Turtles under threat

In 2017, Star Shrimper XXV was arrested by Liberian coastguards. It had no authorisation to fish in Liberian waters and was doing so without a legally-required device designed to help endangered turtles swim out of nets.

The ship is part of a massive fleet of 70 fishing vessels belonging to Nigerian company Atlantic Shrimpers – a company ultimately owned by Dutch fishing giant Cornelis Vrolijk. Its high-value shrimp is certified for export into American and European markets.

“Interestingly, the Star Shrimper XXV had turtle exclusion devices on board but were not using them when they were arrested,” said Hammarstedt. When Sea Shepherd boarded the vessel, they found some shrimp already boxed-up and set for export to Greece.

Illegal fishing can prove lucrative for sophisticated outfits. “Depending on the size of the vessel, an individual voyage can net between US\$3 to US\$5 million a trip,” said McDonnell. “Also there is a significant contamination issue if IUU fish is mixed in with legal fish and processed.”



### A breeding ground for crime and conflict

One in four catches from West African waters are hauled illegally. Okafor-Yarwood pointed out that Chinese vessels often move close to shore at night prowling for shrimp. “That’s supposed to be the breeding ground,” she said, “and that is when they clash with fishermen. According to the fisheries department, Nigeria makes about US\$29 million a year exporting shrimp and loses the equivalent on illegal shrimping.”

Dwindling catches have escalated tensions amongst local fishers. In 2017, 97 Nigerian fishers were killed in neighbouring Cameroon in a US\$300 dispute over fishing taxes. Officials have tended to view illegal fishing and subsequent imports as “victimless” rather than serious crimes that affect their communities.

“Corruption is a major concern,” said Agnes Ebo’o, regional organised crime observatory coordinator for Enact, a group supported by the EU to enhance Africa’s response to organised transnational crime. “I can’t imagine the port of Douala [in neighbouring Cameroon] or Lagos port authority turning away a vessel that has 500 tonnes

of fish just because they have ratified an agreement,” she said, referring to the Port State Measures Agreement, a law designed to stop trade in IUU fish by denying port access to suspected vessels.

Ebo’o added: “The one organ that is supposed to look into fisheries more closely is the Gulf of Guinea Commission, and that’s just a non-starter.”

Launched in 2001, almost two decades later the commission has failed to come up with a legally-binding framework for countries in the region to tackle illegal fishing. Staff did not respond to repeated requests for an interview. chinadialogue also contacted the Nigerian government for comment, including the Department of Fisheries and Maritime Administration and Safety Agency, but has had no response.

To know the fishing fleet size and number of licences given out each year is a struggle for most African countries, according to Ebo’o.

“This is how badly something like corruption can ruin a nation’s resources,” said Okafor-Yarwood. ☺

*Nosmot Gbadamosi is a freelance journalist covering West Africa.*

# 蓝色金融能够拯救海洋吗？

海洋保护区背后的驱动力究竟是地缘政治，还是保护意愿？

□ 弗雷德·皮尔斯



拉迪格岛，塞舌尔群岛

**环**境保护可能还处在蓝色革命的边缘。但是，今年人们已经开始越来越多地讨论利用企业融资，通过珊瑚礁、红树林、盐沼和海草等修复的海洋和沿海生态系统捕获大气中的碳。环保主义者称这种形式捕获和固定的碳为“蓝碳”。

越来越多的科学论证认为，蓝碳是其中一种最廉价的碳捕获手段。

而且利用沿海生态系统进行碳捕获还能带来不少其他的生态、经济和社会效益，比如改善渔业环境、带来更丰富的旅游体验、抵御潮汐和致命热带气旋带来的危害。

今年的联合国气候谈判缔约方大会(COP)将于智利首都圣地亚哥举行。也难怪东道国智利表示希望本次大会能成一场“蓝色缔约方大会”。

## “自然债务”掉期

美国非政府组织大自然保护协会(TNC)率先为海洋保护行动寻求私营资本赞助。该机构沿海湿地战略负责人艾米丽·兰蒂斯表示，蓝色金融是环保主义者面对的一个新领域。她指出，计算沿海生态系统碳含量的科学以及确保其保持稳定的方

法论，如今都趋于成熟。这让银行和投资者有信心投资于蓝碳并获得可交易碳信用额度或其他收益。

去年10月，TNC的推广项目、全球第一个蓝色债券——塞舌尔蓝色主权债券正式面世。塞舌尔共由115个岛屿组成，其中大部分被珊瑚礁环绕。这些岛都散布在三倍于加利福尼亚州面积的印度洋上。该国经济几乎全部依赖旅游业和渔业，政府也处于负债状态。

所以，TNC提出了“海洋自然债务”模式。在投资者、世界银行和全球环境基金的帮助下，TNC收购了塞舌尔、英国、法国、意大利和比利时等国总计2200万美元的债务，然后免去了一些债务，并同时降低了剩余债务的利率，延长了偿还日期。“节省”下来的资金则被放入一个信托基金，为保护塞舌尔海洋保护区、促进渔业和其他蓝色经济发展提供资金支持。世界银行把这种模式称之为“其他发展中小岛屿国家和沿海国家”的发展典范。

TNC更像是一个包装商，将数十个期货交易以同样的方式整合到一起，同时将金融家和政府带到一起，也融入TNC自己的专业生态知识。TNC蓝色债券副总经理罗伯特·韦睿表示：“这些交易会激励政府创建海洋保护区。此外，我们也为各国海洋区域制定计划，并与当地渔民等利益相关方进行合作。”

他强调，为了确保项目完整性，在政府和社会资本合作设立的信托基金董事会中，东道主国家政府将永远占有少数席位。

投资者能够获得稳定的投资回报，而且通常是由美国政府通过其

“  
9个负债深重的加勒比地区岛屿国家在等待参与这个海洋保护债务掉期计划，并且有望改善他们的旅游业和生态多样性。”

海外私人投资公司(OPIC)提供担保。而且这种投资带来的环境收益不仅能让投资者满意，让董事会感到沾沾自喜，而且无疑也是一种不错的公关手段。

韦睿说：“这可以说是一箭三雕。投资者获得了投资回报，我们保护了地方环境，而东道国政府的债务得到重组。”

按照联合国气候变化公约，蓝碳项目还能够吸引可交易的碳信用额度。在2015年各国提交的《巴黎协定》文件中，很少有国家直接提及蓝碳项目，但TNC却将其看作是一个日益增长的市场，而且已经制定了庞大的计划。韦睿表示：“我们希望5年内在20个国家完成20笔交易。”这些交易至少可以为400万平方公里海洋中的三分之一提供保护。“为此，我们至少要筹集30亿美元。”

蓝碳项目初期重点集中在加勒比地区。9个负债深重的岛屿国家在等待参与这个海洋保护债务掉期计划，并且有望改善他们的旅游业和生态多样性。打头阵的是格林纳达、圣卢西亚和巴巴多斯三个国家。而非洲肯尼亚和坦桑尼亚的红树林应该也会很快受到关注。

## 生态系统保险

并非所有项目都只关注蓝碳。兰蒂斯表示，蓝色金融的另外一个版本叫做“生态系统保险”，比如海景酒店经营者等依赖健康沿海生态环境系统的人出钱，保护珊瑚礁和红树林，防范沿海地区受到风暴侵袭。TNC已经建立了一个信托基金，保护墨西哥尤卡坦半岛滨海旅游区的珊瑚礁和海滩，使其免受风暴等自然灾害的袭击。此外，政府还将旅游税纳入信托基金中，用来支付珊瑚礁保护的常规费用，比如清除碎片和珊瑚的复植，以及飓风过后的大规模修复等等。

更复杂的混合金融交易允许投资者将碳捕获和落实企业社会责任目标结合起来，比如致力于达成涵盖了生物多样性、粮食安全、性别平等和海岸地区环境复原力等多个方面的联合国可持续发展目标。

虽然大部分蓝色金融项目都集中在热带地区，但也可以推广到其他任何地方。2019年1月，挪威资产管理公司Storebrand就推出了一款名为波罗的海蓝色债券(Baltic Blue Bond)的产品，为修复波罗的海这个欧洲污染最严重的海域生态环境提供资金支持，承诺通过安装新的污水处理设备或保护净化水域的海洋生态系统的方式治理污水和工业废水。

## 充满危机的海洋

一些生态学家认为，推广海洋保护金融的这种做法还是有些牵强，因为在海洋流动的水体中证明其环境效益要比在地球上难得多。



以蓝碳项目为例。你必须能够证明，红树林恢复之类的项目能与陆地森林一样可以将碳储存至少100年。但是，红树林面临很多源于自身的不可控威胁，比如潮汐会冲走幼苗或带来污染，或者是遭遇热带风暴，再或者是海平面持续上升会淹没所有沿海生态系统等等。

两年前，在澳大利亚召开的一个研讨会得出结论称，这些风险意味着“蓝碳项目……的投资回报率很低，而且可能不具备成本效益。”兰蒂斯说：“由于海平面上升，在选址时就必须非常小心谨慎。”

非政府组织湿地国际曾大力推广人工种植红树林，但是现在更倾向于为植物的自然播种和成长创造合适的沿海条件。该组织表示，过去许多红树林种植项目都没有取得成功。要么是选择了错误的品种，要么将幼苗种在了容易被潮汐冲走的地方。由于地方民众只是受雇种植树苗，而不是做护苗工作，所以后期的维护很糟糕。

今年4月，香港中文大学的李成业及其同事在一项全球调查报告中称，此类项目“长期来看通常不会使红树林面积或林木成活率显著提高”。而且，即便项目取得成功也依然存在不足之处。同一项研究发现，沿中国

海岸线广泛种植盐沼草这种外来植物破坏了当地潮汐泥潭，减少了鸟类东亚主要迁徙路线上的觅食地。

## 蓝色海水养殖

大自然保护协会（TNC）还有另外一种比恢复沿海生态系统更令人惊讶的金融工具，它打算直接参与到快速发展的全球海洋养殖产业中来。

众所周知，水产养殖（比如养虾池）是大面积破坏热带红树林的主要元凶。但TNC的思路其实很简单。目前全球人口仍然在不断增加，但食物浪费的现象却没有大幅减少的迹象，所以说世界需要更多的食物，而水产养殖在其中发挥着相当大的作用。TNC水产养殖战略负责人罗伯特·琼斯表示：“海洋占地球表面积的70%，但是只提供了2%的食物。”

水产养殖将会改变这种情况。琼斯说：“未来十年，我们估计大约会有1500亿到3000亿美元投入到水产养殖基础设施建设中去。”而其中大部分都将成为沿海生态系统的覆顶之灾。

琼斯表示，必须减少它们对环境的破坏，“更加可持续的水产养

殖系统面临很大的融资困难，所以我们希望培养公众对这种系统的兴趣”，利用蓝色金融工具，展示最佳实践，帮助人们找到投资此类系统的途径。TNC在今年5月发布的一份报告就探讨了“如何负责任地获得过度捕捞野生鱼种的替代品种”。

琼斯认为目前主要有3种途径。第一种是“再循环水产养殖”，也就是在陆地上利用污水工程的回收处理容器养殖鱼类。第二种是将沿海渔场迁到离海岸更远的地方，减少对沿海生态系统和水质的影响，目前这项措施已经在中国渤海地区开展起来。第三种是转而养殖海藻和贝类，因为它们不仅不会破坏沿海环境，还能修复沿海环境。

他说，中国沿海地区水产养殖总量占全球的60%，而这种技术对保护中国沿海生态系统或许格外有益。

如今，对全球许多沿海地区而言，水产养殖都变得越来越重要，所以说让水产养殖变得更具可持续性也许才是蓝色金融能够带来的最大效益。☺

弗雷德·皮尔斯，英国自由记者、自由撰稿人，同时也是耶鲁360的常驻作者



# Can blue finance save the oceans?

Blue bonds and other novel financial devices may fund conservation projects that have until now been off-limits

□ Fred Pearce

Conservation could be on the verge of a blue revolution. This year there is growing talk about using entrepreneurial finance to capture atmospheric carbon in revived marine and coastal ecosystems such as coral reefs, mangroves, salt marshes and sea grasses. Conservationists call it “blue carbon”.

There is increasing scientific conviction that blue carbon is one of the cheapest options for carbon capture. And that capturing carbon in coastal ecosystems brings with it a host of other ecological, economic and social benefits, from improved fisheries and richer tourism experiences to protection against rising tides and lethal tropical cyclones.

No wonder Chile, the host of this year’s conference of parties (COP) for the UN climate negotiations in Santiago, says it wants the event to be remembered as the “blue COP”.

## The ‘debt for nature’ swap

Blue finance is new territory for conservationists, says Emily Landis, coastal wetland strategy lead at The Nature Conservancy (TNC), a US-based NGO that has taken a lead in finding private funds for marine conservation. The science of counting tonnes of carbon in coastal ecosystems, and methodologies for making sure it stays put, are now both reaching maturity, she says, giving

banks and investors the confidence to stake money on the virtues of blue carbon in return for tradable carbon credits or other benefits.

TNC’s showcase project is the Seychelles Sovereign Blue Bond, the world’s first blue bond, which was launched last October. The nation comprises 115 islands, many of them coral fringed, spread across an area of the Indian Ocean three times the size of California. Its economy depends almost entirely on tourism and fisheries. And its government is in debt.

So TNC offered a “debt for marine nature” swap. With help from investors, the World Bank and its Global Environment Facility, TNC bought up US\$22 million of Seychelles debt owed to Britain, France, Italy and Belgium. It then excused some of the debt, while lowering interest rates and lengthening the payback period on the rest. The money “saved” goes into a trust fund that pays for conserving marine protected areas and promoting fisheries and other parts of the nation’s blue economy. The World Bank called it “a model for other small island developing states and coastal countries”.

TNC sees itself as a packager of dozens of future deals on the same lines, bringing financiers and governments together, but also bringing their own ecological expertise. “The deals incentivise governments to create marine protected areas. But we also design plans for the countries’ ocean areas, and do work engaging with stakeholders such

as local fishers,” says Robert Weary, deputy managing director for blue bonds at TNC.

He stresses that to ensure the integrity of the project, host governments will always be in a minority on the public-private trust fund boards that manage the cash.

Investors get a secure return on their capital, often insured by the US government through its Overseas Private Investment Corporation. They can also bask in an environmental payback, which may bring self-congratulatory smiles round the boardroom and is also undeniably good PR.

“It’s a triple bottom line,” says Weary. “They get their money back, we get conservation on the ground and the host government gets to restructure its debt.”

Under the UN Climate Convention, blue carbon projects can also attract tradable carbon credits. Very few countries mentioned blue carbon directly in their submissions to the Paris Agreement in 2015. But TNC nonetheless has big plans for cornering what it sees as a growing market. “We want to have 20 deals in place in 20 countries within five years,” says Weary. They could protect at least a third of marine sources in 4 million square kilometres of ocean. “To do that we need to raise US\$3 billion.”

It has a big initial focus in the Caribbean, with nine indebted island nations in line to swap that debt for marine conservation – and hopefully improve their tourism as well as their biodiversity. Grenada, St Lucia and Barbados head the queue. In Africa, the mangroves of Kenya and Tanzania may also soon benefit from attention.

## Ecosystem insurance

Not all projects will focus only on blue carbon. Another version of blue finance, says Landis, is “ecosystem insurance”, in which beach hoteliers or others dependent on healthy coastal ecosystems pay to protect the coral reefs and mangroves that provide coastal protection against storms. TNC has established a trust fund to protect reefs and beaches on the tourist coast of Mexico’s Yucatan peninsula, against hurricanes for instance. A tourist tax is channelled into the fund to pay for both routine reef maintenance,

**Proving environmental benefits in the fluid waters of an ocean is harder than on terra firma.**

such as removing debris and replanting species, and bigger repairs after hurricanes.

More complex hybrid financial deals allow investors to combine carbon capture with meeting corporate social responsibility, such as by contributing to the UN sustainable development goals, which cover everything from biodiversity to food security and gender equality to the resilience of coasts.

And while most blue finance projects have been in the tropics, they could spread elsewhere. In January, the Norwegian asset management company Storebrand unveiled a Baltic Blue Bond to finance ecological recovery in the Baltic, Europe’s most polluted sea. It promises to clean up sewage and industrial waste either by installing new treatment plants or protecting the marine ecosystems that also cleanse the waters.

## An ocean of risk?

Some ecologists see the ambitions for expanding blue conservation finance as far-fetched. Proving environmental benefits in the fluid waters of an ocean is harder than on terra firma.

Take blue carbon. You must be able to demonstrate that projects such as restoring mangroves will store carbon for at least 100 years, the same as for a forest on land. But those mangroves face many essentially uncontrollable threats, from tides that wash away seedlings or bring in pollution, to tropical storms, and the constant rise in sea levels that can drown any coastal ecosystem.

A workshop in Australia two years ago concluded that such risks meant “blue carbon projects ... are likely to have a low return on investment and may not be cost-effective.” Landis says: “You have to be really careful with the choice of your sites, because of sea-level rise.”

Many past projects to plant mangroves have not been successful, says Wetlands International, an NGO that once promoted planting but now instead favours creating the right coastal conditions for natural reseeded and growth. Either the wrong species were planted, or they were planted in places where the seedlings washed away. Aftercare was often poor when communities were paid for planting but not for looking after the results.

In a global survey, Shing Yip Lee of the Chinese University of Hong Kong, with colleagues, reported in April that such projects “generally did not result in significant long-term mangrove area increase or tree survivorship”. And there could be downsides even when projects were successful. The same study found that the widespread planting of cordgrass, an exotic salt marsh grass, along the Chinese coastline, had choked tidal mudflats and reduced foraging areas for migrating wildfowl on their crucial East Asia flyway.

### Blue aquaculture

TNC has another initiative up its finance sleeve that may be more surprising than restoring coastal ecosystems. It wants a hand in the fast-growing global business of marine aquaculture.

Aquaculture is notoriously the destroyer of large areas of tropical mangroves for prawn ponds. But TNC’s thinking is simple. With a still-rising population – and little sign of big declines in food waste – the world needs ever more food. And aquaculture is going to be a big part of that. “Oceans cover 70% of the planet, but provide only

2% of its food,” says Robert Jones, who leads aquaculture strategy for TNC.

Aquaculture is set to change that. “Over the next decade we estimate between US\$150 and US\$300 billion will be invested in building aquaculture infrastructure,” says Jones. Much of it will displace coastal ecosystems.

It has to be made less destructive of the environment, he says. “More sustainable aquaculture systems struggle for finance, so we want to build interest in them,” by using blue finance vehicles to showcase best practice and find ways for people to invest in it. TNC published a report in May looking at “responsible alternatives to overfished wild species.”

Jones sees three opportunities. One is called “recirculating aquaculture”, which means growing fish on land in tanks of recycled treated waste from sewage works. A second is moving coastal fish farms further offshore, as has started happening in China’s Bohai Sea, where their impacts on coastal ecosystems and water quality will be less. A third is switching to cultivation of seaweed and shellfish that can restore coastal environments rather than destroying them.

Such technology could have particular benefits for the troubled coastal ecosystems of China, home to 60% of the world’s aquaculture, he says.

In a world where aquaculture is of fast-growing importance along many coastlines, making it more sustainable could be the biggest benefit of all to be gained from blue finance. ☺

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# 塞拉利昂开始对过度捕捞“开刀”

一个月的工业禁渔令和国家鱼类资源评估能否帮助这个西非国家重拾对日益减少渔业资源的控制权？

□ 奥卢塞贡·奥甘德吉

**为**防止当地渔业资源进一步减少，在刚刚过去的4月，塞拉利昂针对工业捕鱼实施了为期一个月的“休渔期”。虽然出台一个月的禁渔令似乎不是什么难事，但塞拉利昂却耗费了好几十年的时间。

塞拉利昂是西非渔业资源最丰富的国家之一。但是从上世纪八十年代起，随着西班牙、韩国和苏联

的商业捕捞船相继进驻，当地鱼类资源开始出现大幅下滑。而如今，塞拉利昂工业捕鱼船队中有75%都来自中国。

合法的捕捞量非常惊人。一艘拖网渔船一天能够捕捞多达100吨的鱼类及贝类。拖网渔船通过在海底拖曳渔网，捕捞底栖鱼类和贝类。相比之下，面向当地市场的小型手

工捕鱼船队一年的总捕获量也不过17吨。

工业拖网渔船通常只支付少量的许可费用，但是捕获量却远超其申报量。他们利用渔网更大、捕捞范围更广的优势，将当地渔民挤出了市场。而且由于他们的渔获全部销往其他地区，所以也不会给当地经济带来什么好处。





船舶监控数据显示，2016 到 2017 年间，拖网作业小时数增加了 30% 以上，而情况还在继续恶化。

除此之外，非法、不报告和无人管制的捕捞活动（IUU）更是加剧了塞拉利昂的渔业危机。比如船队不公布渔获量，而且也不是所有船只都配备追踪设备。此外，塞拉利昂也缺乏执法所必须的资源，40 万平方公里的海域却只有一艘巡逻艇。

双拖捕捞就是指作业时两艘渔船合拖一张大网的捕捞方式。这种行为在塞拉利昂是非法的。但是今年 3 月英国广播公司（BBC）播出的一个纪录片显示，双拖捕捞不仅仍然存在，而且非常严重。

以上种种非法行为侵占了塞拉利昂的政府收入，也阻碍了当地民众发展渔业的机会。据估算，塞拉利昂每年的渔业收入潜力约为 5000 多万美元，但是由于非法捕捞和海域监管不力，实际收入只有不到 1800 万美元。外国渔业船队就是利用了

塞拉利昂渔业执法不力的漏洞，给当地渔业造成了负面的影响。

### 一场海底追逐战

珀西瓦尔·肖沃斯教授从事塞拉利昂渔业相关工作已经 40 多年了。他多次警告称，塞拉利昂的“领海一直都在遭受拖网渔船的入侵”。

肖沃斯教授同时也是塞拉利昂大学海洋生物学和海洋学研究所的负责人。他表示：“这些渔船来来往往，带走了大量的鱼类资源。（拖网捕捞）这种讨厌的捕捞方式导致塞拉利昂政府损失了数百万美元……每艘拖网渔船每天能够捕鱼 100 吨……想象一下，每天这些渔船总共能捕多少……”

三十多年来，塞拉利昂海域的工业捕捞活动从未停止过。一个月的禁渔令也许不会产生太大的效果，但是它至少是进步的开始。与此同时，该国政府也在努力估算海域中剩余的鱼类资源量。

肖沃斯教授就参与了这次盘点。他表示，目前有迹象显示，塞拉利昂海域的物种丰度、数量和价值都出现了下滑。

他说：“我认为目前的情况已经很严重了，政府必须立即采取行动。去年，世界银行（为我们）开展了一个项目……对海域中的鱼类资源进行了一次新的估算……初步（结果）显示，我们已经接近临界水平。”

据报道，除了出台禁渔令，塞拉利昂政府还宣布拒绝为船上卫生条件较差的中国船队续签捕鱼许可证。虽然这些渔船大多数都是合法的，但是其中很多并没有上报他们的渔获量，而且也没有得到有效的监管。这些渔船被指控违反鱼类资源保护条例，比如利用网眼较小、甚至是蚊帐一类的拖网捕捞小鱼。

### 遏制非法捕捞

在这一个月的禁渔期内，塞拉



塞拉利昂首都弗里敦以东 50 公里的通博手工鱼港

利昂议会还批准了两项联合国协定，包括增加对监管较为规范的欧盟市场的鱼类出口，以及禁止在塞拉利昂海域进行非法、不报告和无管制的捕捞活动。

第一个协定是为了更好地遵循联合国有关国际保护和管理的措施，可以确保悬挂塞拉利昂国旗在公海上活动的渔船，一旦违法都将受到制裁。此外，协定还将确保塞拉利昂与联合国粮农组织（Food and Agriculture Organisation）交换船只类型、名称、注册号码、注册港口、船东姓名与地址等信息。

第二个协定涉及保护和管理塞拉利昂与邻国海域中的高度洄游鱼类种群。

塞拉利昂渔业与海洋资源部长艾玛·科瓦-贾洛对议会表示，批准这两项法规能够保证塞拉利昂的渔获顺利进入欧盟市场，而欧盟市场良好的监管氛围可以为塞拉利昂带来真正的经济收益。

## 渔业资源延续的机会

围绕禁渔令及其有效性有很多争论。肖沃斯很支持这种做法。他认为政府这样做是因为压力越来越大，而且“这个举动让不少国家也感到很吃惊”。

塞拉利昂首都弗里敦以东 50 公里有一个叫做通博（Tombo）手工鱼

港，约翰·奥比是这里的港务监督长。他也表示了同样的观点。他对这个禁令表示了肯定，说渔民们已经注意到了这一个月里的变化，比如现在捕获的不少鱼都是有卵的，这正是鱼群继续繁衍生息、鱼类资源量改善的一个积极信号。

奥比说：“我们希望明年的禁渔期能增加到两个月，让所有塞拉利昂人都能从自己海洋资源中获益。我很感谢艾玛部长，因为是她呼吁我们就她想要采取的任何一项措施进行讨论。这在以前是从来没有过的。”

但是，同样是来自通博的手工渔民穆罕默德·曼萨雷却表示，并没有觉得禁渔令带来多大变化，因为他仍然要到数英里之外的海域才能有好的渔获。“也许从长远来看禁渔令能够产生一些影响。我在海上呆了四天，今天刚刚上岸，看看我都捞到了些什么。”说着便指了指地上的一小堆鱼，“根本没什么变化。”

## 放眼未来

如今，一个月的禁渔期已经结束，塞拉利昂也在等待上述国际协定是否会产生影响。在这期间，渔业政策制定者还可以采取好几种行动措施。比如他们可以采用 2017 年的渔船国有化建议，并要求所有渔获都必须卸载到塞拉利昂境内渔

港。他们还可以考虑采纳世界银行的建议，将捕捞量限制在鱼类种群的更替水平之内，通过每年颁发和公布捕捞许可证情况来提高行业透明度。

虽然目前塞拉利昂渔业部已经开始公布获得许可的船只名单，但是肖沃斯认为，在向政府提交相关建议之前，还需要一段时间来完成鱼类种群资源量的估算。他希望政府能够控制授权渔船的数量和大小，并划定海上绝对禁渔区，帮助鱼类繁衍。

但是目前还有一个涉及面更大也更急切的问题。港务监督长奥比表示：“渔业部中有一些腐败分子，他们正在背地里破坏部长的决定。”他说，渔业部中曾经有人向外发送了一份信，鼓励那些为国际市场购买鱼产品的公司在禁渔令开始后的一周就开始进行交易。

目前，通博地区的渔民仍然坚持他们的立场，并希望直接听到渔业部长或者塞拉利昂副总统的回复。而奥比表示，当地渔民一直以来不得不“只为出口商”工作，这只不过是一个例子罢了。☺

奥卢塞贡·奥甘德吉，尼日利亚的记者，他一直是塞拉利昂的《康科德时报》和国际数据集团的新闻服务提供报道

# Sierra Leone takes steps to tackle overfishing

Can a one-month industrial fishing ban and population count help the nation regain control of its dwindling fish?

□ Olusegun Ogundeji

April was a “closed season” for industrial fishing in Sierra Leone, in a bid to prevent further depletion of dwindling fish populations. But as simple as introducing a month-long ban may seem, it has taken the country decades to get there.

Sierra Leone has one of the richest fisheries in West Africa. But populations have plummeted since the 1980s when fleets from countries as far away as Spain, Korea and the then Soviet Union began to exploit the waters. Today, it is China that accounts for 75% of Sierra Leone’s industrialised fleet.

The volumes of fish being caught legally are huge. Just one trawler can catch up to 100 tonnes in a day by dragging a net along the ocean floor to harvest bottom-dwelling species of fish and shellfish. Small-scale artisanal fishing fleets, in comparison, which fish to feed local communities, catch around just 17 tonnes a year.

Industrial trawlers often pay small licence fees and take more fish than they declare. They use their bigger nets and wider access to outcompete local fishermen, and they provide little to no benefit to the local economy since their catches are sold elsewhere.

With vessel monitoring data showing trawling hours to have increased by more than 30% between 2016 and 2017, the situation is set to get worse.

Sierra Leone’s troubles have been further compounded by IUU – vessels engaging in behaviour that is illegal, unregulated and unreported. Catches are going undeclared, not all boats are fitted with tracking technology, and the country lacks the resources to enforce any regulations, with just a single patrol boat for the 400,000 square kilometres it has to monitor.

Pair trawling, where two vessels together drag a huge net behind them, is illegal in Sierra Leone but a BBC documentary released in March showed it remains a big problem.

All of this is taking away national revenue and preventing local people from developing their own industry. It is estimated that Sierra Leone has the potential to earn more than US\$50 million a year from its fisheries, yet it ends up with less than \$18 million because of illegal fishing and lack of policing. China’s fishing fleets are taking advantage of weak enforcement in Sierra Leone with devastating effect.

## A race to the bottom

Professor Percival Showers, who has worked in the national fishing industry for more than 40 years, has repeatedly warned that Sierra Leone’s “territorial waters have been invaded” by trawlers.



“The vessels come and carry huge tonnes of fish and go away,” says Showers, who heads the Institute of Marine Biology and Oceanography at the University of Sierra Leone. “This [bottom trawling] method of fishing causes the government to lose millions of dollars ... A single trawler can catch up to 100 tonnes per day ... Just imagine how much [the fleet] catches per day.”

Industrial fishing has not been paused in Sierra Leonean waters for over three decades. A one-month ban may not achieve much, but it could be the start of progress, together with a national effort to estimate the amount of fish left in the water.

So far, according to Showers, who is leading the stocktake, there are indications that Sierra Leone’s waters are losing species richness, volume and value.

“I would say they are at critical levels and the government has to do something immediately,” he says. “Last year, the World Bank brought a project [for us] to ... come [up] with new fresh estimate of the level of fish in the water ... The preliminary [finding] shows that we are approaching a critical level.”

Along with the ban comes a reported refusal by the government to renew licences for the Chinese fleet on the

basis of poor sanitation onboard their vessels. While most of their fishing vessels are legal, many do not report their catches and are not regulated effectively. Their vessels are accused of breaking fish stock protection rules, such as by using smaller mesh sizes in their trawler nets, and even mosquito nets, to catch younger fish.

### Curbing illegal practices

During the course of the industrial-fishing-free month, parliament ratified two UN agreements which seek to increase fish exports to the EU market, which is better regulated, and to prevent IUU fishing in Sierra Leone waters.

The first is an agreement to promote compliance with UN international conservation and management measures. It will ensure that fishing vessels flying Sierra Leone’s flag on the high seas face sanctions if they break the law. It will also see Sierra Leone exchange information with the UN’s Food and Agriculture Organisation, including vessel type, name, registration number, port of registry, and owner name and address.

The second relates to the conservation and management



of the highly migratory fish populations Sierra Leone shares with neighbouring countries.

Sierra Leone's minister of fisheries and marine resources, Emma Kowa-Jalloh, told parliament that the ratification of these two measures would guarantee a fair ride for fish caught in Sierra Leone into the EU market, which because of its better regulations would benefit the country financially.

### A chance to breed

There has been much debate surrounding the ban and its effectiveness. Showers approves of the action, which he thinks was imposed due to mounting pressure. “[It] surprised many countries around the world,” he said.

John Obie, the harbourmaster at the Tombo artisanal fishing landing site, 50 kilometres east of the capital, Freetown, shares this view. He praised the ban, saying fishers have noticed changes within the one-month period as most of the fish now caught could be seen with eggs, a hopeful sign for the replenishment of populations.

“We are looking forward to a two-month ban by next year so that every Sierra Leonean would benefit from our waters,” says Obie. “I appreciate the minister a lot because she does call us to negotiate on any decision she wants to take. This has not been happening before now.”

But one of the artisanal fishermen at Tombo, Mohamed Mansaray, said he is yet to see the impact of the ban as he still has to travel miles from shore to get a good catch. “Perhaps, in the long run, we will see the impact. I just landed today, after taking about four days on the sea. Look at the catch I have,” he said, pointing to a small heap of fish on the ground. “No changes.”

### The road ahead

With the ban now over and Sierra Leone waiting to see whether ratification of international agreements will have any effect, fishery policymakers have several possible courses of action. They could endorse 2017 recommendations to nationalise the ownership of fishing vessels and require all catches to be landed on home shores. They could also consider implementing World Bank recommendations to limit fishing to within replacement levels, and to issue and publish fishing licenses each year to increase transparency.

Though the fishery ministry has started publishing a list of licensed vessels, Showers says more time is needed for the stock estimate to be completed before any recommendations can be made to the government. He wants to see the government control the number and size of the vessels they licence and impose a no-go area offshore where fish can breed.

But there is a wider and more immediate concern. Harbourmaster Obie claims “there are some corrupt officials in the ministry that are undermining the decision of the minister.” He says a letter was sent by someone in the ministry encouraging companies that buy fish for foreign markets to start trading just one week into the month-long ban.

Though fishers in Tombo stood their ground, waiting to hear directly from the minister or the vice-president, Obie says this is just one example of how fishers have been subjected to “only working for the exporters”. ↻

*A journalist from Nigeria, Olusegun has reported for Sierra Leone's Concord Times and the International Data Group news service.*



# 一位普利策奖摄影师眼中的气候变化

Pulitzer Prize-winning photographer on the casualties of climate change

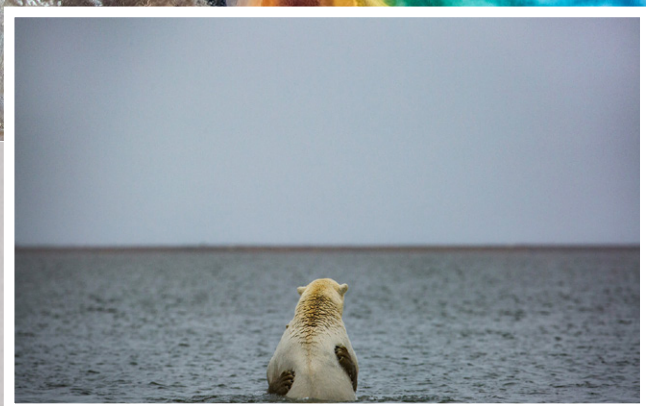
贝丝·沃尔克 Beth Walker



乔什·哈纳 Josh Haner

乔什·哈纳的镜头在天空和海洋捕捉到了气候变化直击人心的影响

Josh Haner's images capture the visceral loss of climate change from the air and sea



两只北极熊在北极卡托维克村附近的浅水区大打出手  
*Two polar bears roughhouse in the shallow waters near the Arctic village of Kaktovik.*



塔卜维娜·考卡特凯会在基里巴斯斯塔拉瓦布阿里基岛的北岸照料红树林，“我不想大海吞噬我的土地。”  
*Tabwena Kaokatekai tends to her mangrove trees on the north shore of Buariki, Kiribati.*



3岁的刘佳丽（音译）在家门外腾格尔沙漠的沙丘上玩耍。随着荒漠化的加速，中国政府正尝试对缺水地区的居民实施大规模的重新安排  
*Liu Jiali, three years old, plays in the dunes outside her home in the Tengger Desert, a smaller expanse within the Gobi Desert.*



庙湖现在居住着来自西北的7000名移民，在中国，他们被称为“气候移民”  
*Miaomiao Lake is now home to 7,000 Hui Muslims, moved from their ancestral lands in China's northwest.*



科学家认为，随着海洋温度上升导致藻类减少，海鬣蜥可能会重新吸收自己的一部分的骨骼，以缩小体型，控制饮食，提高生存机会。  
*A marine iguana in the Galápagos Islands of Ecuador.*



# 《1986》播客系列

《1986》系列播客节目由“可持续亚洲”和“中外对话”联合制作。  
1986 is produced by Sustainable Asia in collaboration with chinadialogue.

## 《中国与全球鱼类现状》

中国在全球渔业政策及管理占据着怎样的地位？如何应对过度捕捞的问题？

嘉宾：  
/ 玛格特斯泰尔斯, Oceana  
/ 伊冯·萨多维博士, 香港大学  
/ 约翰·弥米卡基斯, 环境保护基金会

### China and the global state of fish

What is China's place in the global network of policies regulating the world's fisheries? And what is the country trying to do to break the cycle of overfishing?

Guests:  
/ Margot Stiles, Oceana  
/ Dr Yvonne Sadovy, The University of Hong Kong  
/ John Mimikakis, Environmental Defense Fund

## EP.1



## 《中国的过度捕捞史》

为了打破过度捕捞的恶性循环、促进渔业可持续发展，中国政府正在采取哪些措施？

嘉宾：  
/ 曹玲, 上海交通大学  
/ 王亚民, 山东大学海洋学院  
/ 约翰·弥米卡基斯, 美国环保协会  
/ 周薇, 绿色和平中国

### The history of overfishing in China

What are the Chinese authorities doing to break the cycle of overfishing and promote sustainability in the sector?

Guests:  
/ Cao Ling, Shanghai Jiao Tong University  
/ Wang Yamin, Shandong Ocean University  
/ John Mimikakis, Environmental Defense Fund  
/ Zhou Wei, Greenpeace China

## EP.2



## 《中国庞大的水产养殖业》

中国水产养殖业造成的过度捕捞问题该如何解决？如何在兼顾环境保护的前提下继续为世界提供食物？

嘉宾：  
/ 王松林, 青岛海洋生态协会、Ocean Outcomes 中国项目  
/ 伊冯·萨多维博士, 香港大学  
/ 周薇, 绿色和平  
/ 韩寒, 海南智渔 (China Blue) 可持续科技发展研究中心

### China's massive aquaculture industry

What are the solutions for China's aquaculture industry? Can China's aquaculture industry continue to feed the world without devastating wild fish populations and causing pollution?

Guests:  
/ Wang Songlin, Qingdao Marine Conservation Society and Ocean Outcomes  
/ Dr. Yvonne Sadovy, University of Hong Kong  
/ Zhou Wei, Greenpeace China  
/ Han Han, China Blue Sustainability Institute

## EP.3



## 《中国沿海海域的海洋牧场》

“海洋牧场”等措施对于恢复中国正在枯竭的鱼类种群，修复其受损的海洋生态系统是否有帮助呢？

嘉宾：  
/ 约翰·弥米卡基斯, 环境保护基金会  
/ 张春, 中外对话  
/ 田涛, 大连大学  
/ 孙斌, 上海大学  
/ 王松林, 青岛海洋生态研究会、Ocean Outcomes 中国项目

### Marine ranching off China's coast

Can "marine ranching" and other practices help replenish China's depleted fish populations and restore its damaged marine ecosystems for the benefit of both people and nature?

Guests:  
/ John Mimikakis, Environmental Defense Fund  
/ Zhang Chun, chinadialogue.net  
/ Tian Tao, Dalian University  
/ Sun Bin, Shanghai University  
/ Wang Songlin, Qingdao Marine Conservation Society and China Ocean Outcomes

## EP.4



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