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Global breeding programme benefits wild panda conservation



Giant panda conservation is often considered a global success story. Through habitat protection and a breeding programme that is bolstered by over 20 zoos worldwide, panda populations have been increasing and their extinction risk level was downgraded from 'endangered' to 'vulnerable' in 2016 (ref. 1). However, a series of recent investigative reports published by the *New York Times*^{2–4} raised doubts over the integrity of the global panda breeding programme. Although we commend the investigation for highlighting some issues that have previously been overlooked, we contend that this reporting misrepresents the breeding programme and its conservation effects. Indeed, most of the critiques of the reports were based on practices that were occurring more than two decades ago, despite being presented as the current situation.

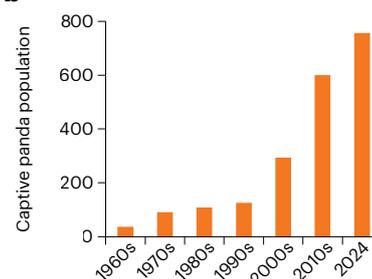
Overall, the reports criticize the panda breeding programme as being primarily driven by financial gain and political leverage, and argue that the programme has failed to fulfil its commitments to panda reintroduction and uphold animal welfare during artificial breeding procedures. Although China has indeed leveraged the programme to foster international collaborations and participating zoos have benefited from increased visitations due to pandas, the programme has nonetheless made substantial contributions to the conservation of giant pandas in the wild. Here, we clarify three key points to rectify these misconceptions.

First, as each participating zoo has contributed about US \$1 million to conservation funding annually², the global panda breeding programme has substantially enhanced giant panda conservation efforts in China. About 90% of this international fund is allocated to conservation activities, facilities and habitat restoration. Moreover, the global visibility of giant pandas – enhanced by their presence in participating zoos – has, in part, reinforced the Chinese government's commitment to panda conservation, and prompted substantial national investments in nature reserves,

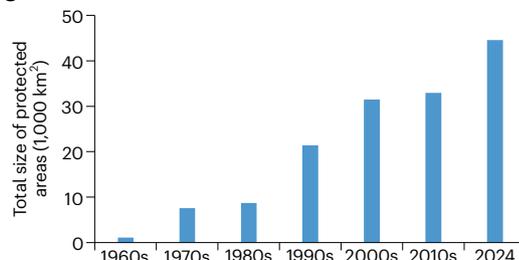
a Zoos outside of China that hold pandas



b



c



d

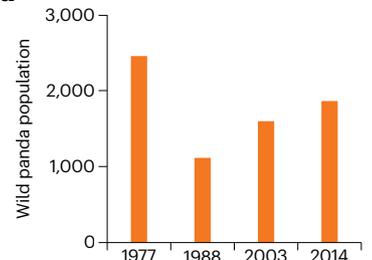


Fig. 1 | The ex situ and in situ conservation of giant pandas. **a**, Distribution of zoos participating in the global panda breeding programme outside of China. **b**, The captive giant panda population over time. **c**, The total size of protected areas for giant panda conservation in China over time. **d**, Estimate of the wild giant panda population over time. Based on data from 1960 to present from the China Conservation and Research Center for Giant Panda (**a**, **b**); on boundary data of protected areas designated for giant panda conservation over time (**c**); and four national panda surveys led by China's National Forestry and Grassland Administration (**d**).

deforestation prevention and habitat restoration. For example, China has expanded the network of protected areas for giant panda conservation from 1,460 km² in the 1960s to 33,562 km² today (Fig. 1), which covers 85% of panda habitat. China's financial commitment to these efforts far surpasses the funding from the global breeding programme: the annual allocation of about \$255 million is nearly ten times the amount from the programme⁵. All of this has contributed to the recovery of the wild panda population, which has increased from 1,114 individuals in the 1980s to 1,864 in the 2010s¹.

Second, although only 12 captive-born giant pandas have been released into the wild thus far⁶ – a small number relative to the 757 pandas currently in captivity⁷ – this should not be viewed as a failure. On the contrary, the

programme is actively experimenting with new rewilding approaches, and invests over \$1.2 million annually in reintroduction efforts. Through decades of collaborations among zoos worldwide, the breeding programme has managed to establish a self-sustaining and steadily growing captive population that, since the early 2000s, has not relied on sourcing wild-caught individuals⁸ (Fig. 1). This healthy and growing captive panda population provides insurance against extinction and serves as the foundation for reintroduction efforts initiated in 2003 (ref. 9). Following initial setbacks – including the death of the first captive-born reintroduced panda in 2006, which stalled progress owing to public backlash – the first successful reintroduction occurred in 2012, using a new rewilding approach based on maternal-guided wild

training. Since then, 10 additional captive-born pandas have been reintroduced, eight of which survive (yielding a relatively high total survival rate of 75% (9/12)), alongside more reintroductions planned for the future⁶.

Third, although it is reasonable to raise welfare concerns associated with artificial insemination (especially during the early stages of the technique's development), it is also important to acknowledge the considerable strides made to enhance panda welfare under the global breeding programme. Rigorous protocols are now in place to minimize discomfort and ensure panda health and well-being, including increasing the size and naturalness of their enclosures. These advancements have contributed to a much longer lifespan (an average of between 25 and 30 years) of captive pandas, as compared with their wild counterparts (which generally live around 15 to 20 years)¹⁰. Moreover, the growth of the captive panda population and improvements in care have reduced reliance on artificial insemination for breeding: approximately 70% of captive pandas are now born from natural mating. Complementing this trend, researchers have devised a novel approach to enhance genetic diversity and reproductive welfare, which further reduces the need for artificial insemination for breeding. This new method temporarily releases captive female giant pandas to natural habitat during breeding seasons to allow natural mating with wild males. After mating, the pregnant females are then brought back to captivity to safely give birth and raise their cubs. This breeding method

has resulted in 12 offspring to date, which has enhanced the genetic diversity of the captive population while aligning breeding practices more closely with pandas' natural instincts.

Despite past challenges, the global panda breeding programme stands at the forefront of modern wildlife conservation and reintroduction efforts. International zoo partnerships under the programme have not only generated funding for in situ conservation but also catalysed scientific breakthroughs. These efforts have established a viable captive panda population, enabled reintroduction and contributed to natural habitat recovery, which have helped to bring the giant panda back from the brink of extinction. The achievements of the global panda breeding programme demonstrate the immense potential of sustained global collaboration, scientific innovation, and integrated in situ and ex situ conservation strategies to safeguard endangered species and combat the global biodiversity crisis of our time.

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Competing interests

The authors declare no competing interests.

Additional information

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