



The fragile Sundarbans mangrove ecosystem (dark green in this satellite image) is threatened by increased development in Bangladesh.

Edited by Jennifer Sills

## Saving the Sundarbans from development

The Padma Bridge construction project in Bangladesh is near completion (1). The 6.15-km-long bridge, costing nearly US\$4 billion (2), will connect the northern and eastern parts of the country to the southwest Khulna division, which includes the Sundarbans—the world’s largest mangrove forest stretching over 10,000 km<sup>2</sup> in Bangladesh and India (3). The bridge, when commissioned, is expected to boost Bangladesh’s gross domestic product by as much as 1.2% (4), but it will also put the fragile Sundarbans mangrove ecosystem at risk.

Bangladesh has already lost the Chakaria Sundarbans, one of the oldest mangrove forests in South and Southeast Asia, as a result of the rise of commercially profitable shrimp farming (5). The same could happen in the Khulna division, where the bridge construction has exacerbated increasing land prices and expanding development of real estate, fisheries, tourism, and resorts near the Sundarbans (6). The bridge will also facilitate greater access to the busy Mongla Port and likely accelerate forest clearing and land grabbing in the area.

Although economic gains are important, ecological and environmental issues must be considered in long-term development plans. The Sundarbans mangroves region is a UN Educational, Scientific, and Cultural Organization World Heritage Site, a Ramsar site, and a Class 3 tiger conservation landscape of global priority (7). At least 355

species of birds, 49 species of mammals (including the globally endangered Bengal tiger), 87 species of reptiles, 14 amphibians, 291 species of fish, and 334 species of plants have been recorded in the area (3). The Sundarbans region is situated on the highly active Ganges-Brahmaputra delta, the third largest river basin in the world after the Amazon and the Congo (8). One-third of the Sundarbans consists of rivers and streams, which act as a nursery for fish and other aquatic life, including Asia’s last two remaining freshwater dolphin species: the Ganges river dolphin and Irrawaddy dolphin (9).

More than 3.5 million people depend on the Sundarbans ecosystem for their livelihood and income (10). The world-renowned mangrove forest regularly protects human lives and habitation from cyclones and tidal surges (11). The Sundarbans region also plays an important role in regulating key ecological processes, including carbon sequestration, storage, and cycling (12).

The Sundarbans forest already faces many challenges, including sea-level rise, salinity intrusion, habitat degradation, and biodiversity loss (3). The government’s plan to establish a coal-based power plant has also threatened the region’s sustainability (11). Once traffic begins entering Khulna by way of the Padma Bridge, the risks will only increase. The Government of Bangladesh should provide clear guidelines for development, including strict regulations on land clearing, landfilling, waste disposal, and wastewater discharge. To protect the Sundarbans, any development in the region should also comply with policies that conserve local ecosystems and livelihoods.

Sharif A. Mukul<sup>1,2\*</sup>, Saleemul Huq<sup>2,3</sup>, John Herbohn<sup>1,4</sup>, Nathalie Seddon<sup>5</sup>, William F. Laurance<sup>6</sup>

<sup>1</sup>Tropical Forests and People Research Centre,

University of the Sunshine Coast, Maroochydore DC, QLD 4558, Australia. <sup>2</sup>International Centre for Climate Change and Development, Dhaka 1229, Bangladesh. <sup>3</sup>International Institute for Environment and Development, London WC1X 8NH, UK. <sup>4</sup>Sustainable Minerals Institute, The University of Queensland, Brisbane, QLD 4072, Australia. <sup>5</sup>Nature-based Solutions Initiative, Department of Zoology, University of Oxford, Oxford OX1 3SZ, UK. <sup>6</sup>Centre for Tropical Environmental and Sustainability Science, James Cook University, Cairns, QLD 4878, Australia.

\*Corresponding author. Email: smukul@usc.edu.au

### REFERENCES AND NOTES

1. Government of Bangladesh, “Padma multipurpose bridge project” (2015); [www.padmabridge.gov.bd](http://www.padmabridge.gov.bd).
2. J. J. Hamre *et al.*, “Padma bridge (construction)” (Reconnecting Asia, 2020).
3. S. A. Mukul *et al.*, *Sci. Tot. Environ.* **663**, 830 (2019).
4. J. Islam, “Padma Bridge will up GDP by 1.2 pc,” *The Daily Observer* (2015).
5. S. R. Biswas *et al.*, *Wetlands Ecol. Manage.* **17**, 365 (2009).
6. M. Anam *et al.*, “Padma bridge—new lifeline of development,” *The Daily Star* (2016).
7. M. M. H. Khan *et al.*, “Bangladesh tiger action plan, 2018–2017” (Bangladesh Forest Department, Dhaka, 2018).
8. G. Rasul, *Int. J. River Basin Manage.* **13**, 387 (2015).
9. B. D. Smith *et al.*, *Mar. Mammal Sci.* **22**, 527 (2006).
10. M. S. Uddin *et al.*, *Ecosyst. Serv.* **5**, e88 (2013).
11. P. Schwartzstein, “This vanishing forest protects the coasts—and lives—of two countries,” *National Geographic* (2019).
12. D. C. Donato *et al.*, *Nat. Geosci.* **4**, 293 (2011).

10.1126/science.abb9448

## Aggregating data from COVID-19 trials

In their Policy Forum “A strategic approach to COVID-19 vaccine R&D” (29 May, p. 948), L. Corey *et al.* discuss the importance of coordinating randomized clinical trial (RCT) protocols to facilitate the evaluation of coronavirus

# Science

## Saving the Sundarbans from development

Sharif A. Mukul, Saleemul Huq, John Herbohn, Nathalie Seddon and William F. Laurance

*Science* **368** (6496), 1198.  
DOI: 10.1126/science.abb9448

|               |  |
|---------------|--|
| ARTICLE TOOLS | <a href="http://science.sciencemag.org/content/368/6496/1198.1">http://science.sciencemag.org/content/368/6496/1198.1</a>  |
| REFERENCES    | This article cites 6 articles, 0 of which you can access for free<br><a href="http://science.sciencemag.org/content/368/6496/1198.1#BIBL">http://science.sciencemag.org/content/368/6496/1198.1#BIBL</a> |
| PERMISSIONS   | <a href="http://www.sciencemag.org/help/reprints-and-permissions">http://www.sciencemag.org/help/reprints-and-permissions</a>  |

Use of this article is subject to the [Terms of Service](#)

---

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science* is a registered trademark of AAAS.

Copyright © 2020 The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works