



The Vulnerable fishing cat (*Prionailurus viverrinus*) has been seen in an area India has cleared for development.

Edited by Jennifer Sills

Development projects jeopardize India's forests

As climate change intensifies, India, one of the world's most megadiverse countries, has put its forests and wildlife in jeopardy. Between January and May, India's Ministry of Environment, Forest, and Climate Change gave environmental clearance (i.e., approval to proceed) to 73 projects located within 10 km of a forest, including some planned near forests with protected status (1). Protected areas and forests can effectively mitigate the effects of urbanization and anthropogenic pressure (2), but human land use along their boundaries reduces their effectiveness (3), especially if the activities include permanent infrastructure (4). Low- and middle-income countries like India should mitigate environmental damage caused by development by imposing more stringent rules and regulations for environmental clearances.

India's approved projects include industrial construction, roadways, mining, and new infrastructure. Such development could lead to permanent changes in land use, land cover, and topography. Environmental impact assessment reports for 23 of the proposals found species in the vicinity of the project area that were designated as Schedule I (the most vulnerable) in India's Wildlife (Protection) Act (5), yet environmental clearances were granted regardless. For example, one approved project [IA/

AS/IND2/92824/2007 in (1)] outlines a plan to conduct extension drilling and test hydrocarbons 1.34 km from Dibru-Saikhowa National park (6). An environmental impact assessment report confirms the presence of species in the area such as the Critically Endangered white-rumped vulture (*Gyps bengalensis*) (7), the Vulnerable fishing cat (*Prionailurus viverrinus*) (8), and the Endangered western hoolock gibbon (*Hoolock hoolock*) (9), all of which are classified under Schedule I (5). Oil and fossil fuel extraction in forests drives wildlife mortality, habitat loss, and fragmentation as well as carbon sequestration (10), putting these species in further danger.

Development projects that threaten vulnerable species are antithetical to the United Nations' Sustainable Development Goals (11). Megadiverse countries like India should focus on sustainable development and formulate environment-centered development policies. Project approval decisions should rely on the results of mandatory and more stringent environmental impact assessments, which consider areas in the immediate vicinity of protected areas and forests in addition to the designated project area. More research is needed to assess the efficacy of the mitigation measures mentioned in environmental impact assessment reports. India could conserve forests and protect the habitats of vulnerable species by restricting development to urban areas and industrial zones.

Suvarna Khadakkar
RTM Nagpur University, Nagpur 440022, India.
Email: suvarmask17@gmail.com

REFERENCES AND NOTES

1. Ministry of Environment, Forest, and Climate Change, Government of India, Parivesh (2020); <http://parivesh.nic.in/>. To search for approved projects, click on the "Environment clearance" icon at the bottom of the page. Then click "Dashboard" on the blue bar. Select 2020 in the "Year of Submission" dropdown and search. Then click "More info" under the box labeled "EC granted." The resulting table provides details for 200 approved projects, 73 of which are within 10 km of a forest.
2. L. Naughton-Treves, M. Holland, K. Brandon, *Annu. Rev. Environ. Resour.* **30**, 219 (2005).
3. S. Leroux, J. Kerr, *Conserv. Biol.* **27**, 166 (2012).
4. A. Hansen *et al.*, *BioScience* **61**, 363 (2011).
5. Government of India, The Wildlife (Protection) Act, 1972 (1972); www.indiacode.nic.in/handle/123456789/1726.
6. Oil India Limited, "EIA for extension drilling and testing of hydrocarbons at 7 (seven) locations under Dibru-Saikhowa National Park area: NorthWest of Baghjan PML under Tinsukia District" (2018); <http://environmentclearance.nic.in/writereaddata/EIA/28022019DSI931GBEIAReport-ERDLocationsText.pdf>.
7. BirdLife International, *Gyps bengalensis* (The IUCN Red List of Threatened Species, 2017).
8. S. Mukherjee *et al.*, *Prionailurus viverrinus* (The IUCN Red List of Threatened Species, 2016).
9. W. Brockelman, S. Molur, T. Giessmann, *Hoolock hoolock* (The IUCN Red List of Threatened Species, 2019).
10. N. Jones, L. Pejchar, J. Kiesecker, *BioScience* **65**, 290 (2015).
11. United Nations, Department of Economic and Social Affairs, Sustainable Development (https://sdgs.un.org/#goal_section).

10.1126/science.abd4305

North African forests falling to charcoal

In North Africa, illegal man-made fires are on the rise (1), driven in large part by a growing demand for charcoal (2), which is

produced by burning wood in underground pits. In the past, local people collected dead wood on a small scale, and larger operations were regulated by the government (3). However, as the demand for charcoal and the price for which it sells have increased (2), illegal efforts to produce it have multiplied (4). North African countries must address the resulting fires to protect forest ecosystems, which play an important role in the welfare of both urban and rural people and harbor unique and sensitive biodiversity (5).

The religious feast of the sacrifice (Eid al-Adha)—an important celebration in the Islamic religion during which a sheep is sacrificed—increases the demand for charcoal, which is required for traditional meat grilling (6). This year in Algeria, the number of fires peaked on 27 July (4 days before Eid al-Adha) with 66 simultaneous fires in 20 provinces (7). The next few years could bring substantial environmental damage because Eid al-Adha will take place during the summer, when forest fires peak and become difficult to contain (8).

The business model for producing charcoal is ominous for the health of North Africa's forests because the revenue from the charcoal sold increases with the size of the exploited area. The fires are likely to deteriorate the soil, intensify desertification, and exacerbate climate change (9). A Mediterranean forest requires several decades to recover and reach its equilibrium (10). Climate change has already increased the total area burned by wildfire in the region (11), and the increased anthropogenic disturbance related to charcoal production could threaten the resilience of the environment, the economy, and human well-being (12).

Local authorities should increase enforcement to curtail illegal charcoal production, which often takes place at night and across wide geographic areas (2). Educating the public about the value of these forests and facilitating collaborations between scientists, the government, and rural and urban residents would also be effective strategies. If residents were motivated to report fires and other environmental crimes, authorities could take prompt action for the benefit of the environment.

Rassim Khelifa

Department of Zoology, University of British Columbia, Vancouver, BC V6T 1Z4, Canada.
Email: rassimkhefifa@gmail.com

REFERENCES AND NOTES

- O. Meddour-Sahar *et al.*, *Méditerranée* **121**, 33 (2013).
- H. Faouzi, *Les Cahiers d'Outre-Mer* **262**, 155 (2013).

- L. Auclair, M. R. Saïdi, *Forêt Méditerranéenne* **23**, 133 (2002) [in French].
- H. Hadri, M. Guellouz, *Forests and Rangelands in the Near East Region: Facts and Figures* (FAO Office for the Near East, Cairo, 2011); www.fao.org/3/a-i12557e.pdf.
- L. Croitoru, *For. Pol. Econ.* **9**, 536 (2007).
- M. Gagaoua, H.-R. Boudechicha, *J. Ethnic Foods* **5**, 83 (2018).
- "Incendies en Algérie: Plus de 8.000 hectares brûlés, le président ordonne une enquête," *Le Figaro* (2020) [in French].
- O. Meddour-Sahar, R. Meddour, V. Leone, R. Lovreglio, A. Derridj, *iForest-Biogeosci. Forestry* **6**, 247 (2013).
- R. Alkama, A. Cescatti, *Science* **351**, 600 (2016).
- A. Rodrigo, J. Retana, F. X. Picó, *Ecology* **85**, 716 (2004).
- C. Giannakopoulos *et al.*, *Glob. Planet. Change* **68**, 209 (2009).
- D. M. Bowman *et al.*, *Science* **324**, 481 (2009).

10.1126/science.abe2315

Protect Iran's Zagros forests from wildfires

Since 21 March, more than 374 wildfires have spread through the oak forests in Iran's Zagros Mountains (1), burning more than 50,000 ha (2), compared with the average of 15,000 ha of Iranian forests that burn annually in wildfires (3). These deciduous forests, which include trees that are more than 400 years old (4), cover an area of 6 million hectares and are home to a wide variety of wildlife (5), including wolves, Persian squirrels, the endangered Persian leopard (6), and the Persian fallow deer, which was once thought to be extinct (5). Because the Zagros oak trees grow slowly (2), it could take 100 years for the burned areas to recover (7). The Zagros forests feed more than 50% of Iran's livestock (8) and include some of the country's most important riverine sources of fresh water (8). Given their valuable biodiversity and strategic importance, the Iranian government must address the recent wildfires.

The head of Iran's Department of Environment has announced that the magnifying effects of glass and plastic waste caused the wildfires (9). However, some environmentalists and researchers suspect that local people may be setting fires, either deliberately (3, 7) or accidentally (10). Deforestation and illegal logging also contribute to wildfire ignition and spread (5, 7). The Iranian government should clearly identify the causes of these frequent fires.

The Iranian forests are protected by the Forests, Range, and Watershed Management Organization, which has provincial centers monitoring their local territories (11). If deliberate illegal action is the cause of the increased wildfires, policy-makers should introduce national legislation to implement more stringent

regulations against starting fires and to increase enforcement in the Zagros Mountains to prevent illegal logging and brush burning. The government should identify and prioritize the trees and endangered species that are at risk, improve fire planning, and streamline fire responses by learning from other countries with similar experiences, such as Australia (12). Without these actions, wildfires will continue to destroy trees, increase endangered species' risk of extinction, and deprive the Iranian people of crucial resources.

Mostafa Kheshti

Shandong University, Jinan, China.
Email: kheshti@sdu.edu.cn

REFERENCES AND NOTES

- "Are the fires intentional?" *Aftab Yazd* (2020); www.pishkhan.com/news/183021/ [in Farsi].
- "Ashes of the Zagros forests in the flames of negligence," *Islamic Republic News Agency* (2020); www.irna.ir/news/83850837/ [in Farsi].
- "Why are Zagros forests burning?" *Tabnak* (2020); www.tabnak.ir/fa/news/982140/ [in Farsi].
- M. A. Haqshenas, "Zagros oak forests would cry out if they could!" *Tehran Times* (2018).
- "Saving Zagros forests must become first priority," *Tehran Times* (2019).
- A. B. Stein, "Panthera pardus (amended version of 2019 assessment)" (IUCN Red List of Threatened Species, 2020).
- "Zagros in the fire of human fires," *Mashregh News* (2020); www.mashreghnews.ir/news/1089354/ [in Farsi].
- G. Tavangar, "Homelessness of Zagros species with the fire of negligence," *Kayhan* (2020); www.kayhan.ir/fa/news/191035/ [in Farsi].
- "Kalantari: Less than 1,500 hectares of forest have been set on fire," *Khabar Online* (2020); www.khabaronline.ir/news/1397174/ [in Farsi].
- "The story of recent fires in Iran: Intentional or unintentional?" *Borna News* (2020); www.borna.news/fa/tiny/news-1006988/ [in Farsi].
- "Executive policies of Zagros forest ecosystem management," *Zistonline* (2019); www.zistonline.com/news/80630/share/do.
- R. M. Kooyman *et al.*, *Science* **367**, 1083 (2020).

10.1126/science.abd2967

ERRATA

Erratum for the Research Article: "Global wildlife trade across the tree of life," by B. R. Scheffers *et al.*, *Science* **369, eabd8164 (2020).** Published online 24 July 2020; 10.1126/science.abd8164

Erratum for the Report: "Estimating the burden of SARS-CoV-2 in France," by H. Salje *et al.*, *Science* **368, eabd4246 (2020).** Published online 26 June 2020; 10.1126/science.abd4246

Erratum for the Report "Forest microclimate dynamics drive plant responses to warming" by F. Zellweger *et al.*, *Science* **368, eabd3881 (2020).** Published online 26 June 2020; 10.1126/science.abd3881

Erratum for the Report: "The global tree restoration potential" by J.-F. Bastin *et al.*, *Science* **368, eabc8905 (2020).** Published online 29 May 2020; 10.1126/science.abc8905

North African forests falling to charcoal

Rassim Khelifa

Science **369** (6507), 1065-1066.
DOI: 10.1126/science.abe2315

ARTICLE TOOLS

<http://science.sciencemag.org/content/369/6507/1065.2>

REFERENCES

This article cites 10 articles, 2 of which you can access for free
<http://science.sciencemag.org/content/369/6507/1065.2#BIBL>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

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