LETTERS

Afghanistan's unexplored mountains could hold hidden biodiversity.

Edited by **Jennifer Sills**

Biodiversity research in a changing Afghanistan

In the second half of the 20th century, 90% of major armed conflicts took place in countries that fall in biodiversity hotspots (*1*). Afghanistan is not considered a biodiversity hotspot (*2*), but this designation may be inaccurate. Biodiversity research is thus desperately needed to add to our knowledge of the region.

Afghanistan has suffered from more than 40 years of political instability and civil war, hindering far-reaching conservation research activities (*3*). The golden age of Afghanistan's biodiversity research took place decades ago (*4*, *5*), before the advent of DNA techniques used to evaluate biodiversity today. Afghanistan's biodiversity research is mostly based on museum collections assembled in the 1970s or before (*6*–*8*). Given the country's unique position, which is influenced by the Palearctic and Oriental biogeographical realms, and its habitat diversity, Afghanistan may hold a high level of hidden species and genetic diversity that are crucial for understanding the historical biogeography of Asia. Mountains have driven past speciation events worldwide (*9*), yet the mostly mountainous Afghanistan has remained unexplored (*6*).

The first Afghan national park was established only 12 years ago, and others have followed, providing hope that wildlife research and conservation would contribute to the stability of the country (*3*, *10*). Although these national parks are a step forward, we still have little information about the distribution of the country's diverse biota or the threats that they face. Many species are likely in circumstances similar to the endemic, critically endangered mountain salamander, *Paradactylodon* (*Afghanodon*) *mustersi*, which is virtually unprotected and at increased risk due to human activities (*11*).

Despite the ongoing unrest in Afghanistan (*12*), the Afghan government must prioritize biodiversity research. Taking each local security situation into account, the government should work together with local universities and conservation organizations to bridge gaps in biodiversity research and seek support from the international scientific community. Protected areas should be expanded, and local communities should be supported and empowered to safeguard them. Scientists should collaborate to reestablish and update natural history museum collections, identify species-rich areas, assemble comprehensive checklists of biota, and create national distribution atlases for all known species, especially those that are endangered.

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Developing countries must fund local research

Conversations on the imperialistic undertones in global research funding overlook the lack of support for researchers in developing countries from their own governments (*1*). Research spending by developing countries is often meager to nonexistent (*2*), resulting in an overreliance on foreign grants and international collaborations. The lack of alignment between research priorities of foreign funders and developing nations can lead to local research activities that do not benefit local communities. For that reason, member states of the African Union recently agreed to spend 1% of their gross domestic product (GDP) on research and development (R&D) to promote responsibility and ownership of their own economic growth (*3*). This positive commitment is an encouraging start, but developing nations will not succeed with good science policy alone; they also need a supporting research funding infrastructure and strong financial commitments.

Zambia's past efforts demonstrate how good intentions can fall short. Despite launching an ambitious science policy in 1996 that established the National Science and Technology Council and mandated an R&D spending of 3% of GDP, Zambia lags in innovation and spent less than 0.6% on R&D in 2014 (*4*). In 2016, a Zambian parliamentary committee attributed the lack of success to a lack of legislation, harmonized planning and coordination, and interaction between scientists and policy-makers, as well as disjointed funding infrastructure for R&D (*4*).

Zimbabwe's President Emmerson Mnangagwa recently signed the promising Manpower Planning and Development Amendment Act of 2020, which provides a funding infrastructure plan, into law (*5*). The legislation will establish a Manpower Development Fund and stimulate the business sector to support the Innovation and Industrialization Fund. It also outlines plans for several academies of science that are similar to the Chinese Academy of Sciences and South Korea's Institute for Basic Science. However, because the Act does not include any strong commitments to R&D spending, the infrastructure could stall without financial support.

Rwanda has shown how strong financial commitments underpin R&D success. To ensure that it meets its target of 1% of the GDP by 2024, the country has established two national research and innovation funds, integrated R&D spending into the national budget, and stated target funds for basic and applied research in priority areas. Rwanda has also promoted partnerships between the public and the business sector and offered incentives for the business sector to invest in R&D (*6*). Such strong commitment to R&D has already yielded results: Rwanda developed innovative strategies to combat the COVID-19 pandemic (*7*).

For science and technology to drive economic growth, developing countries need ambitious science policies, concrete R&D funding commitments, and a supporting funding infrastructure. African countries should study the challenges faced by Zambia, the gaps in Zimbabwe's laws, and the model set by Rwanda as they formulate their own R&D policies.

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Science transcends national borders

The US Endless Frontier Act, which recently passed in the Senate as part of the "US Innovation and Competition Act" (*1*), has been lauded by the academic community [e.g., (*2*, *3*)] for its massive increase in science and technology funding—a proposed total of US$250 billion over the next 5 years (*4*). However, this proposed legislation is not solely about funding science and technology. As J. Mervis explains in his News story "Senate panel backs funding ban on US researchers in Chinese talent programs" (13 May, https://scim.ag/3vCoxOF), Section 303 of the bill prohibits scholars who participate in China's national talent program from receiving US national funding, serving as the primary applicant in US federal grants, and, "to the extent possible," being listed on US federal grant applications. Even beyond Section 303, the bill is unequivocally framed as a response to the "China threat," building on the Cold War rhetoric of space races and iron curtains. The Act intends to set the United States on a path to out-innovate, out-produce, and out-compete China in strategic emerging industries. Healthy competition between prosperous nation-states should be welcomed on the global stage, but the latent Cold War rhetoric is at best misplaced and at worst counterproductive.

An extreme competitive focus, in addition to increasing anti-Asian sentiment within the United States (*5*), could stifle scientific and policy collaboration between the United States and China in the face of much larger existential threats, such as global climate change. China and the United States share a multitude of common causes, such as helping the world end poverty, halting biodiversity loss, and promoting peace and development. Rousing nationalistic sentiment at the expense of scientific cooperation may be a fleeting strategy for bipartisanism within the halls of Congress, but in the long run, it is a lose-lose proposition for the planet. The world has witnessed the consequences of politicization associated with the COVID-19 pandemic, with soaring cases and fatalities alongside anti-scientific denialism and increasing anti-Asian sentiment. The politicization of science inherent in the Endless Frontier Act is not a productive path forward. The so-called "endless frontier" that science is said to enable can only be realized if it does not stop at national borders.

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