



Madagascar's ploughshare tortoise faces extinction in the wild.

Edited by Jennifer Sills

Madagascar: Crime threatens biodiversity

Madagascar's new president, Andry Rajoelina, was elected on a promise to improve living standards for the millions who live in poverty (1). To achieve this goal, he must address the declining rule of law. Madagascar fell eight places in the Rule of Law Index between 2016 and 2018 (2), and it is 155th of 180 countries listed in the Corruption Perceptions Index (3). Weak governance slows development by reducing the willingness of citizens and foreign companies to invest (4). Since his election, President Rajoelina has expressed a desire to make Madagascar a model of conservation and a destination for ecotourism (5). The solutions to the country's poverty—strengthening Madagascar's government and reducing crime—are also key to turning around the country's precipitous loss of biodiversity.

The threats faced by Madagascar's protected areas and species are increasingly linked to criminal networks and corruption (6, 7). Illegal extraction of high-valued timber from protected areas greatly increased a decade ago (8). Repeated gem mining “rushes” and gold mining threaten the integrity of protected areas in the east (9); in the west, migrants escaping drought in the south are rapidly clearing theoretically protected forests for large-scale cultivation (10). Many species are illegally traded internationally (7) [with the ploughshare tortoise facing imminent extinction in the wild (11)].

Madagascar, like all nations, has the

right to use its natural resource wealth, but the increasing exploitation of protected areas and species without regard to national laws does not benefit the country. Illegal activities, especially mining, are often linked to local violence and insecurity (12), discouraging legitimate investment. If urgent action is not taken, some of Madagascar's most iconic habitats and species may reach a point of no return. By restoring the rule of law, President Rajoelina would help deliver a Madagascar with both an inclusive, growing economy and effective biodiversity conservation.

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Empowering Latina scientists

The #MeToo movement and other women's empowerment movements have raised awareness about hostile conditions for women scientists, stimulating revisions of norms of conduct for scientific societies and institutions (1, 2). Specific problems confronted by female researchers, however, are often deeply rooted in national and regional culture. Latin American women scientists, for example, are immersed in a society where culturally ingrained masculine pride (“machismo”) is

normalized (3, 4) and deeply intertwined with the scientific endeavor.

Dismissal of women's contributions, patronizing behavior, and objectification of women's bodies are entrenched attitudes in Latin American society (5), often extending into academic settings (6). Machismo promotes sexist attitudes that often pass unnoticed. Latina scientists grow accustomed to unfair working conditions, where they must guard themselves from unwanted sexual advances and risk retaliation and intimidation from colleagues they do not appease (7). These factors contribute notably to Latinas leaving academia (8).

Allowing constructive conversations is a foundational issue for improving conditions for Latina scientists. For example, when a scientist known for sexist behavior (9) was invited as plenary speaker at a Colombian scientific conference, there was no avenue for Latina researchers to express their concerns and know they would be respected. Blatant sexism that arises from machismo precludes discussions to promote inclusion.

Latinas are striving to be heard, as reflected by an unprecedented nationwide movement to demand nonsexist education in Chile (10) and a surge of Women in Science symposia across the region [e.g., (11, 12)]. We urge scientists and institutions across Latin America to be aware of the damage that machismo, and its denial, inflicts on women and the enterprise of science as a whole and to be proactive about recognizing, confronting, and penalizing inappropriate behaviors. Latinas and their allies in science, technology, engineering, and mathematics demand changes to promote a respectful environment for all.

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SUPPLEMENTARY MATERIALS

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Assessing cell-based animal proteins

As our ability to produce meat ("Agencies carve up cultured meat," *News In Brief*, 30 November 2018, p. 977) and seafood by cell culture (1) has increased, the U.S. Food and Drug Administration (FDA) has been called upon to provide stronger and clearer guidelines to biotechnology start-ups on safety and ethical concerns (2–5). In a 2017 report, the National Academy of Sciences named cell-based animal proteins as an area with "high growth potential" in the field of biosciences and recommended a regulatory framework to govern the new industry (6). However, the FDA did not highlight cell-based ingredients for direct consumption as a new case for regulatory approval; instead, the agency determined that the existing guidelines thoroughly covered adventitious agents, cell-based ingredients, and novel manufacturing processes (7). This



Evaluating the safety of lab-grown meat, like this burger made from cultured beef, falls to scientists.

puts the onus on the scientific community to determine the safety of these products.

According to the FDA (7), both cultured cells, as constituents of food, and their corresponding metabolites have been inspected with well-established tests and have a long history of safe consumption. Examples of the former ingredients include the direct consumption of cultured bacterial, fungal, and algal cells (7). As suggested by the FDA, most cultured cells and metabolites are certified through the Generally Recognized as Safe (GRAS) notification program. Rather than direct submission to the FDA, the GRAS program relies on the scientific community to show expert consensus on the safety of the ingredients' intended use (7).

It is, therefore, both an opportunity and a responsibility for the scientific community to explore and investigate related frameworks for the rigorous evaluation of potential hazards and benefits of cell-based animal proteins. Future research on the foreseeable risks and preventive controls could focus on the possible metabolites of concern and potential microbial contamination, with the aid of quantitative modeling and structural simulation. As part of their safety review, scientists should find ways to determine whether cell-based meat and fish meet the criteria for "substantial equivalence" to or "no material difference" from conventional food products; these concepts (8) are accepted by policy-makers such as the FDA (9), the World Health Organization (10), the Food and Agriculture Organization of the United Nations (10), and the Organisation for Economic Co-operation and Development of Europe (11).

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