BRI Horizon Scan:
Issues related to groundwater pumping and the expansion of Traditional Chinese Medicine

Amy Hinsley

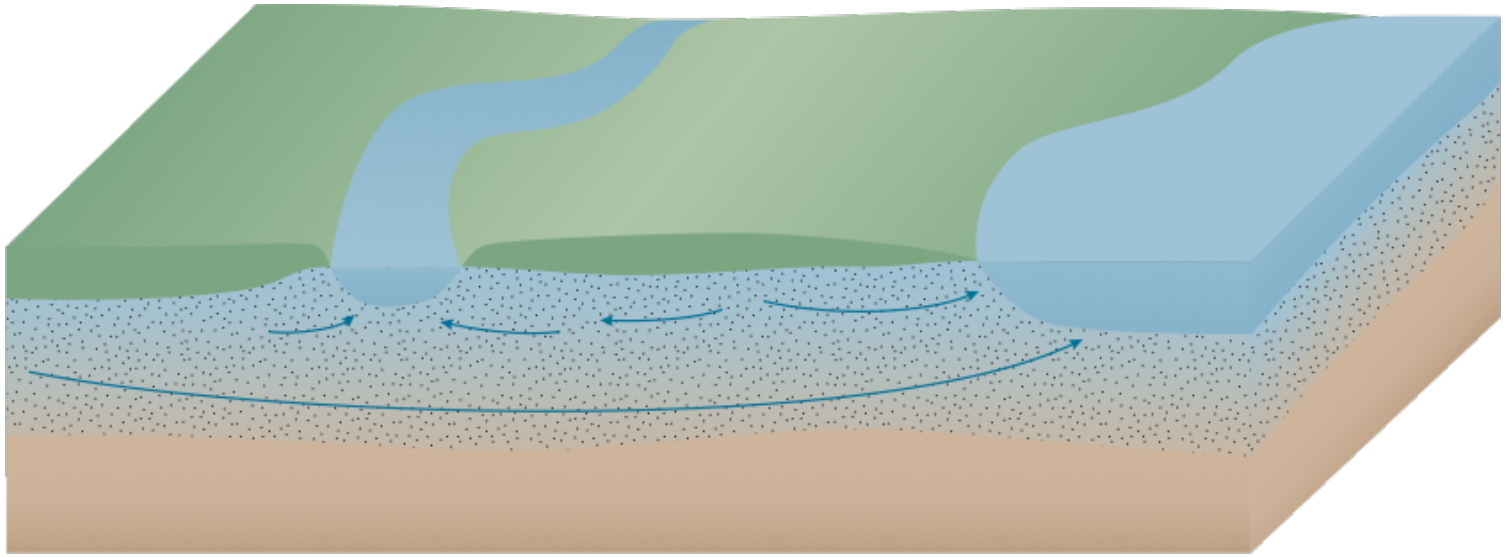
Senior Research Fellow,

Wildlife Conservation Research Unit (WildCRU)/Worcester College,

University of Oxford

@orchiddelirium amy.hinsley@zoo.ox.ac.uk

Issue: Groundwater Pumping Threatening the Viability of Freshwater Ecosystems



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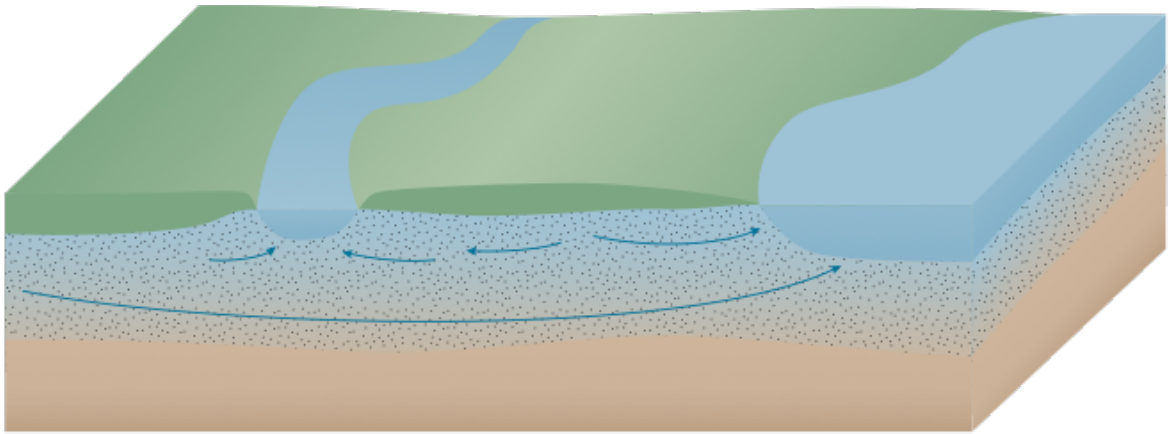
Issue: Groundwater Pumping Threatening the Viability of Freshwater Ecosystems

Damming has been identified as a threat to freshwater ecosystems worldwide, but relatively little attention has been paid to threats from groundwater pumping



Recent paper:
de Graaf, I.E., Gleeson, T., van Beek, L.R., Sutanudjaja, E.H. and Bierkens, M.F., 2019. Environmental flow limits to global groundwater pumping. *Nature*, *574*(7776), pp.90-94.

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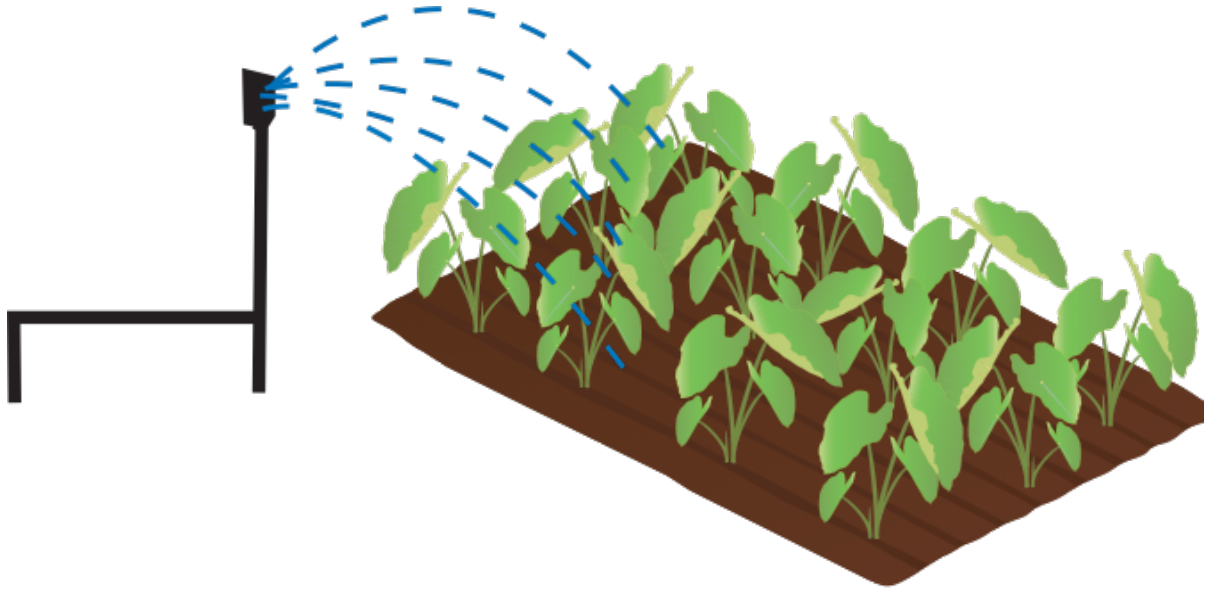
Issue: Groundwater Pumping Threatening the Viability of Freshwater Ecosystems

Groundwater pumping is used all over the world to provide water for irrigation. 70% of groundwater pumping is for agriculture.



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Issue: Groundwater Pumping Threatening the Viability of Freshwater Ecosystems

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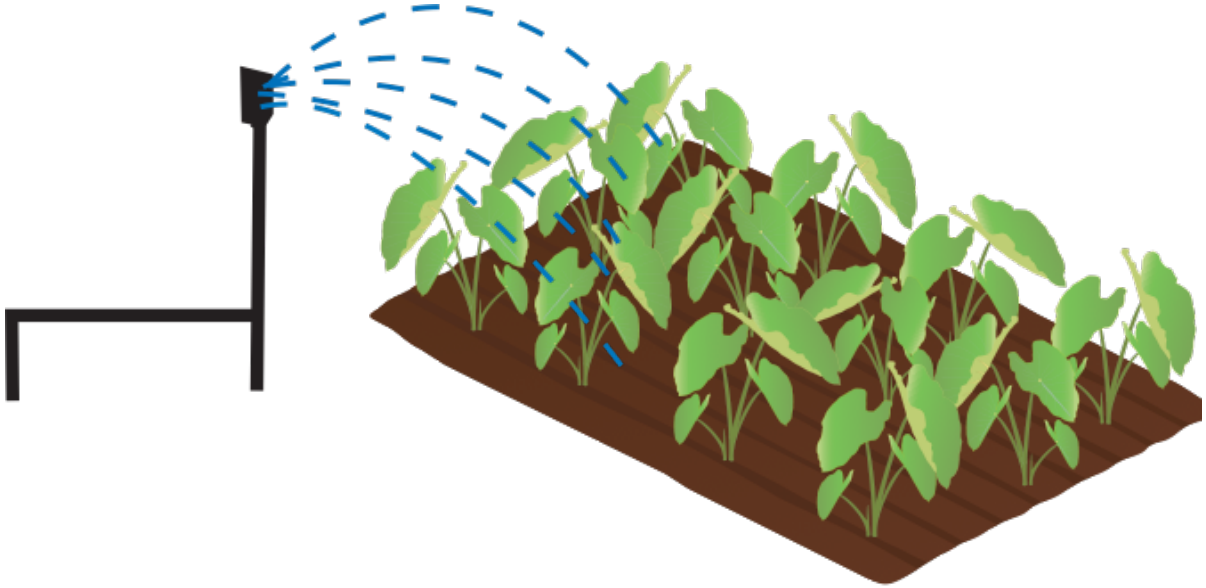
It also provides water for construction (e.g. cement production), mining and many other activities linked to infrastructure development.



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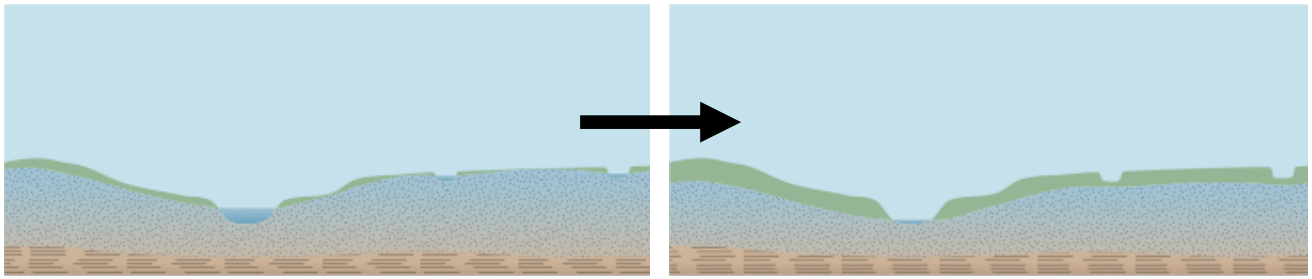
Issue: Groundwater Pumping Threatening the Viability of Freshwater Ecosystems

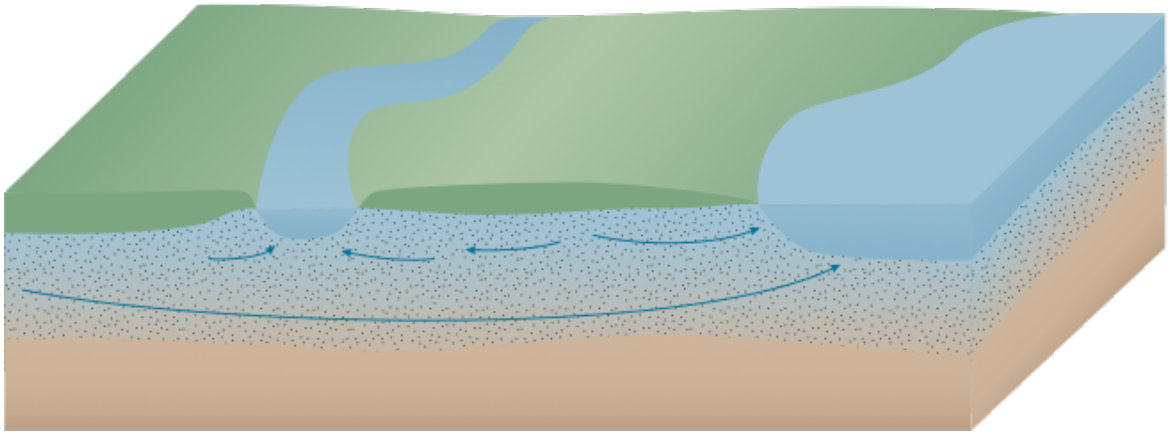
Where extraction is higher than recharge from rainfall or rivers, groundwater levels can drop.

Serious impacts on ‘baseflow’, which brings fresh, oxygenated water into rivers, streams, lakes and wetlands.

Two key impacts:

- **Reduction of baseflow**
  - Aquatic ecosystems dry out or are no longer viable
- **Reversal of flow**
  - Surface water flows into groundwater, bringing with it pesticides, heavy metals etc.





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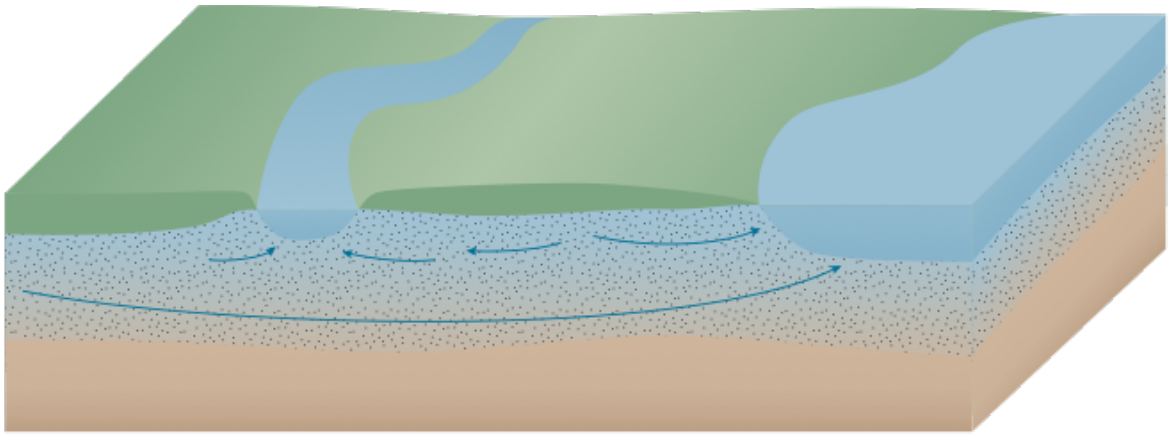
Issue: Groundwater Pumping Threatening the Viability of Freshwater Ecosystems

This not a new issue, or one caused by the BRI.

"*Our results show that environmental flow limits caused by groundwater pumping have already been reached for a substantial number of watersheds (currently estimated as approximately 15%, 17% and 21% for the wettest, average and driest climate projections, respectively) and are likely to be reached for more than half of the watersheds before the end of 2050 (approximately 42%, 58% and 79%).*"

de Graaf et al. 2019 https://www.nature.com/articles/s41586-019-1594-4



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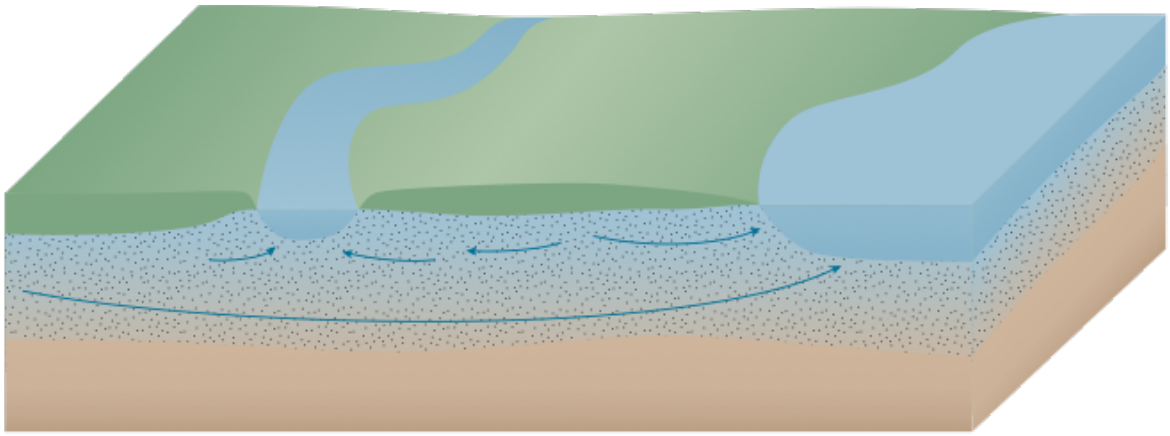
But, increased infrastructure development, especially in arid regions (e.g. Central Asia), could exacerbate these threats

Priorities for mitigation

- Identify at-risk areas where groundwater may already be under pressure from pumping
- Avoid these areas, or develop alternative practices for use in these areas that require less water



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Issue: Expansion of Traditional Chinese Medicine Changing Wildlife Trade Markets

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PERSPECTIVE
https://doi.org/10.1038/s41893-019-0460-6

nature sustainability

Building sustainability into the Belt and Road Initiative's Traditional Chinese Medicine trade

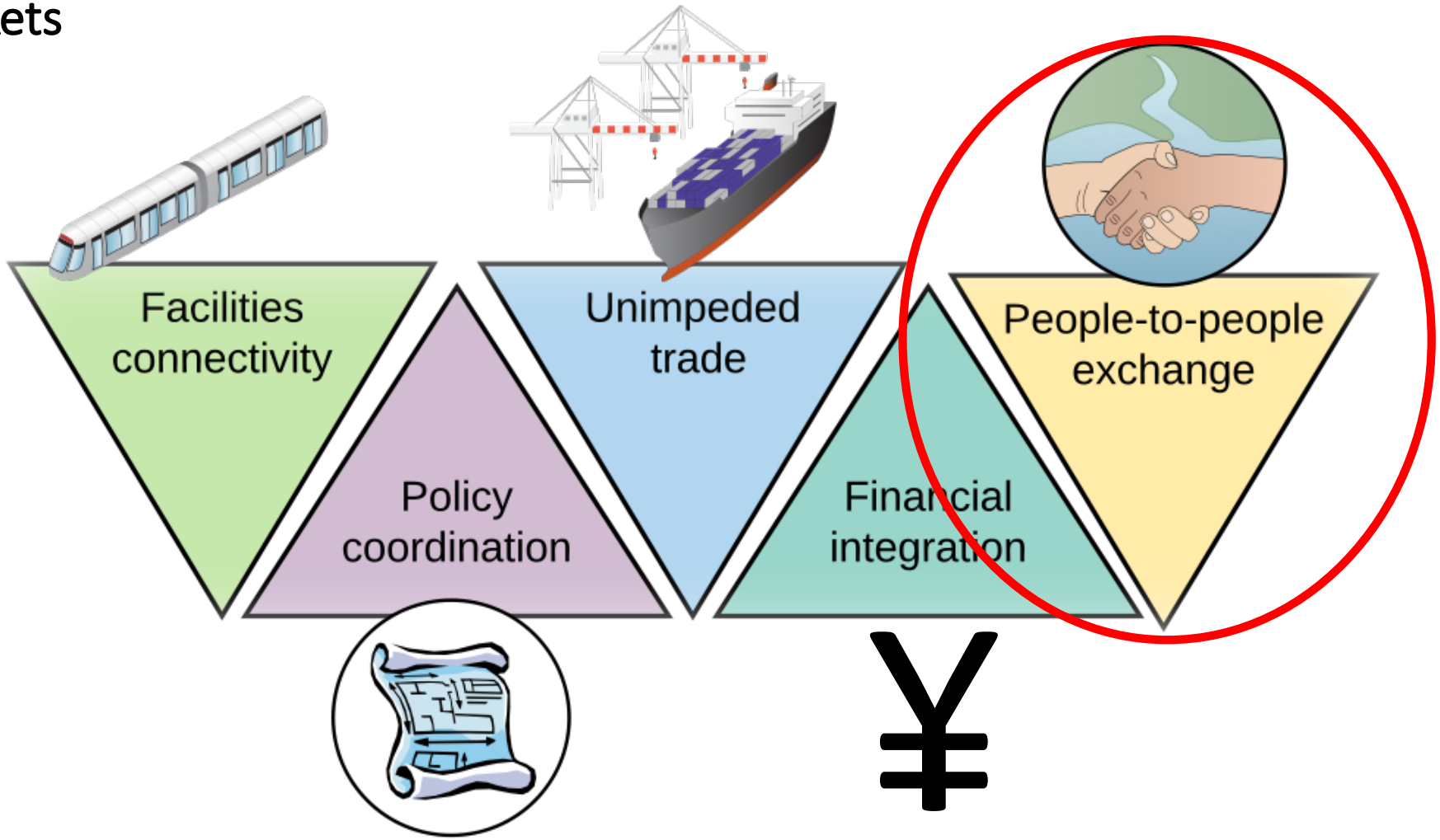
Amy Hinsley[1,2*], E. J. Milner-Gulland[1,2], Rosie Cooney[3], Anastasiya Timoshyna[4], Xiangdong Ruan[5] and Tien Ming Lee[6*]

Issue: Expansion of Traditional Chinese Medicine Changing Wildlife Trade Markets

“Traditional Chinese medicine resources [were] *once the important part of the ancient "Silk Road" …the political connections was strengthened…trade was developed, and Chinese medicine culture was spread. Before Qing Dynasty, people took out the "silk" and brought back "herbs" on the "Silk Road", which enriched China's medicinal resources. ”*

Zhang et al. (2018) Discussion on exploitation of foreign traditional Chinese medicine resources based on "the Belt and Road”. Zhongguo Zhong Yao Za Zhi. 43 (7).

Issue: Expansion of Traditional Chinese Medicine Changing Wildlife Trade Markets



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Issue: Expansion of Traditional Chinese Medicine Changing Wildlife Trade Markets

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Demand for TCM ingredients will likely increase from all over the world, and there will be better access to supplies of wildlife used as medicinal ingredients

News / National

Chinese firm to set up hospital in Zimbabwe

by Staff reporter

07 Dec 2019 at 12:10hrs | 428 Views

China Daily @Chin... 3 Mar 2018
Wang Guoqiang, head of the State Administration of Traditional Chinese Medicine, said countries along the #BeltandRoad have shown a growing interest in #TCM, and TCM has demonstrated a strong momentum as an export.

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THE NORTH AFRICA POST

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China & Morocco to Set up Traditional Medicine Center in Casablanca

PRINT EMAIL

In Zhejiang @InZheji... 30 May 2018
China-Israel Traditional Chinese Medicine Center came into operation on May 29. It is the first national overseas TCM center built cooperatively by Zhejiang Province and the Belt-and-Road countries.

#Zhejiang #BeltAndRoad

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Chinese medicine popular along BRI routes

China Daily, October 12, 2018 0 Comment(s) Print E-mail

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Chinese officials and businesses are seeking opportunities to export traditional Chinese medicine to Central and Eastern European (or CEE) countries, against the backdrop of the country's Belt and Road Initiative.

Government wants to promote research in Chinese medicine with Portugal

By LUSA

Issue: Expansion of Traditional Chinese Medicine Changing Wildlife Trade Markets

Increasing TCM demand is not, in itself, a problem. Legal ‘patent’ products are well-regulated, and exports would be subject to international wildlife trade regulations.

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Two main risks:

- A rapid increase in harvesting of legally traded species could put pressure on wild populations if sustainability is not considered

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Two main risks:

- A rapid increase in harvesting of legally traded species could put pressure on wild populations if sustainability is not considered
- Demand could also increase for informal, illegal products outside of official TCM, and improved infrastructure along illegal wildlife trade routes could facilitate trafficking.

Farhadinia et al. (2019) BRI may create new supplies for illegal wildlife trade in large carnivores. Nature Ecology & Evolution.

Issue: Expansion of Traditional Chinese Medicine Changing Wildlife Trade Markets

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However, sustainable wild-harvest of many popular medicinal species used in the legal trade is possible, and increasing TCM demand could be used to develop sustainable supply-chains that support livelihoods and protect habitats

A basket of schisandra berries drying in the sun. Today, the FairWild schisandra project has helped families set up a 23-village cooperative and establish contracts with buyers, including Traditional Medicinals, that pay a set price that is at least 30 percent more than the market rate.

Courtesy of Josef Brinckmann

FOOD FOR THOUGHT

How A Wild Berry Is Helping To Protect China's Giant Pandas And Its Countryside

April 26, 2017 · 7:00 AM ET

KRISTINA JOHNSON

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