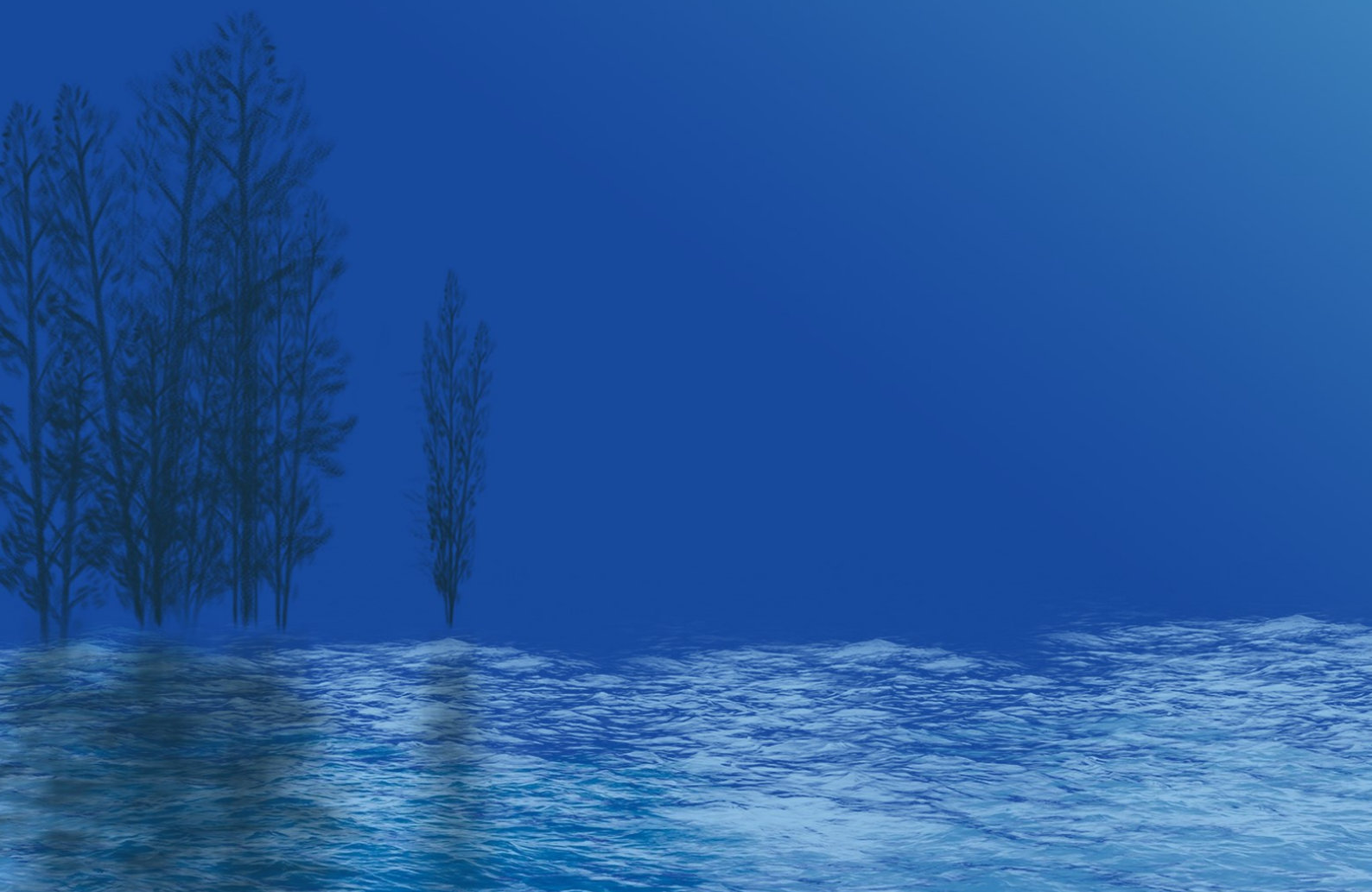
WASWAC

HOT NEWS

ISSUE 03, 2022



HOT NEWS

ISSUE 03 2022

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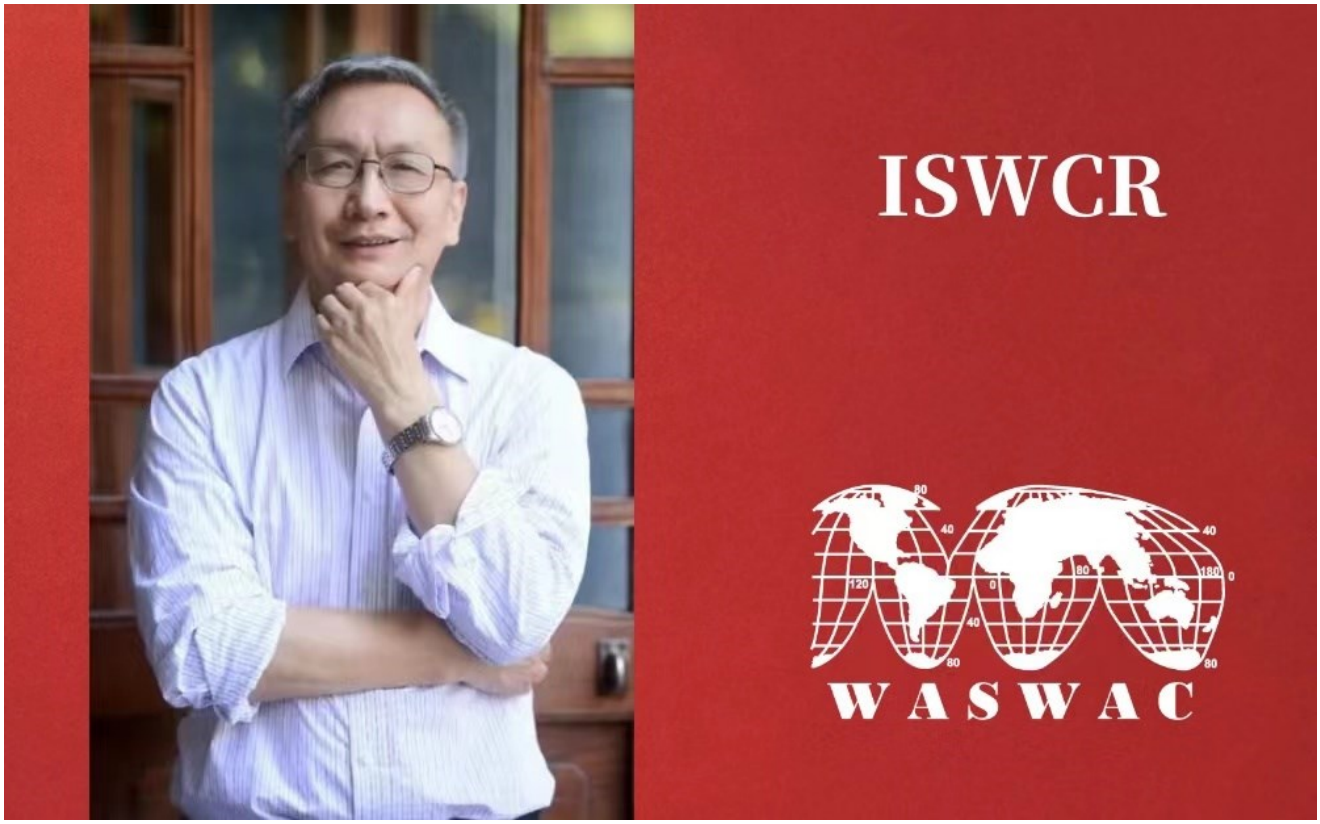
Editor: Pengfei DU

The New Editor-in-Chielf of ISWCR, the Official Journal of WASWAC



Prof. Baoyuan Liu

Prof. Pasquale Borrelli is not able to serve as the Editor-in-Chief for WASWAC official journal - ISWCR. Although he has been appointed as the Editor-in-Chief for only a few months, a series of important contributions to the Journal have been made, such as introducing a couple of outstanding young scientists to our Editorial board, proposing the period online editorial meeting, and initialized the first meeting, proposed a couple of special issue in plan.

We are pleased to announce that Prof. Baoyuan Liu from the Beijing Normal University is appointed as the new Editor-in-Chief. Prof. Liu's research interests are related to soil erosion processes, soil erosion modeling, monitoring, and assessment of conservation practices. Prof. Liu has published more than 80 research articles in the International Journals in English and about 143 articles in Chinese with a total citation of over 7,100 times according to Google Scholar. Prof. Liu's scientific contribu-

tions are widely known for deriving the equations for the slope gradient and length factors in the Universal Soil Loss Equation (USLE) on steep slopes, establishing the Chinese Soil Loss Equation (CSLE) and its computer model grounded on GIS. Prof. Liu also designed the field soil erosion investigation technique in China, which has been applied in the National Census for Water Erosion.

Following is the list of Prof. Liu and his team's paper published in ISWCR:

The assessment of soil loss by water erosion in China
https://www.sciencedirect.com/science/article/pii/S2095633920300472

Unpaved road erosion after heavy storms in mountain areas of northern China
https://www.sciencedirect.com/science/article/pii/S2095633921000460

Assessing soil thickness in a black soil watershed in northeast China using random forest and field observations
https://www.sciencedirect.com/science/article/pii/S2095633920300721

Quantifying spatial distribution of interrill and rill erosion in a loess at different slopes using structure from motion (SfM) photogrammetry
https://www.sciencedirect.com/science/article/pii/S2095633922000016

Impacts of horizontal resolution and downscaling on the USLE LS factor for different terrains
https://www.sciencedirect.com/science/article/pii/S2095633920300538

Study on a soil erosion sampling survey in the Pan-Third Pole region based on higher-resolution images
https://www.sciencedirect.com/science/article/pii/S2095633920300502

Monitoring and predicting the soil water content in the deeper soil profile of Loess Plateau, China
https://www.sciencedirect.com/science/article/pii/S2095633915301131

Comparison of the Effects of the Different Methods for Computing the Slope Length Factor at a Watershed Scale
https://www.sciencedirect.com/science/article/pii/S209563391530040X

Natural and anthropogenic rates of soil erosion
https://www.sciencedirect.com/science/article/pii/S2095633917300618

In Memoriam Samir Aly El-Swaify (1937-2022)

by Ildefons Pla Sentis

It is with deep regret that we have to announce the death of Prof Dr Samir Aly El-Swaify, the advisor of our association for the term of 2017-2019 and 2020-2022, age 84, who passed away at Honolulu, Hawaii on April 27, 2022, following complications from heart surgery.

Prof. Dr. Samir A. El-Swaify was well known to all concerned with soil and water conservation around the world. He dedicated all his life to the study, research and promotion of the conservation and sustainable use the natural resources soil and water, through different activities at global level. He was the main promoter and founding member of the two main World Organizations on Soil and Water Conservation, ISCO (International Soil Conservation Organization) and WASWAC (World Association on Soil and Water Conservation). Both organizatios were created during the International Conference on Soil Erosion and Conservation that he organized in Honolulu, Hawaii (USA) in 1983. He was also Chairman (1986-1990) of the recently created Subcomission C on Soil Conservation and Environment of ISSS (now Comission 3.2 on Soil and Water Conservation of IUSS).

Following the foundation of ISCO he became the Coordinator of the ISCO-Board of Directors, promoting and collaborating in the organization of 20 International Conferences in different countries in every continent, the last one in New Delhi (India) in 2019. Many of those Conferences have been held in cooperation with WASWAC, ESSC (European Society for Soil Conservation) and the Comission on Soil and Water Conservation of IUSS.

For his research, teaching, organizing activities and strong commitment to the sustainable use of global natural resources soil and water, while meeting essential human needs, he will

long be remembered. We have lost not only a good scientist, but also a human colleage who always looked for understanding and cooperation among the diferent people, institutions and organizations dealing with soil and water conservation.

Prof Dr Samir A. El-Swaify was born on July 14, 1937 in Port Said, Egypt. After graduating from the University of Alexandria with a BS in Soil Sciences, he went to USA on an Egyptian government scholarship to attend the University of California, Davis. There he gained his Ph.D. in Soil and Water Sciences. Following a year of postdoctoral work at UC Riverside, Samir received an offer to commence his prestigious, 40 year career at the University of Hawaii as a Professor; including time Chairing the Departments of Agronomy and Soil Science, and Natural Resources and Environmental Management. After retiring in December of 2005, Samir continued his service to the University as a Professor Emeritus in Soil and Water Conservation.

He is survived by : his wife Charlene; his children, Ayman (Jeri El-Swaify), Hala (Glenn Tompkins) and Salwa (Dennis Kasabian); his grandchildren, Gabriel (Dyanna El-Swaify), Micah (Marissa Tompkins), Victoria El-Swaify, Jared (Jamie Tompkins), Colin (Alexandria Tompkins), Nathan Tompkins, Iman (Gunnar Cox) and Aram Kasabian (Aliya Kasabian); his siblings, Salwa Swaify, Gamal Swaify and Yassar Swaify; and also, Abigail Tompkins, Madison Tompkins, Maia El-Swaify, Rebecca Tompkins, Levi Tompkins and Aleigha Tompkins.

Prof Samir A. El-Swaify has made great contribution both for the science and the association, we will deeply miss him.

ISWCR 2021 CiteScore 10.1

Elsevier officially released the 2021 CiteScore on June 8, 2022. This is the latest assessment of thousands of peer-reviewed research journals, book series, conference proceedings, and trade publications covered in Scopus. The CiteScore of ISWCR increased from 8.5 to 10.1 this year. ISWCR was officially indexed by Scopus in 2017, and is classified into four subject areas: Water Science and Technology, Agronomy and Crop Science, Nature and Landscape Conservation, and Soil Science. According to 2021 CiteScore released this year, ISWCR is ranked as the top ten journals in three subject areas. The specific rankings are as follows:

- Water Science and Technology: 9/237
- Agronomy and Crop Science: 13/370
- Nature and Landscape Conservation: 10/192
- Soil Science: 8/145

More infor on this journal:
https://www.sciencedirect.com/journal/international-soil-and-water-conservation-research

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EGU Awards and Medals Nomination

The European Geosciences Union (EGU) Awards & medals nominations for the year 2023 are currently open. The deadline for submissions is 15 June 2022.

We encourage the hydrological community to nominate their outstanding colleagues. EGU members can nominate candidates for all EGU awards and medals. Nominees do not need to be members.

The Hydrological Sciences Division Medals are:

https://www.egu.eu/awards-medals/henry-darcy/

https://www.egu.eu/awards-medals/john-dalton/

We are also accepting nominations for the Division Outstanding Early Career Scientist Award:

https://www.egu.eu/awards-medals/division-outstanding-ecs-award/

The nomination packages are easy to prepare; check here:

https://www.egu.eu/awards-medals/proposal-and-selection-of-candidates/

Checklist for submitting nominations:

- Have you read the guidelines for proposal and selection of candidates carefully?
- Do you know that members of the award and medal committees are not eligible for that award or medal for two years after stepping down from their service?
- Did you check whether previous honours were received from EGU/EUG/EGS by the person you are nominating and that they are compatible with your nomination?
- If applicable, are you submitting a joint nomination? If so, are you aware of the implications? It is possible to award recognition shared between individuals; in such a case the relevant recognition will not subsequently be awarded for as many years as the number of recipients exceeds one (two years for two recipients, three years for three recipients etc.).
- Did you check what the nomination package must contain for the award or medal you are submitting a nomination form? Did you check the documents meet the requirements (including maximum length) for nomination?
- Does your nomination letter clearly explain why the candidate deserves this recognition?

- If applicable, did you make sure that support letters are written by individuals other than the nominators?
- If applicable, did you check whether supporting letters clearly establish the nominee's recognised contribution to the field?
- Did you prepare all the documents in PDF format and combine them into a single file (e.g., PDF, ZIP, TGZ or RAR format)?
- Do you have EGU membership for the current year (does not apply to nominations to the Angela Croome Award)?

Some key nomination procedures:

A person is eligible to receive one EGU/EUG/EGS medal only once in their lifetime, except for the Union medals, which can be assigned only once to any person, including previous division medal awardees.

All past EGU awardees and medallists are eligible for the Katia and Maurice Krafft Award, provided they have not previously received it. The same applies to the Union Service Award.

Moreover, the following individuals are not eligible to be candidates for awards and/or medals during their terms of service and one year after the term is finished (meaning that the nomination for these individuals cannot be accepted during the year their term ended, but can be accepted the subsequent year):

- EGU president;
- EGU vice-president;
- Council members (not including ex-officio members);
- Chairs of EGU committees.

Similarly, members of the awards and medals committees are not eligible for that award/medal in the year they step down as committee members and the following year (term of committee members ends during the General Assembly when the award is conferred). Their nomination can only be accepted from the third nomination period after they leave the committee.

For more info:

https://www.egu.eu/awards-medals/nominations/

Deserts Inhale and Exhale Water Vapor through Their Surface

by M.Y. Louge et al.

Using a new probe that detects tiny amounts of moisture on sand grains, a team of researchers from Cornell University, the Ecole Polytechnique de l'Université de Nantes, and the Université de Rennes determined that desert surfaces exchange less moisture with the atmosphere than expected, and that water evaporation from individual sand grains behaves like a slow chemical reaction.

Louge et al. show how water vapor penetrates powders and grains. Image credit: Pexels.

The capacitance probe developed by Cornell University's Professor Michel Louge and colleagues uses multiple sensors to record everything from solid concentration to velocity to water content, all with unprecedented spatial resolution.

The scientists used their new instrument to study the moisture content in sand dunes to better understand the process by which agricultural lands turn to desert, an interest that

has only become more urgent with the rise of global climate change.

"The wind flows over the dune and as a result creates imbalances in the local pressure, which literally forces air to go into the sand and out of the sand," Professor Louge said.

"So, the sand is breathing, like an organism breathes."

"That 'breathing' is what allows microbes to persist deep inside hyper-arid sand dunes, despite the high temperature."

The authors found that vapor infiltration is considerably slower in dry sand, and that wind flowing over a dune creates weak internal air currents contributing to the transport of moisture. Their strength depends on dune location, wind speed and direction.

When wind is strong enough to let dry sand meander over a dune, the resulting rapid variation in surface moisture sends evanescent waves of humidity downward.

An analysis of these waves implies that water evaporation from individual sand grains behaves like a slow chemical reaction.

The exchange of moisture with the atmosphere is not always driven by the difference between humidity at the dune surface and in the ambient, as current models assume, and it is weaker than they predict.

In future, the team's probe can be used as 'ground truth' to calibrate satellite observations over deserts, explore extraterrestrial environments holding scant water, and detect moisture contamination in pharmaceutical products.

"The probe will have a number of applications — from studying the way soils imbibe or drain water in agriculture, to calibrating satellite observations over deserts, to exploring extraterrestrial environments that may hold trace amounts of water," the researchers said.

The team's paper was published in the Journal of Geophysical Research: Earth Surface.

Source:

http://www.sci-news.com/othersciences/geophysics/deserts-water-vapor-10672.html

More than 57 billion tons of soil have eroded in the U.S. Midwest

by Rachel Crowell

Tilling farmland is a key contributor to erosion and has played a role in the loss of billions of tons of soil in the U.S. Midwest, a new study finds. JAREN KANE/GETTY IMAGES PLUS

With soils rich for cultivation, most land in the Midwestern United States has been converted from tallgrass prairie to agricultural fields. Less than 0.1 percent of the original prairie remains.

This shift over the last 160 years has resulted in staggering — and unsustainable — soil erosion rates for the region, researchers report in the March Earth's Future. The erosion is estimated to be double the rate that the U.S. Department of Agriculture says is sustainable. If it continues unabated, it could significantly limit future crop production, the scientists say.In the new study, the team focused on erosional escarpments — tiny cliffs formed through erosion — lying at boundaries between prairie and agricultural fields (SN: 1/20/96). "These rare prairie remnants that are scattered across the Midwest are sort of a preservation of the pre-European-American settlement land surface," says Isaac Larsen, a geologist at the University of Massachusetts

Amherst.

At 20 sites in nine Midwestern states, with most sites located in Iowa, Larsen and colleagues used a specialized GPS system to survey the altitude of the prairie and farm fields. That GPS system "tells you where you are within about a centimeter on Earth's surface," Larsen says. This enables the researchers to detect even small differences between the height of the prairie and the farmland.

At each site, the researchers took these measurements at 10 or more spots. The team then measured erosion by comparing the elevation differences of the farmed and prairie land. The researchers found that the agricultural fields were 0.37 meters below the prairie areas, on average.

This corresponds to the loss of roughly 1.9 millimeters of soil per year from agricultural fields since the estimated start of traditional farming at these sites more than a century and a half ago, the researchers calculate. That rate is nearly double the maximum of one millimeter per year that the USDA considers sustainable for these locations.

There are two main ways that the USDA currently estimates the erosion rate in the region. One way estimates the rate to be about one-third of that reported by the researchers. The other estimates the rate to be just one-eighth of the researchers' rate. Those USDA estimates do not include tillage, a conventional farming process in which machinery is used to turn the soil and prepare it for planting. By disrupting the soil structure, tilling increases surface runoff and erosion due to soil moving downslope.

Larsen and colleagues say that they would like to see tillage incorporated into the USDA's erosion estimates. Then, the USDA numbers might better align with the whopping 57.6 billion metric tons of soil that the researchers estimate has been lost across the entire region in the last 160 years.

This massive "soil loss is already causing food production to decline," Larsen says. As soil thickness decreases, the amount of corn successfully grown in Iowa is reduced, research shows. And disruption to the food supply could continue or worsen if the estimated rate of erosion persists.

Not everyone is convinced that the average amount of soil lost each year has remained steady since farming in the region started. Much of the erosion that the researchers measured could have been caused in the earlier histories of these sites, dating back to when farmers "began to break prairies and/or forests and clear things," says agronomist Michael Kucera.

Perhaps current erosion rates have slowed, says Kucera, who is the steward of the National Erosion Database at the USDA's National Soil Survey Center in Lincoln, Neb.

To help reduce future erosion, farmers can use no-till farming and plant cover crops, the researchers note. By planting cover crops during off-seasons, farmers reduce the amount of time the soil is bare, making it less vulnerable to wind and water erosion.

In the United States, no-till and similar practices to help limit erosion have been implemented at least sometimes by 51 percent of corn, cotton, soybean and wheat farmers, according to the USDA. But cover crops are only used in about 5 percent of cases where they could be, says Bruno Basso, a sustainable agriculture researcher at Michigan State University in East Lansing who wasn't involved with the study. "It costs $40 to $50 per acre to plant a cover crop," he says. Though some government grant funding is available, "the costs of cover crops are not supported," and there is a need for additional incentives, he says.

To implement no-till strategies, "the farmer has to be a better manager," says Keith Berns, a farmer who co-owns and operates Green Cover Seed, which is headquartered in Bladen, Neb. His company provides cover crop seeds and custom seed mixtures. He has also been using no-till practices for decades.

To succeed, farmers must decide what particular cover crops are most suitable for their land, when to grow them and when to kill them. Following these regimens, which can be more complicated than traditional farming, can be "difficult to do on large scales," Berns says.

Cover crops can confer benefits such as helping farmers repair erosion and control weeds within the first year of planting. But it can take multiple years for the crops' financial benefits to exceed their cost. Some farmers don't even own the land they work, making it even less lucrative for them to invest in cover crops, Berns notes.

Building soil health can take half a decade, Basso says. "Agriculture is really always facing this dilemma [of] short-sighted, economically driven decisions versus longer-term sustainability of the whole enterprise."

Sources:

https://www.sciencenews.org/article/soil-erosion-rate-us-midwest-unsustainable-usda

Biocrusts Reduce Global Dust Emissions by 60 Percent

by Nikk Ogasa

Lichens (whitish-pink) and cyanobacteria (dark brown to blackish) form biological soil crusts that carpet the ground between succulent plants and shrubs in the Succulent Karoo ecoregion in South Africa. (B. WEBER)

In the unceasing battle against dust, humans possess a deep arsenal of weaponry, from microfiber cloths to feather dusters to vacuum cleaners. But new research suggests that none of that technology can compare to nature's secret weapon — biological soil crusts.

These biocrusts are thin, cohesive layers of soil, glued together by dirt-dwelling organisms, that often carpet arid landscapes. Though innocuous, researchers now estimate that these rough soil skins prevent around 700 teragrams (30,000 times the mass of the Statue of Liberty) of dust from wafting into the air each year, reducing global dust emissions by a staggering 60 percent. Unless steps are taken to preserve and restore biocrusts, which are threatened by climate change and shifts in land use, the future will be much dustier, ecologist Bettina Weber and colleagues report online May 16 in Nature Geoscience.

Dry-land ecosystems, such as savannas, shrublands and deserts, may appear barren, but they're providing this important natural service that is often overlooked, says Weber, of the Max Planck Institute for Chemistry in Mainz, Germany. These findings "really call for biocrust conservation."

Biocrusts cover around 12 percent of the planet's land surface and are most often found in arid regions. They are constructed by communities of fungi, lichens, cyanobacteria and other microorganisms that live in the topmost millimeters of soil and produce adhesive substances that clump soil particles together. In dry-land ecosystems, biocrusts play an important role in concentrating nutrients such as carbon and nitrogen and also help prevent soil erosion (SN: 4/12/22).

And since most of the world's dust comes from dry lands, biocrusts are important for keeping dust bound to the ground. Fallen dust can carry nutrients that benefit plants, but it can also reduce water and air quality, hasten glacier melting and reduce river flows. For instance in the Upper Colorado River Basin, researchers found that dust not only decreased snow's ability to reflect sunlight, but it also shortened the duration of snow cover by weeks, reducing flows of meltwater into the Colorado River by 5 percent. That's more water than the city of Las Vegas draws in a year, says Matthew Bowker, an ecologist from Northern Arizona University in Flagstaff who wasn't involved in the new study.

Experiments had already demonstrated that biocrusts strengthened soils against erosion, but Weber and her colleagues were curious how that effect played out on a global scale. So they pulled data from experimental studies that measured wind velocities needed to erode dust from various soil types and calculated how differences in biocrust coverage affected dust generation. They found that the wind velocities needed to erode dust from soils completely shielded by biocrusts were on average 4.8 times greater than the wind velocities need to erode bare soils.

The researchers then incorporated their results, along with data on global biocrust coverage, into a global climate simulation which allowed them to estimate how much dust the world's biocrusts trapped each year.

"Nobody has really tried to make that calculation globally before," says Bowker. "Even if their number is off, it shows us that the real number is probably significant."

Using projections of future climate conditions and data on the conditions biocrusts can tolerate, Weber and her colleagues estimated that by 2070, climate change and land-use shifts may result in biocrust losses of 25 to 40 percent, which would increase global dust emissions by 5 to 15 percent.

Preserving and restoring biocrusts will be key to mitigating soil erosion and dust production in the future, Bowker says. Hopefully, these results will help to whip up more discussions on the impacts of land-use changes on biocrust health, he says. "We need to have those conversations."

Sources:

https://www.sciencenews.org/article/soil-biocrusts-reduce-global-dust-emissions-earth

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Using a modified PAP/RAC model and GIS-for mapping water erosion and causal risk factors: Case study of the Asfalou watershed, Morocco

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Overland flow resistance and its components for slope surfaces covered with gravel and grass

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