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Title

What's soil got to do with climate change?

Permalink

<https://escholarship.org/uc/item/4d76p54r>

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Sequential Potential

Publication Date

2021-04-01

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What's SOIL Got to Do with CLIMATE CHANGE?

Presented by THE CENTER FOR HUMANITIES @ UC MERCED

By ASMERET ASEFAW BERHE

SEQUENTIAL POTENTIAL

WHEN PEOPLE THINK OF CLIMATE CHANGE THEY MIGHT THINK OF THE POLAR ICE SHEETS MELTING IN ANTARCTICA...

... OR THE IMMINENT SEA LEVEL RISE THAT THREATENS OUR COASTAL CITIES...

... OR LIFE-THREATENING HEAT WAVES THAT CRIPPLE OUR COMMUNITIES EACH AND EVERY SUMMER.

BUT RARELY DO PEOPLE THINK OF HOW THE VERY GROUND BENEATH THEIR FEET PLAYS AN INTEGRAL PART IN OUR GLOBAL ENVIRONMENTAL CRISIS.

CLIMATE CHANGE IS HAPPENING NOW DUE TO AN INCREASE OF GREENHOUSE GASES IN THE ATMOSPHERE.

DESPITE HUMANS PUTTING MORE CARBON IN THE ATMOSPHERE, A GOOD PORTION OF THAT CARBON IS STORED IN OUR SEAS AND SOILS THROUGH A PROCESS KNOWN AS CARBON SEQUESTRATION.

I'VE BEEN STUDYING SOIL SINCE I WAS 18. AND I'M HERE TO TELL YOU THAT SOIL CAN HELP US COMBAT CLIMATE CHANGE, IF ONLY WE CAN STOP TREATING IT LIKE DIRT.

SOIL STORES MORE THAN TWICE AS MUCH CARBON AS THE ENTIRE ATMOSPHERE + ALL THE PLANTS ON EARTH COMBINED

CARBON

SOIL

THAT AMOUNTS TO 3,000 BILLION METRIC TONS OF CARBON GLOBALLY IN THE SOIL!
(OR ABOUT 315 TIMES THE AMOUNT OF CARBON EMITTED INTO THE ATMOSPHERE EACH YEAR.)

PLANTS **ATMOSPHERE**

THINK ABOUT THAT FOR JUST A SECOND...

THE AMOUNT OF CARBON IN THE EARTH'S SOIL IS MORE THAN ALL OF THE CARBON IN ALL OF THE WORLDS...

...CROPLANDS **GRASSLANDS** **RAINFORESTS** **GIANT SEQUOIAS**

+ATMOSPHERE COMBINED!

TWICE OVER!

SOIL

OUR SOIL SYSTEM CAN STORE CARBON FOR POTENTIALLY THOUSANDS OF YEARS THROUGH ENTRAPMENT WITH SOIL AGGREGATES AND CHEMICAL BINDING OF CARBON ON SURFACES OF SOIL MINERALS.



THIS LONG-TERM STORAGE IS POTENTIALLY IMPORTANT FOR CLIMATE MITIGATION.



HOWEVER, THE AMOUNT OF CARBON THAT ENTERS THE SOIL AND THE AMOUNT OF CARBON RELEASED CAN GREATLY AFFECT THE BALANCE OF CO₂ IN OUR ATMOSPHERE, FOR BETTER OR WORSE.



WE CAN THINK OF THE SOIL LIKE A BANK ACCOUNT AND CARBON AS MONEY.



RECENTLY, HUMANS HAVE BEEN WITHDRAWING MORE MONEY FROM THEIR ACCOUNT THEN HAVE BEEN DEPOSITED.



A MORE SPONGE-LIKE SOIL THAT STORES LARGE AMOUNTS OF CARBON IS NOT ONLY IMPORTANT FOR CLIMATE MITIGATION, BUT IT'S ALSO MORE USEFUL FOR PEOPLE -- PROVIDING NUTRIENTS, FIBER & FEED.



SO, WE SHOULD BE TREATING SOIL LIKE THE PRECIOUS RESOURCE THAT IT IS, RIGHT?



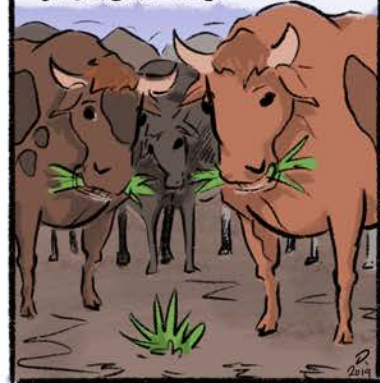
MORE THAN HALF THE SOIL AROUND THE WORLD IS NOW DEGRADED DUE TO INTENSIVE AGRICULTURAL PRACTICES.



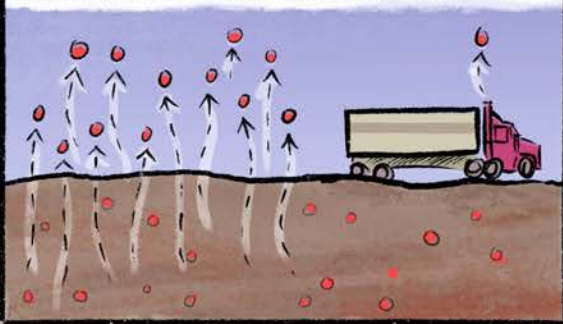
... RAMPANT AND UNCHECKED DEFORESTATION...



... AND UNSUSTAINABLE OVERGRAZING.



DEGRADATION OF SOIL BY HUMANS HAS ALREADY RELEASED 12 TIMES MORE CARBON INTO THE ATMOSPHERE THAN THE BURNING OF FOSSIL FUELS DOES ANNUALLY GLOBALLY.



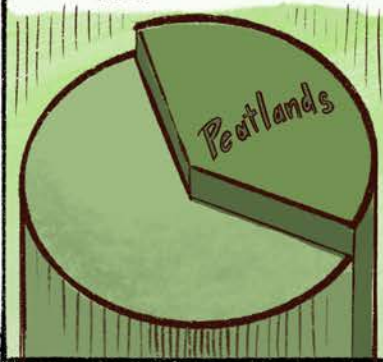
DEGRADED SOILS CAN'T SUPPORT PLANTS AND CAN'T STORE AS MUCH CARBON, WHICH DIMINISHES OUR ABILITY TO COMBAT CLIMATE CHANGE.



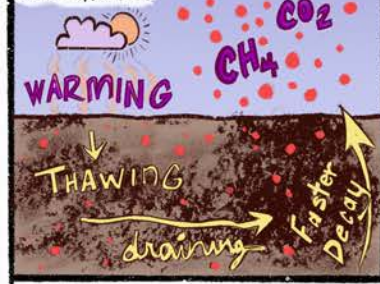
AND I'M AFRAID THERE'S MORE BAD NEWS, SPECIFICALLY IN SOILS AT HIGH LATITUDES.

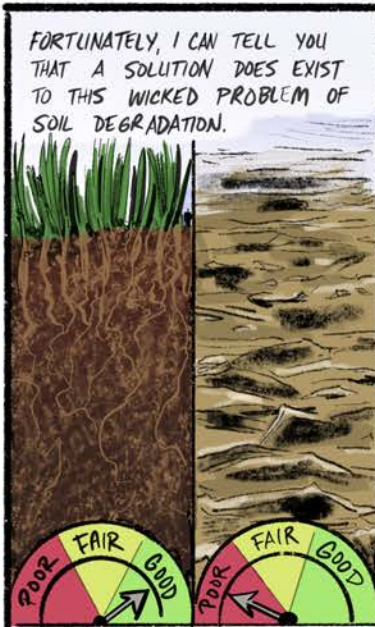


PEATLANDS IN POLAR ENVIRONMENTS STORE ONE THIRD OF THE WORLD'S SOIL CARBON RESERVES.



AND IF THE CLIMATE KEEPS WARMING THIS PERMAFROST WILL THAW, RELEASING HUNDREDS OF BILLION METRIC TONS OF GREENHOUSE GASES INTO THE ATMOSPHERE.





FORTUNATELY, I CAN TELL YOU THAT A SOLUTION DOES EXIST TO THIS WICKED PROBLEM OF SOIL DEGRADATION.



WE CREATED THESE PROBLEMS, BUT WE ALSO KNOW HOW TO SOLVE THEM. WHAT DO WE DO?

HINT: WE MAKE A DEPOSIT.



THIS MEANS TILLING LESS, REFORESTING FORESTS, WHILE ADOPTING MORE EFFICIENT USE OF AGRICULTURAL CHEMICALS, AND BETTER GRAZING PRACTICES.



AN INITIATIVE WAS RECENTLY ADOPTED BY THE UNITED NATIONS CALLED THE "4 PER MIL EFFORT."



THE EFFORT AIMS TO INCREASE THE AMOUNT OF CARBON STORED IN THE SOIL BY JUST 0.4% EVERY YEAR.



THAT MEANS HIGHER FOOD PRODUCTION AND MORE SEQUESTRATION.

A TRUE WIN-WIN!

OVER TIME THAT SMALL AMOUNT COULD OFFSET ONE-THIRD OF ALL GLOBAL EMISSIONS OF CO₂. THAT'S 3 BILLION METRIC TONS OF CARBON!

3 billion Metric TONS



F.D.R. SAID IT BEST WHEN HE SAID...

A nation that destroys its soil destroys itself.



IF WE TREAT THE SOIL WITH THE RESPECT IT DESERVES, WE CAN SOLVE CLIMATE CHANGE AND REVERSE LAND DEGRADATION, WHILE ENSURING FOOD AND NUTRITIONAL SECURITY FOR THE GROWING HUMAN POPULATION FOR YEARS TO COME.

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