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Mangrove crossbreeding: the agricultural solution to the water scarcity crisis?

Mangrove crossbreeding utilizes the use of saltwater shedding new light on a possible solution to the increasing costs in the agricultural industry.

What is mangrove crossbreeding?

Mangrove trees are able to survive in saltwater environments, like coastal sea water, through their natural ability to desalinate the water entering their roots by rejecting salt in the water and filtering out Na+ ions (salt) in its roots. By breeding these trees with freshwater plants, there's a possibility of having these freshwater plants to have the desalination properties of mangroves and survive in saltwater conditions while still producing their own vegetation such as fruits.

Why is the utilization of saltwater important?

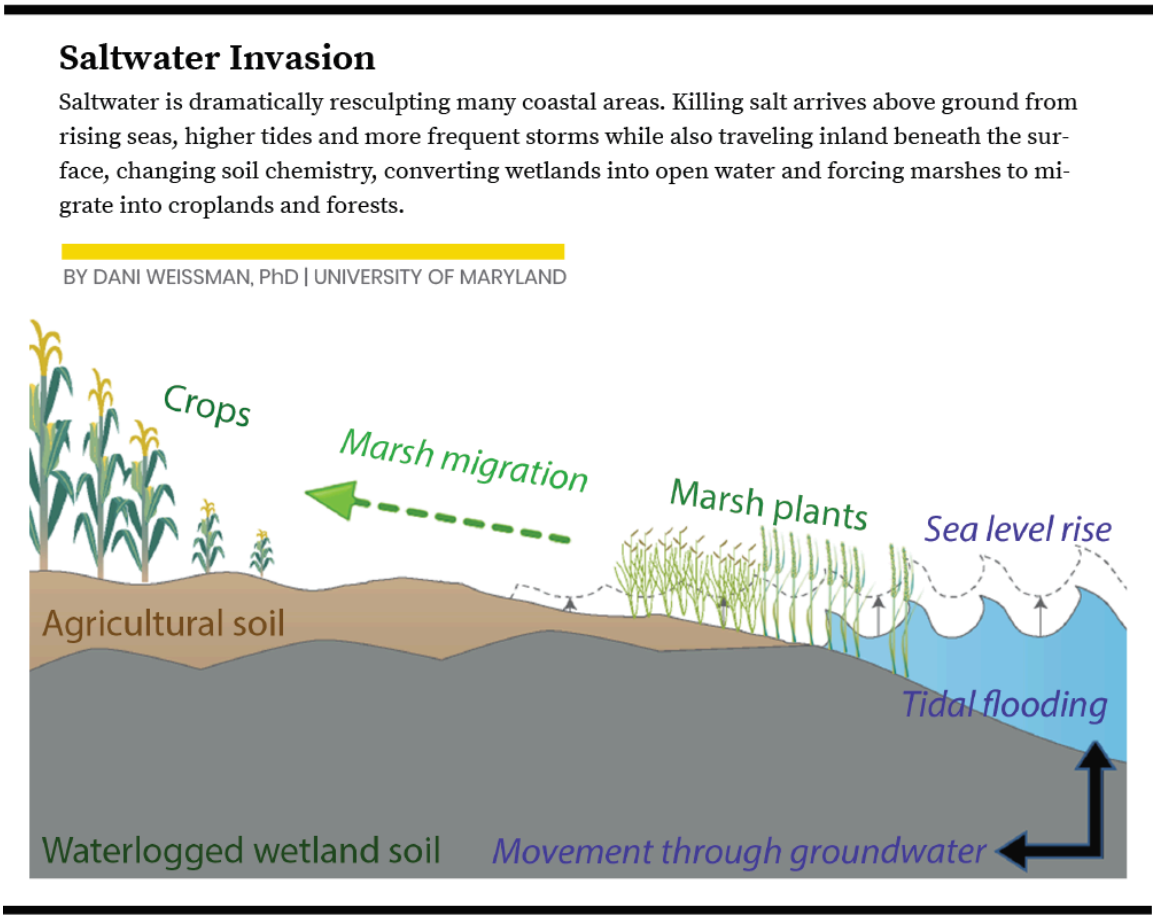
The utilization of saltwater is becoming increasingly necessary due to the effects of climate change. The amount of freshwater available is decreasing at an alarming rate lowering the amount of crops that farmers can yield. The drying farmland shrinks the

amount of productive space available thus causing this strand of food production to get more expensive. This new technology can possibly save the agricultural industry providing a solution to the water scarcity crisis allowing farmers to grow their crops without the fear of an insufficient yield.

How does mangrove crossbreeding work?

Mangrove cross breeding works just as one would think. A mangrove tree (a well known plant that can easily grow in salt water) is cross bred with another tree like an apple tree to be able to produce fruit in salt water climates instead of being confined to normal apple tree conditions. Since the mangrove is known to reject salt intake and can filter out most salt ions, this tree is a strong choice for the agriculture industry because of this factor. Since a partial cause of the world's water crisis is due to contamination, this cross breeding could provide an opportunity to push back against this.

Who is impacted by the utilization of saltwater in agriculture?



Saltwater in agriculture affects more people than you might think. If water is contaminated by salt, it is unable to be used for irrigation, feeding animals, and so much more. The livestock will suffer and will not be as healthy, and the crops will also suffer as a result of this. Alongside this, the amount of water used in this industry, from crops to animals to basic cleaning of machinery, is much greater than most people think and due to contamination by salt, there is so much water wasted and lost. From here, the industry will be producing significantly less and would be unable to keep up with demand of consumers.

How will this new technology change the agriculture industry?

Mangroves provide natural infrastructure and protection to nearby populated areas. They prevent erosion and absorb storm surge impacts during extreme weather events such as hurricanes. Their dense roots build up the soil and ground around them, making the land stronger and more resilient to natural events. Crossbreeding them with other plants could potentially be a way where salt water could be used for originally freshwater plants. It also helps the fishing industry as it helps sustain reef health in neighboring areas, creating a more viable habitat for marine life in fishing areas, which leads to higher catch yields. It is not a viable solution for all freshwater plants, however and may not solve enough of the major issues at hand, such as the strain on agriculture, to receive the funding needed to be implemented.

Where will this utilization have the most impact?

West Asia struggles heavily with fresh water scarcity, so this would be a great place to start. Places like Indonesia actually are habitat to a large mangrove population, so utilizing that would be very beneficial. Coastal Africa would also be a prime place to make use of mangrove crossbreeding as well.

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