

# Flowers grown floating on polluted waterways can help clean up nutrient runoff and turn a profit

February 13 2024, by Jazmin Locke-Rodriguez and Krishnaswamy Jayachandran

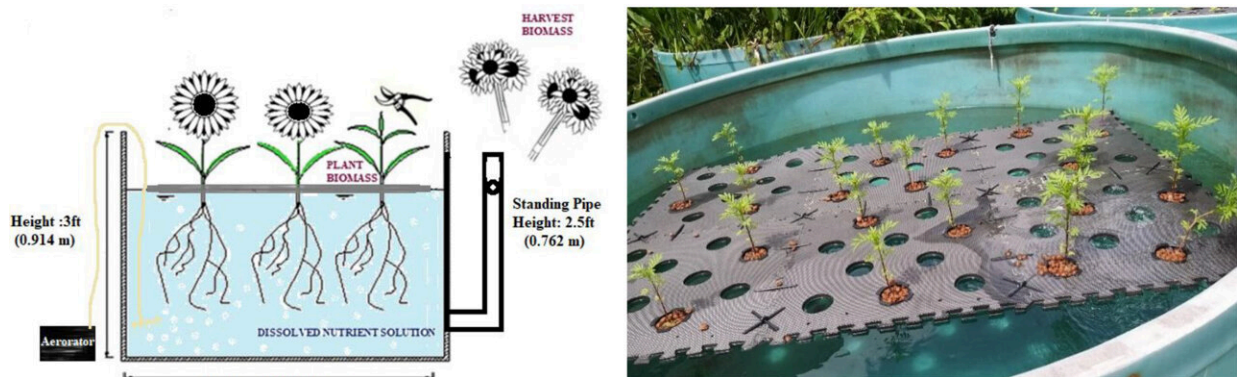


Diagram illustrates mesocosm dimensions and design (left). The picture shows a floating treatment wetland in mesocosm with cut-flower planted treatment spaced at 9 plants per  $m^2$  (right). Credit: *Environmental Advances* (2023). DOI: 10.1016/j.envadv.2023.100405

Flowers grown on inexpensive floating platforms can help clean polluted waterways, over 12 weeks extracting 52% more phosphorus and 36% more nitrogen than the natural nitrogen cycle removes from untreated water, according to our [new research](#). In addition to filtering water, the cut flowers can generate income via the [multibillion-dollar floral market](#).

In our trials of various flowers, giant marigolds stood out as the most successful, producing long, marketable stems and large blooms. Their yield matched typical [flower farm production](#).

## Why it matters

[Water pollution](#) is caused in large part by runoff from farms, urban lawns, and even [septic tanks](#). When it rains, excess phosphorus, nitrogen, and other chemicals wash into lakes and rivers.

These nutrients feed algae, leading to widespread and harmful algae blooms, which can severely lower oxygen in water, creating "[dead zones](#)" where aquatic life cannot survive. Nutrient runoff is a critical issue as [urban areas](#) expand, affecting the health of water ecosystems.

Water pollution is an escalating crisis in our area of Miami-Dade and Broward counties in Florida. The [2020 Biscayne Bay fish kill](#), the largest mass death of [aquatic life](#) on record for the region, serves as a stark reminder of this growing environmental issue.

## How we do our work

We study [sustainable agriculture](#) and [water pollution](#) in South Florida.

Inspired by traditional floating farm practices, including the Aztecs' [chinampas in Mexico](#) and the [Miccosukees' tree island settlements in Florida](#), we tested the idea of growing [cut flowers](#) on floating rafts as a way to remove excess nutrients from waterways. Our hope was not only that the flowers would pay for themselves, but that they could provide jobs here in Miami, the center of the U.S. cut-flower trade.

We floated 4-by-6-foot (1.2-by-1.8-meter) mats of inexpensive

polyethylene foam called [Beemats](#) in 620-gallon (2,300-liter) outdoor test tanks that mirrored water conditions of nearby polluted waterways. Into the mats we transplanted flower seedlings, including zinnias, sunflowers and giant marigolds. The polluted tank water was rich in nutrients, eliminating the need for any fertilizer. As the seedlings matured into plants over 12 weeks, we tracked the tanks' improving water quality.

Encouraged by the success of the marigolds in our tanks, we moved our trials to the nearby canals of Coral Gables and Little River. We anchored the floating platforms with 50-pound (22.7-kilograms) weights and also tied them to shore for extra stability. No alterations to the landscape were needed, making the process simple and doable.

## **What still isn't known**

The success of the giant marigolds might be linked to the extra roots that grow from their stems known as [adventitious roots](#). These roots likely help keep the plants stable on the floating platforms. Identifying additional plants with roots like these could help broaden plant choices.

Future raft designs may also need modifications to ensure better stability and growth for other cut-flower and crop species.

## **What's next**

Our promising findings show floating cut-flower farms could be a sustainable option for mitigating [water pollution](#).

One of us (Locke-Rodriguez) is expanding this research and working to scale up floating farms in South Florida as a demonstration of what could take place in the many locations facing similar issues worldwide.

**More information:** Jazmin Locke-Rodriguez et al, Floating flowers: Screening cut-flower species for production and phytoremediation on floating treatment wetlands in South Florida, *Environmental Advances* (2023). [DOI: 10.1016/j.envadv.2023.100405](https://doi.org/10.1016/j.envadv.2023.100405)

This article is republished from [The Conversation](#) under a Creative Commons license. Read the [original article](#).

Provided by The Conversation

Citation: Flowers grown floating on polluted waterways can help clean up nutrient runoff and turn a profit (2024, February 13) retrieved 27 April 2024 from <https://phys.org/news/2024-02-grown-polluted-waterways-nutrient-runoff.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.