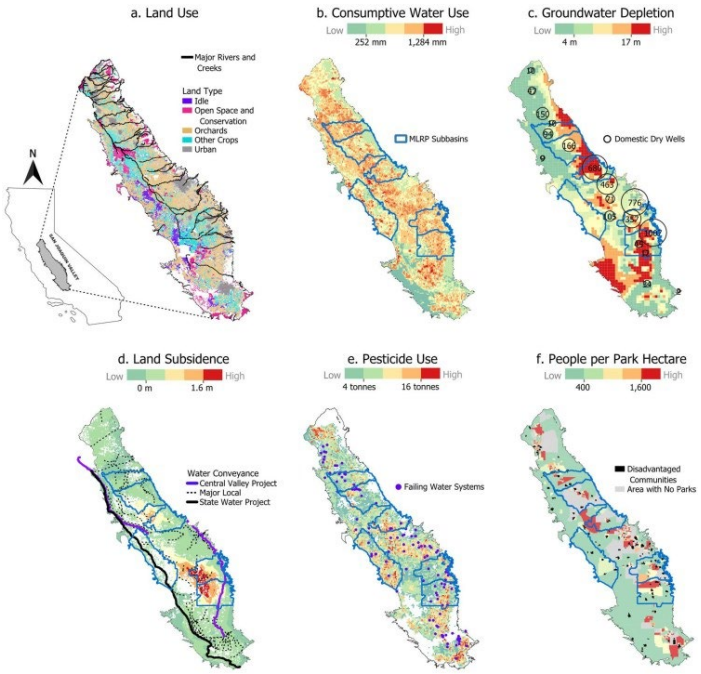
THE ENVIRONMENTAL DEFENSE FUND

New journal article highlights multibenefit land repurposing as an innovative approach to strengthen rural resilience

September 4, 2025
By: Environmental Defense Fund Contributor



A new peer-reviewed article in Frontiers in Water outlines how multibenefit land repurposing can serve as an innovative strategy to respond to water scarcity while fostering healthier rural communities and ecosystems.

The article, “Enhancing water security and landscape resilience through multibenefit land repurposing,” describes how, in water-scarce regions of the world, multibenefit land repurposing offers a promising alternative to business-as-usual approaches that focus predominantly on idling cropland. Leaving land unplanted and barren can create multiple negative impacts, including harming rural economies and exacerbating inequalities, increasing dust pollution and worsening air quality, introducing pests and weeds, and degrading soil.

By contrast, multibenefit land repurposing is a proactive alternative that strategically incorporates multiple benefits from the beginning as a basis for inclusive planning. If designed and implemented intentionally, multibenefit land repurposing can contribute to landscapes that support a mosaic of productive agriculture, healthy communities, and thriving habitat. Potential multibenefit land repurposing projects include transitioning to regenerative agriculture, groundwater recharge, habitat and floodplain restoration, solar panel installations, and outdoor recreational spaces.

“Multibenefit land purposing has the potential to help catalyze a powerful paradigm shift from siloed, ad-hoc land and water management to a more holistic approach that ultimately enables growers and communities to adapt more effectively to environmental pressures like climate change and unexpected disturbances like economic shocks,” said Gopal Penny, PhD, lead author and senior scientist, climate resilient water systems, at Environmental Defense Fund. “While the process may not be easy, fast, or cheap, the daunting and potentially dire consequences of business-as-usual water and land practices demand that we embrace innovative solutions.”

Tackling three water-land management challenges

In their article, Penny and his 14 co-authors from 11 institutions describe how multibenefit land repurposing can be designed to help address three major challenges at the nexus of water and land management:

A natural resources challenge associated with water scarcity, environmental degradation and environmental injustice. Multibenefit land repurposing projects can improve air and water quality, expand and enhance habitat, and/or create new recreational opportunities, while offering financial incentives to growers, who voluntarily participate.

A governance challenge associated with lack of strategic coordination and inequities in decision making. In water-scarce agricultural landscapes, growing demand for a shrinking water supply often contributes to a competitive landscape where individualistic decisions are prioritized and impedes collective agreement on sustainable, equitable solutions for the greater community. Multibenefit land repurposing can be structured to support more collaborative and equitable decision making through broad, coordinated outreach and planning that brings together growers and communities.

A structural challenge shaped by institutions, perceptions, and mental models that reinforce existing behaviors and maintain the status quo. A multibenefit land repurposing program that fosters a shift toward collaboration, dedicates financial resources to enable greater capacity and system flexibility, and demonstrates an openness to experimentation can help catalyze a paradigm shift as participants deliberate challenges and solutions.

San Joaquin Valley and Madera County: Experiences on the ground

The article explores the benefits and challenges of multibenefit land repurposing through the lens of California’s Multibenefit Land Repurposing Program (MLRP) and the San Joaquin Valley, where there were more than 4.2 million acres of irrigated agriculture in 2023 and more than 3,800 domestic wells have gone dry in the past 10 years. To comply with California’s 2014 Sustainable Groundwater Management Act (SGMA) and adapt to climate change, the valley may need to remove up to 20% of its irrigated farmland from production.

In response, the California Legislature created MLRP and approved $90 million in state funding for it. (An additional $200 million for MLRP was approved via California’s Proposition 4 Climate Bond in November.) The California Department of Conservation has awarded eight MLRP block grants, including six in the San Joaquin Valley, which in turn have brought together more than 100 organizations to contribute to the process.

“California may need to take as many as one million acres of farmland out of production to reduce groundwater use to sustainable levels. The question is not whether this will happen, but how — and how it will affect our rural communities,” said Stephanie Mercado, a co-author and community development specialist at Self-Help Enterprises. “This article shows how with thoughtful, inclusive planning, multibenefit land repurposing can turn the economic, societal, and ecological risks of water scarcity into an opportunity to bring together historically siloed, diverse interests — including rural communities, Indigenous Peoples, landowners, growers, and environmental interests — to work collectively on reshaping their future.”

The article also highlights Madera County, where agriculture generates nearly $2 billion a year, as an early adopter of multibenefit land repurposing. To comply with SGMA, landowners in Madera will need to reduce groundwater consumption considerably, resulting in lower agriculture production and revenue that will affect not only growers but also farm laborer communities and related food production and distribution industries.

To design its multibenefit land repurposing program, Madera County organized and participated in 39 public outreach activities and events. After receiving 72 pre-applications and 28 proposals, Madera County selected six projects to submit to the Department of Conservation for state approval and funding:

- Almond orchard to multibenefit stormwater management with public access and recreational opportunities
- Almond orchard to tribal cultural space
- Combined groundwater recharge and flood management
- Low water use agave crop with habitat co-benefits
- Almond orchard to a buffer adjacent to a disadvantaged community
- Planned citrus orchard to groundwater recharge with native habitat restoration

Another pilot project that already received state approval repurposed five acres of an almond and walnut orchard to pollinator habitat adjacent to a small, disadvantaged community dependent entirely on groundwater for its water supply.

“Madera County received four times more project proposals than could be funded, demonstrating strong landowner interest in the MLRP throughout our agricultural community and highlighting the significant need for more funding,” said Katie Carlson, a co-author and program director at Zanjero, the firm contracted by Madera County to lead implementation of multibenefit land repurposing. “It has been tremendously rewarding to support collaboration between the program team, partners, landowners and communities to implement economically viable projects that create benefits for disadvantaged communities while supporting long-term agricultural sustainability.”

Applications beyond California

Although the article focuses on California, the authors suggest that many agricultural areas around the world facing similar problems could draw valuable lessons from the state’s Multibenefit Land Repurposing Program.

“Single-purpose management fragments our landscape around individual interests and has gotten California and other places into tough situations around water and environmental management,” said Michael Kiparsky, PhD, a co-author and director of the Wheeler Water

Institute at the UC Berkeley School of Law. “This research shows how California is experimenting with programs that integrate multiple interests to address water scarcity. We don’t yet know which strategies will be the most effective, so we have to try a suite of solutions to head off large-scale catastrophe. Research that analyzes this living experiment can help orient the state towards the most effective interventions.”

The authors of the article are Gopal Penny, Anna Schiller and Maurice Hall, EDF; José M. Rodríguez-Flores, formerly EDF and now CSU Monterey Bay; Angel Santiago Fernandez-Bou, Union of Concerned Scientists; Elizabeth A. Koebele, University of Nevada-Reno; Divya Solomon, Cornell University; Katie Carlson, Zanjero; Leticia Classen-Rodriguez, SocioEnvironmental and Education Network; Molly Daniels, Environmental Incentives; Robyn Grimm, California Water Data Consortium; Michael Kiparsky, UC Berkeley; Stephanie Mercado and Sonia Sanchez, Self-Help Enterprises; and Karina Mudd, Valley Eco.