Managing Groundwater with Small Farms in Mind:

Risks, Barriers, and Opportunities of the Sustainable Groundwater Management Act

UC Small Farms Network
University of California
Agriculture & Natural Resources

CAFF
COMMUNITY ALLIANCE
with FAMILY FARMERS

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Based on three years of statewide outreach, surveys, focus groups, and document review with small-scale farmers across California's priority groundwater basins

Developed in partnership by the University of California Small Farms Network and Community Alliance with Family Farmers

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Thao's Fruit Stand, Merced County

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EXECUTIVE SUMMARY

Managing Groundwater with Small Farms in Mind:

Risks, Barriers, and Opportunities of the Sustainable Groundwater Management Act

Dulce Organic Farm, Santa Cruz County

> *"Sustainable groundwater management should not come at the expense of the very communities it is meant to serve."*
>
> — Farmer in the San Joaquin Valley

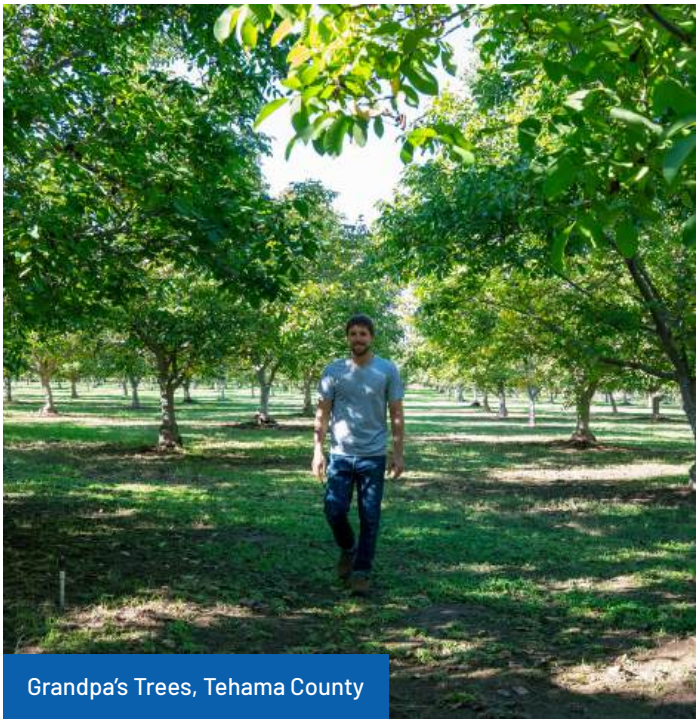
The Challenge

California's 2014 Sustainable Groundwater Management Act (SGMA) is a necessary step toward ending decades of unsustainable groundwater pumping. Yet, as local agencies work to achieve groundwater sustainability and farms across the state adapt to new regulations, there is a growing risk that small farms face disproportionate challenges in understanding and adapting to those rules. These producers anchor rural communities, local food systems, and cultural heritage across California, while contributing the least to groundwater overdraft.

Vital to the state's economy and the national food supply, California agriculture faces increasing challenges. Farmers are producing food in the face of volatile commodity markets, rising costs, complex regulations, and now, increasing constraints on the water they depend on. Within this landscape, small-scale farmers, including immigrant, refugee, tenant, and multi-generational family farmers, grow diverse and culturally significant crops that support food sovereignty and rural community resilience. Despite this valuable contribution, they are among the state's most vulnerable groundwater users and have fewer pathways to adapt and less capacity to absorb new costs.

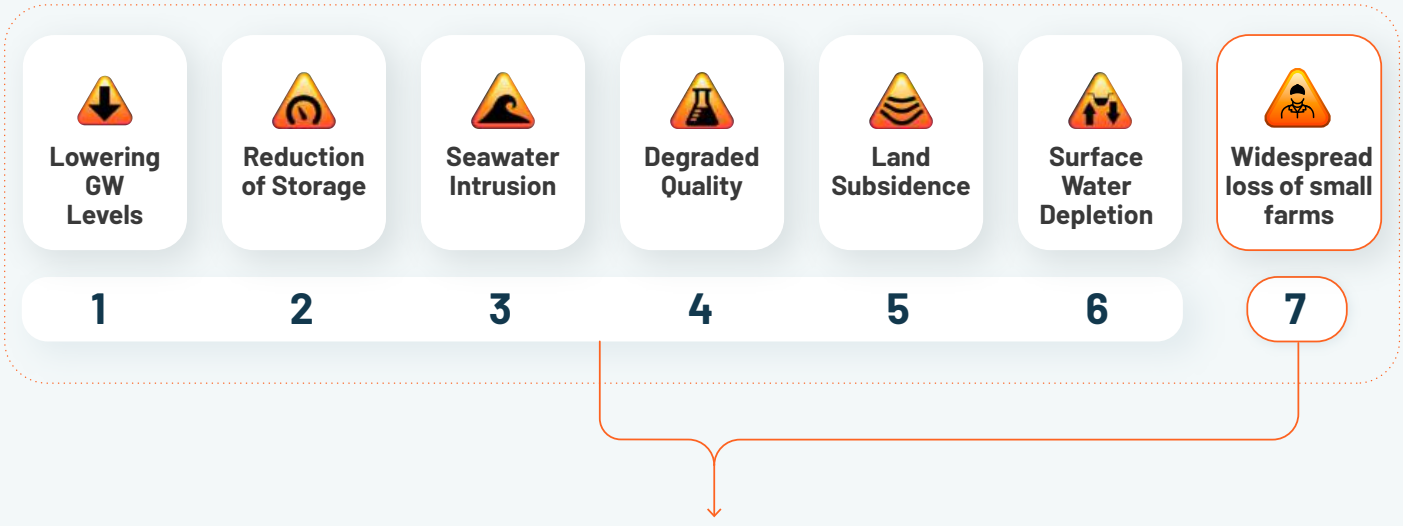
SGMA identifies six "undesirable results" to avoid: chronic lowering of groundwater levels, reduced groundwater storage, seawater intrusion, degraded water quality, land subsidence, and depletion of interconnected surface water. This report argues that **the widespread loss of small farms should be understood as an emerging "seventh undesirable result"** — one that arises not only from overdraft itself, but from how groundwater management is designed and implemented. In using this framing, this report is not calling for statutory changes to SGMA — rather, it is a call for deliberate and proactive attention to prevent this outcome.

Small farms can be part of the solution to California's groundwater issues — through low-water-use crops, expansion of on-farm recharge opportunities, and long-term land stewardship. As SGMA implementation continues, meaningful inclusion of small farms in management decisions can both protect rural livelihoods and food security, and provide additional tools for regional groundwater management.



Grandpa's Trees, Tehama County

Undesirable Results



The widespread loss of small farms should be understood as an emerging "seventh undesirable result" that arises not only from overdraft itself, but from how groundwater management is designed and implemented. This calls for deliberate and proactive attention to prevent this outcome (but is not intended as a statutory change to SGMA).

Findings

Findings of this report are the result of three years of direct engagement with small-scale farmers by Outreach Specialists across California through workshops, on-farm meetings, focus groups, statewide surveys, and review of Groundwater Sustainability Plans. The findings are consistent and concerning:

- Groundwater markets, land fallowing, recharge projects, and pumping fees — as currently structured — can unintentionally favor larger, better-resourced operations, which may contribute to the displacement of small farms.
- Small farms are subject to the same rates and regulatory complexity as larger operations, despite accounting for a small fraction of total groundwater use. For example, in the critically overdrafted Tule and Tulare Lake subbasins, **over 40% of pumpers account for only 1% of total water use.**
- Tenant farmers — who make up a significant share of small-scale producers — are often invisible to GSAs, which typically communicate only with landowners.
- Most small-scale farmers have limited awareness of SGMA — across outreach conducted in priority basins, **more than half of small-scale farmers had not heard of SGMA** before they met a SGMA Outreach Specialist.
- Satellite-based evapotranspiration monitoring tools used to estimate groundwater use are not well calibrated for diversified small farms, creating **risks of inaccurate assessments and overcharges.**
- Most surveyed small-scale farmers are concerned they may be **forced to shut down their operations.** This risk could intensify under inequitable implementation of SGMA, and this report outlines practical steps to help prevent that outcome.

Dulce Organic Farm, Santa Cruz County

EXAMPLES OF INCLUSIVE OUTREACH & MANAGEMENT ACTIONS

SONOMA GSAS

Inclusive Outreach

Contracted with CAFF to hire a small farm Outreach Specialist embedded in the farming community — expanding meaningful participation across monitoring programs, water use efficiency programs, and data exchange systems.

EAST TURLOCK SUBBASIN GSA

Cover Crop Accounting

Developed an innovative groundwater accounting approach that credits cover crop adoption by recognizing increased infiltration — directly incentivizing sustainable practice adoption.

NORTH KINGS GSA

Accessible Engagement

Coordinated with UC ANR Fresno Small Farms bilingual team to provide targeted SGMA outreach and education to South East Asian small-scale farmers — creating space for inclusive engagement.

PAJARO VALLEY WATER MANAGEMENT AGENCY

Recharge Incentive

ReNeM program offers landowner rebates based on infiltration volume — making on-farm recharge economically viable for smaller operations that would otherwise lack resources to participate.

Four Opportunities for Action

The report identifies four interconnected opportunities that, taken together, offer a practical and equitable path forward:

1. **Identify Small-Scale Farmers Locally:** Not all farmers carry equal responsibility for overdraft, yet most face identical requirements. GSAs should establish a transparent, locally grounded process to identify small-scale farmers who contribute minimally to groundwater overdraft yet face disproportionate risk. A proposed three-part framework suggests assessing water impact, community value, and financial vulnerability to distinguish these producers from larger, higher-impact water users. This identification is the essential first step toward equitable policy design.

2. **Coordinate and Act to Keep Small Farms in Business:** State agencies, GSAs, and farmers each have a distinct role. DWR should establish a dedicated fund for "Building Small Farm Resilience Under SGMA" to support technical assistance, small-farm liaisons, and inclusive governance. GSAs should evaluate how their outreach, fee structures, and management actions affect small producers and adjust accordingly. Small-scale farmers, in turn, should have meaningful pathways to participate in and shape groundwater governance decisions.

3. **Implement Actions that Support Small Farms in Groundwater Management Decisions:** Fifty actionable recommendations — organized across GSA general operations, management actions, and groundwater use regulation — can protect small farms while bringing them into the fold as part of the groundwater management solution. The recommendations include practical reforms to outreach and accessibility, governance and board composition, monitoring accuracy, fee design, water markets, recharge programs, fallowing alternatives, allocation models, and adjudication processes.

4. **Support Equitable Transition Pathways:** Support transitions that build low-water-use landscapes while preserving the social and economic benefits of small-scale, diversified, and local farming operations. Value small-scale and diversified farming operations as a viable alternative to land fallowing for current water-intensive operations. Land repurposing should prioritize systems that reduce groundwater use while protecting working lands and keeping working people on the landscape. For farms unable to sustain current operations, California should establish an "Equitable Transition Initiative," offering coordinated technical assistance, financial support, and workforce training for farmers and farmworkers navigating land repurposing, crop transitions, or departure from irrigated agriculture.

The Case for Action

Equity and sustainability are not competing goals under SGMA — **they are mutually reinforcing**. Small-scale farmers contribute least to overdraft yet face disproportionate risk under current implementation, and their loss would undermine the rural economies, food systems, and cultural heritage that they sustain.

By embedding equity, transparency, and support into SGMA implementation, California has the opportunity to build a groundwater governance system that protects both its water resources and the farmers who depend on them.

The future success of SGMA will be measured not only by hydrologic indicators, but by whether California's agricultural communities remain viable, diverse, and resilient.

INTRODUCTION

Red Gate Ranch, Tehama County

Agriculture is the backbone of California's rural communities and a cornerstone of the national food supply. In 2024, California farms and ranches generated more than $61 billion in sales, leading the nation in agricultural production.[1]

The state grows more than 400 commodities, including 14 crops that are not produced elsewhere in the US, making California agriculture critical for both the national food supply and global markets. **Although California agriculture is often associated with large-scale operations, the majority are small and mid-sized farms.** According to the 2022 USDA Census of Agriculture, farms under 500 acres represent 88% of all farm businesses in the state.[2] California agriculture includes nearly 10 million acres of irrigated agriculture, which depends heavily on groundwater to irrigate crops, sustain rural economies, and provide culturally significant foods for diverse communities.[3] That dependence on groundwater makes it one of the most important resources in the national food system.

The economic success of California's agricultural industry at large masks an increasingly difficult production environment for individual farms. Farmers must navigate volatile commodity markets, rising costs for labor and agricultural inputs, increasingly complex regulatory requirements, and the loss of regional processing and distribution infrastructure.[4] Climate change is intensifying drought cycles and increasing heat stress on farmworkers, farmers, and crops. Structural changes in farmland ownership and investment patterns are also reshaping the sector, with farmland consolidation and investment-driven agriculture altering access to land, water, and capital.[5,6] These overlapping pressures are particularly challenging for smaller and mid-sized farms that operate with limited financial reserves. Among these many challenges, one of the most significant and transformative is the increasing constraint on groundwater availability.

Groundwater is a foundational resource for California agriculture, **supplying up to 60% of the state's water in dry years.**[7] Decades of largely unregulated pumping, combined with climate variability and expanding irrigation demands, have led to widespread groundwater overdraft in many basins, threatening long-term groundwater supplies. In response, California enacted the Sustainable Groundwater Management Act (SGMA) in 2014, establishing the state's first comprehensive framework for groundwater regulation. SGMA requires high- and medium-priority groundwater basins to achieve sustainable groundwater management within 20 years of adopting a Groundwater Sustainability Plan (GSP). These plans must avoid six statutory "undesirable results": chronic lowering of groundwater levels, reduction of

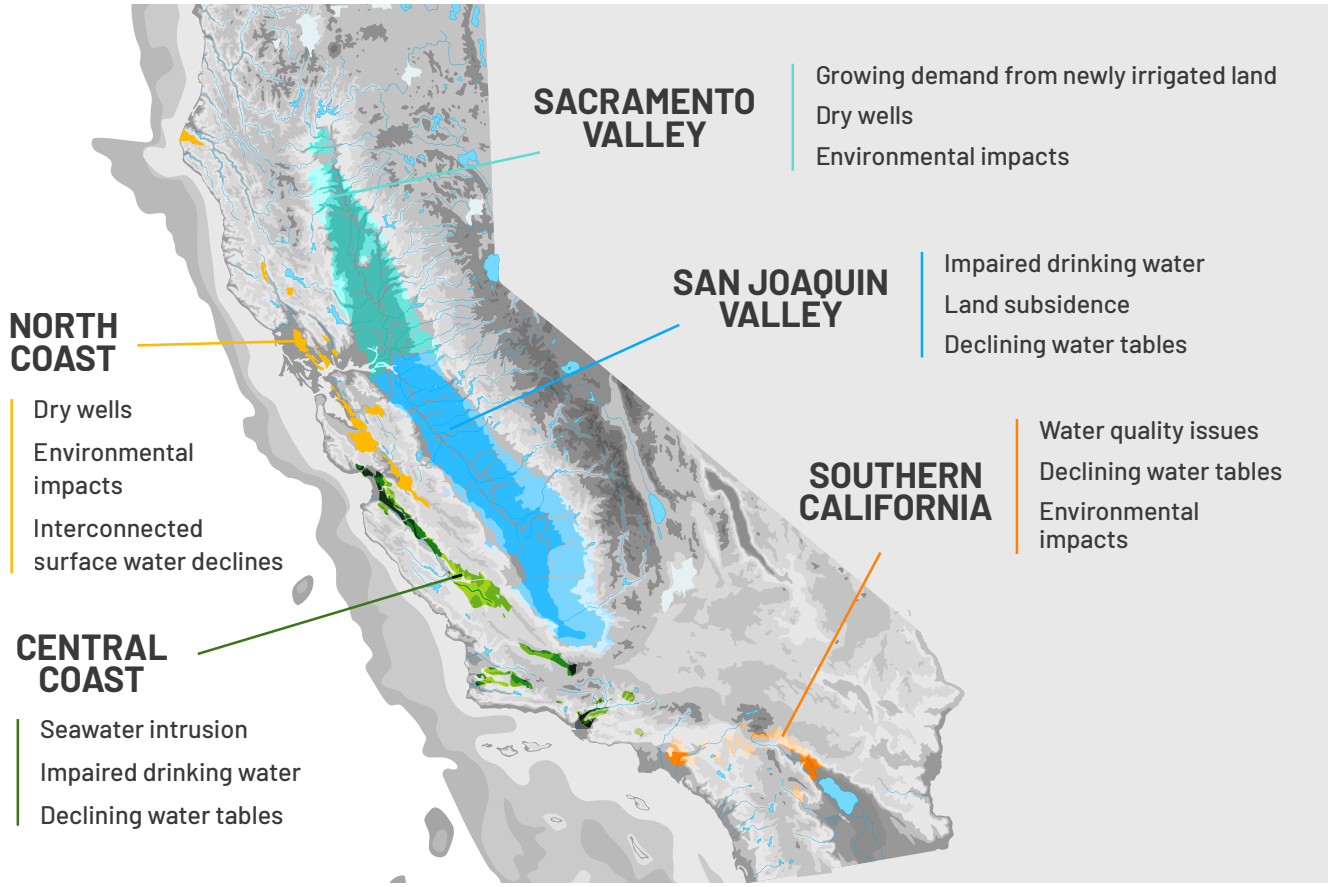


Figure 1. Highest priority issues vary across regions. Three high priority issues for each subbasin shown here.

groundwater storage, seawater intrusion, degraded water quality, land subsidence, and depletion of interconnected surface water. Responsibility for implementation rests primarily with Groundwater Sustainability Agencies (GSAs), reflecting the principle that groundwater is best managed at the local level. Over 250 GSAs now exist to manage groundwater locally. The California Department of Water Resources (DWR) has a dual role in SGMA implementation: (1) providing regulatory oversight through evaluation and assessment of GSPs and (2) providing assistance to local agencies through best management practices, guidance, planning, technical, and financial assistance. The State Water Resources Control Board (SWRCB) serves as the enforcement agency. Together, DWR and SWRCB ensure that local efforts are accountable, data-driven, and aligned with statewide goals for groundwater sustainability.

SGMA implementation is inherently complex. Groundwater conditions vary widely across California, and the six undesirable results are not experienced uniformly across or even within subbasins (Figure 1). In parts of the San Joaquin Valley, decades of chronic overdraft have produced severe groundwater level declines, dry wells, and widespread land subsidence (sinking of the Earth's surface as volumes of water below the surface are removed). In other regions, the primary risk is seawater intrusion or the growing groundwater demand from newly irrigated land as operations are pushed out of the San Joaquin Valley.

At the same time, basins are at different stages of SGMA implementation, with varying timelines, governance structures, and management strategies. Given that more than 250 GSAs are responsible for this implementation, tracking all these differences is complex. As GSPs are implemented, their effects are beginning to reshape agricultural production across the state. Field research in the San Joaquin Valley documented instances of farm abandonment even before SGMA implementation reached full strength.[8] While SGMA-related pumping limitations and groundwater management actions affect farms of all sizes, the impacts are often felt disproportionately by farmers with fewer resources and limited capacity to adapt. Many of these farmers rely on groundwater for both their drinking water and their irrigation practices. While this report does not focus on drinking water, it is critical to support SGMA implementation that addresses the intersecting needs of both small farms and drinking water users.

Small Farms & Small-Scale Farmers

Definitions of small-scale farmers vary across programs and agencies, and an appropriate definition may depend on the specific issue being addressed. The USDA defines small farms as operations with gross cash farm income below $350,000 and CDFA's Underserved and Small Producer Program sets the threshold at $400,000 annually (or up to $1 million for dairy). DWR's Underrepresented Communities, California Tribes and Small Farmers Groundwater Technical Assistance (URCTA) program combines the Farmer Equity Act's definition of socially disadvantaged farmers with a combination of factors such as acreage (typically under 80 acres or 200 acres depending on other farm characteristics), direct-to-consumer sales, and crop diversity. UC Cooperative Extension focuses on farms outside traditional commodity-based extension programs, including diversified, value-added, niche, direct-marketed, limited-resource, beginning, and underrepresented operations. In the context of SGMA, it is important to identify small farms with higher vulnerability and risk of unintended consequences that might result from regional groundwater management decisions if their concerns are not explicitly addressed.

In this report, the terms **small farm** and **small-scale farmer** are used broadly to encompass a diverse range of producers whose characteristics differ across the state and who farm small acreages, often with limited resources compared to larger farms.[9] In the context of SGMA, many rely on shallow irrigation wells and lack the capacity to adapt to groundwater scarcity through investment in deeper wells or irrigation infrastructure. **They are among the state's most vulnerable groundwater users despite the high value that they bring to their communities and across California, producing local, diverse, and culturally significant crops that support food sovereignty, quality of life, and rural community resilience.** The first "opportunity" in this document proposes an approach to identifying these farmers at the local level.

CT Farms, Merced County

Why Small Farms Matter to California

For many small-scale farmers, groundwater restrictions intersect with existing economic and structural pressures in ways that threaten their long-term viability and the benefits they provide to California communities. Many California consumers access fresh, local produce from small- to mid- scale family farms selling through local, direct, and retail markets including farmers markets, community-supported agriculture, or other direct markets.[10] Currently, 2,191 farmers provide California consumers with fresh, seasonal, local produce at 724 certified farmers markets across the state, with additional farmers markets that are not certified.[11] Access to seasonal local produce can increase quality of life for many California residents as well as improve connection between rural and urban areas of the state.[12] Small farms can also provide important benefits to natural resource stewardship, rural communities, and local food systems.[9,13] Because small-scale farmers often live and work directly on or close to the land they farm, they have increased incentives to manage soil, water, and ecological resources with a long-term stewardship perspective compared to farms with absentee landowners or investment farms managed remotely. Crop diversity as well as non-crop biodiversity can be higher on smaller farms with potential landscape-level ecological benefits, and some integrated pest management tactics may be easier to implement on a small scale.[14,15]

Small farms also generate economic benefits in rural communities through local purchasing and employment, while providing pathways for individuals to transition from farmwork into farm ownership. The diversification of crops and products, and shorter supply chains that are more common to small farms can also provide economic resilience and regional food security during periods of market disruption. Small farms contribute to food sovereignty by producing culturally significant crops and livestock that allow communities (often including immigrant communities) to maintain traditional diets. The vulnerability of these farms represents a potential loss - not only of individual livelihoods, but of the broader social, ecological, and economic contributions that smaller-scale operations provide to California communities. While larger farms may also provide benefits to communities and ecosystems, the local economies, fresh seasonal produce, and unique crops and products associated with small farms are a key aspect of life in California for many residents.

The potential decline of small farms that provide these socio-economic and environmental benefits warrants serious and targeted consideration in how groundwater governance is designed and implemented.[16] Small farms likely contribute relatively little to overall groundwater overdraft compared to larger operations. They also likely lack the capital, land, or water access needed to adjust to the new reality under SGMA implementation. The resulting loss of livelihoods, agricultural diversity, and rural economic stability was not captured within SGMA's six statutory undesirable results. However, these consequences are real and increasingly visible across agricultural regions. **For this reason, this report proposes that the widespread loss of small farms be understood as an emerging "seventh undesirable result" of SGMA implementation (Figure 2).** This is an issue that not only arises from groundwater overdraft itself, but also from how groundwater management is implemented to address it. In using this framing, this report is not calling for statutory changes to SGMA — rather, it is a call for deliberate and proactive attention to prevent this outcome. Recognizing this risk is essential for ensuring that groundwater sustainability is achieved while maintaining the vitality of California's agricultural communities.

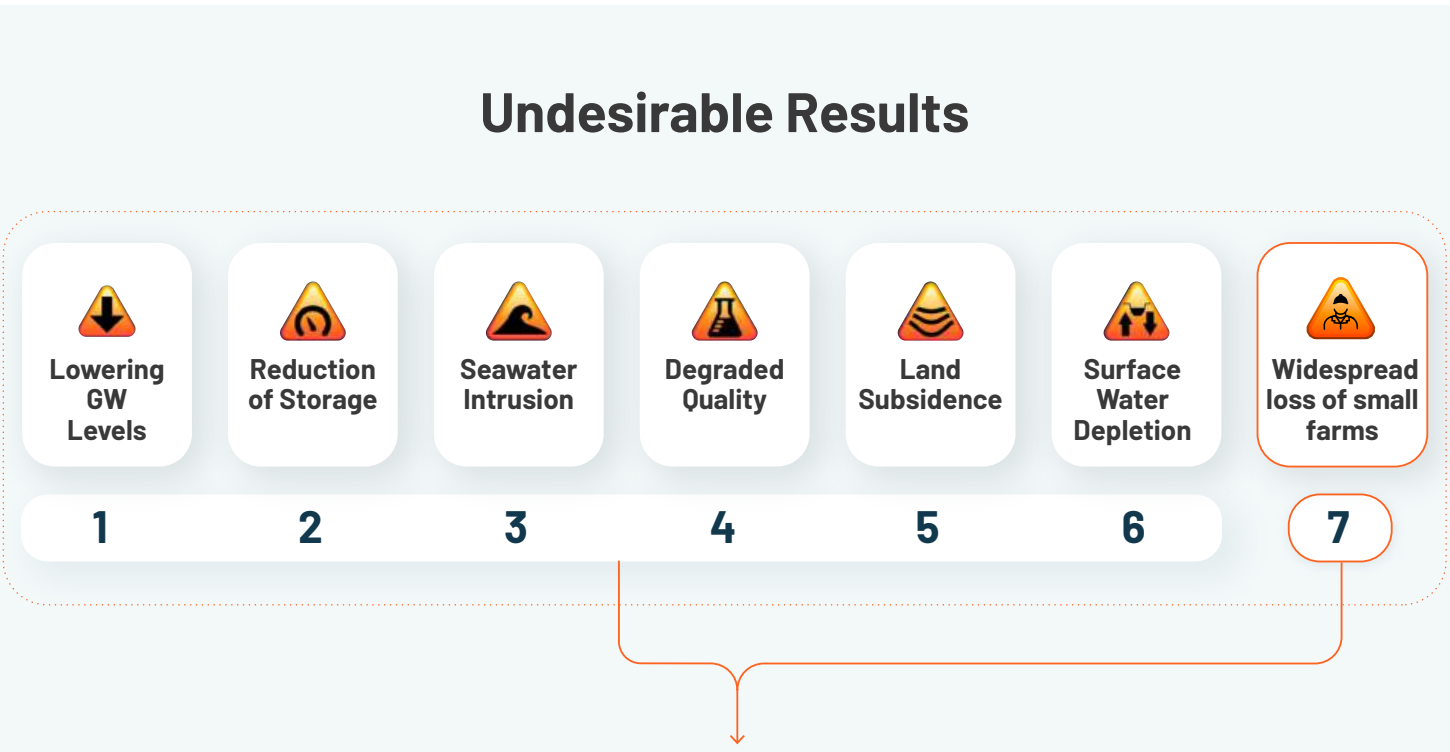


Figure 2. Loss of small farms can be understood as an emerging "seventh undesirable result". Groundwater management to avoid this outcome ensures true sustainability for SGMA implementation.

"I agree with the sustainability goals of SGMA and the need to protect our groundwater resources while also safeguarding people and communities. However, this balance has been largely overlooked in the implementation process. As a result, there has been insufficient effort to provide meaningful assistance to growers and rural communities who are being negatively impacted by the transition. Sustainable groundwater management should not come at the expense of the very communities it is meant to serve."

— Farmer in the San Joaquin Valley

Dulce Organic Farm, Santa Cruz County

To prevent the loss of small farms as an unintended consequence of SGMA implementation, this report identifies four opportunities for action across state agencies, GSAs, and farmers themselves that can value small farms while advancing groundwater sustainability. The following pages describe the methodology used in identifying these opportunities and describes the opportunities themselves:

1. **Identify small-scale farmers locally:** Each GSA should identify small-scale farmers within its jurisdiction who contribute minimally to groundwater overdraft yet face disproportionate risk, using criteria of relative groundwater use, operational vulnerability, and community contributions.

2. **Coordinate and act to keep small-scale farmers in business:** State agencies, GSAs, and farmers themselves each have a role. Coordination across these actors, through outreach, governance design, management actions, and regulatory structures, is essential to prevent small farms from going out of business.

3. **Implement actions that support small-scale farmers in groundwater management decisions:** Fifty actionable recommendations, organized across GSA operations, management actions, and groundwater use regulation. Together, these can protect small farms' agricultural contributions while bringing them into the fold as part of the groundwater management solution.

4. **Support equitable transition pathways:** Target SGMA-related land repurposing to reduce groundwater demand while expanding access for small-scale farmers by prioritizing transitions of large, water-intensive acreage. Invest in technical assistance, funding, and workforce development, and establish a coordinated Equitable Transition Initiative to support farmers and farmworkers with a focus on equity and regional coordination.

APPROACH TO WORK

This report draws on more than three years of outreach, technical assistance, and research with small-scale farmers and partners working on groundwater issues across California. Outreach was primarily conducted by 12 Outreach Specialists with Community Alliance with Family Farmers (CAFF) and UC Agriculture and Natural Resources (UC ANR) (Figure 3).

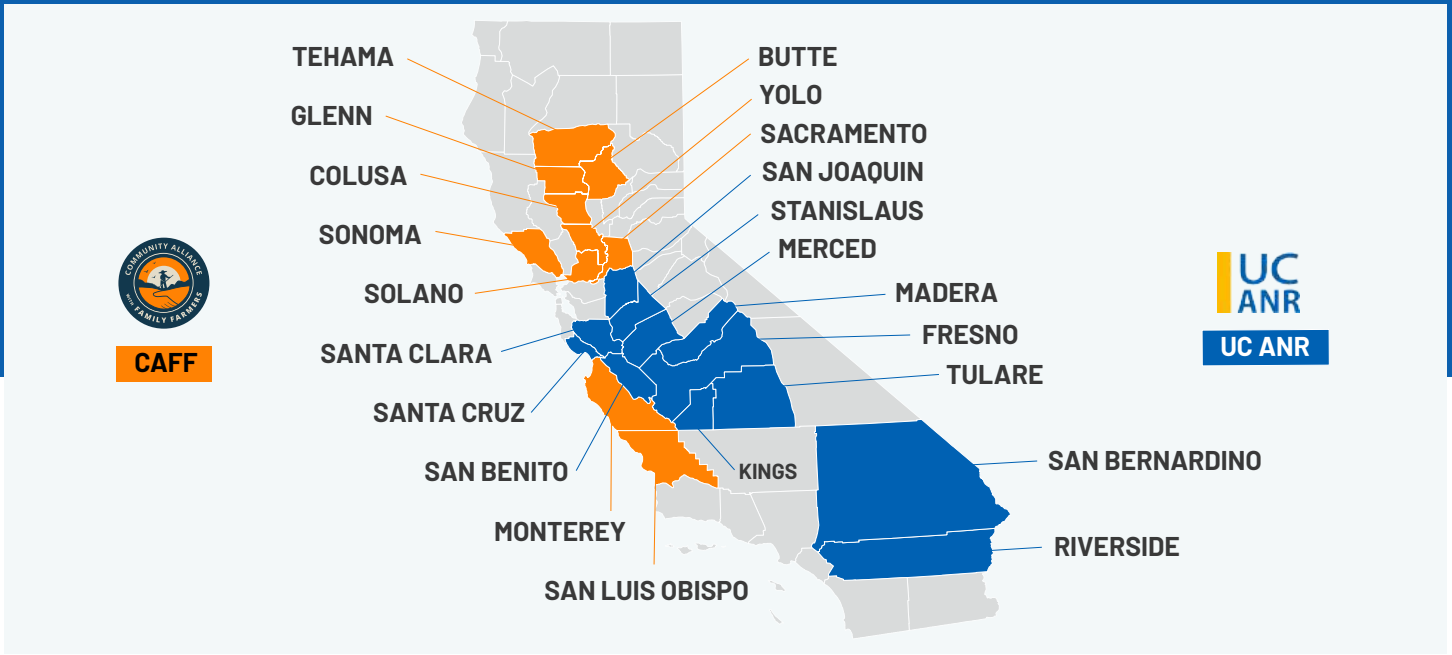


Figure 3. Locations of the CAFF and UC ANR Small Farm Outreach Specialists.

Findings draw on four sources. First, **in-depth interviews** and written reports from the small farm Outreach Specialists working statewide, conducting workshops, farm visits, one-on-one technical support, and multilingual outreach since 2024. These individuals work closely with small-scale farmers and serve as a bridge between policy and on-the-ground realities. Second, a UC ANR **statewide needs assessment** was conducted with a survey designed to capture SGMA-related barriers, risks, and opportunities directly from farmers. Distributed from November 2025 to May 2026, the survey included farm characteristics, GSA engagement experiences, and demographic information. Data collection occurred through regional focus groups, farm visits, one-on-one outreach and at conferences (see Additional Resources for survey questions). Dozens of completed surveys were included in the analysis presented in this document. Survey results from CAFF's 2025 Annual Farmer Survey were also included, which focused on questions of water access, water conservation practices, and pressing concerns related to water availability, cost, or quality. This survey had over 300 respondents across 51 California counties. Third, a **document review** related to SGMA implementation, including GSPs, annual reports, GSA Joint Powers Agreements, Memoranda of Understanding, and research on groundwater governance, rural economies, and small farm challenges. Lastly, data from the **projects and management actions module** hosted on the DWR SGMA Portal was used to describe how select groundwater management activities are included in current GSPs. Together, these varied data sources built a grounded understanding of what SGMA means for small farms - not in theory, but in terms of both daily farm decision-making and long-term sustainability.

Early versions of the report went through multiple rounds of review with small farm Outreach Specialists, small-scale farmers, regional partners, GSA managers, academics, and community partners. Each review cycle incorporated feedback to refine wording, validate interpretation, and ensure the findings accurately reflected on-the-ground experiences across different regions. This iterative process helped strengthen the credibility and relevance of the final recommendations.

Like many efforts working across a large state and a diverse farm population, this work has limitations. California's regions present very diverse conditions, and some farmer groups remain harder to reach because of language, trust, access, or time constraints. Even so, the information gathered paints a clear and consistent picture of the challenges and opportunities small-scale farmers face under SGMA.

OPPORTUNITY 1

Locally Identify Small Farms Who Are Vulnerable Under SGMA Implementation

SB Farms LLC, Fresno County

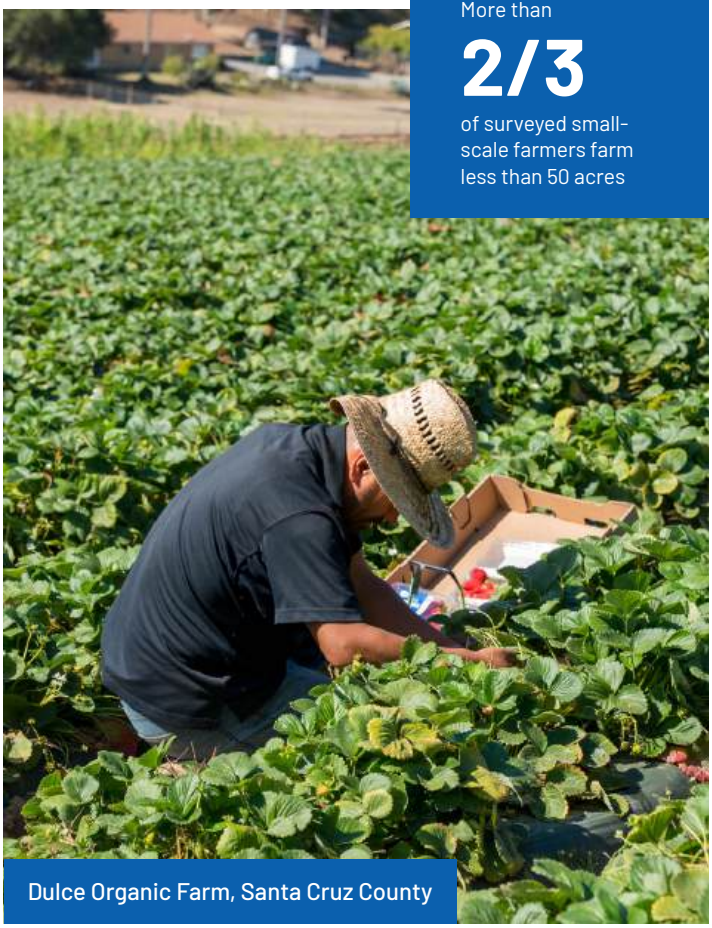
Cardoza and Cardoza Farming, Tulare County

The first step in avoiding the emerging "seventh undesirable result" is ensuring that GSAs explicitly recognize that not all agricultural water users contribute equally to overdraft. In some groundwater basins, there are many farmers who use little groundwater, yet face disproportionate risk under SGMA implementation.

Without acknowledging this distinction, equitable policy design is not possible. Opportunity 1 proposes a two-tiered approach. First, GSAs should identify and account for the population of small farms whose characteristics make them particularly vulnerable under SGMA and therefore warrant targeted accommodations. Second, within this broader group, GSAs should identify a narrower subset of farmers whose groundwater use is negligible and whose circumstances justify alternative requirements. This section outlines both the rationale for these distinctions and a practical, locally-grounded framework for making them.

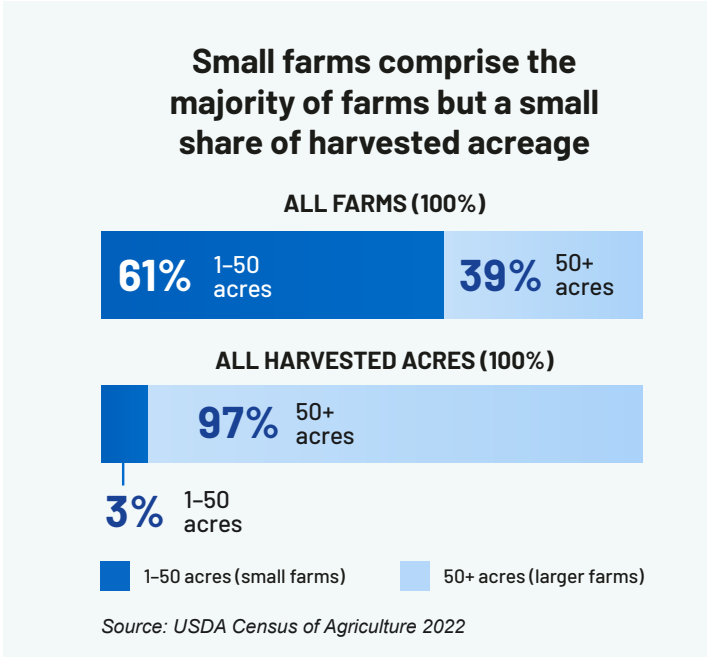
Acknowledging the Value and Vulnerability of Small-Scale Farmers

Groundwater management decisions are only as equitable as the distinctions they make among water users. Although SGMA treats agricultural water users as a single class of beneficial users, farmers vary widely in both their contribution to groundwater overdraft and their ability to adapt to new management requirements. Available data points to a potential structural imbalance: **many small farmers likely contribute little to overdraft compared to their neighbors.** Farms under 50 acres make up a majority of agricultural operations in California, yet their total groundwater use and acreage is minimal (Figure 4). Any accommodations directed towards these farms would benefit a lot of farmers with few if any undesirable results. **A recent statewide survey of small-scale farmers found that 70% of respondents farm fewer than 50 acres (n=63), a trend also found in the CAFF survey where over 80% of parcels were under 50 acres.** In the critically overdrafted Tule and Tulare Lake subbasins, a substantial share of pumpers (over 40%) account for only a marginal fraction (about 1%) of total groundwater use according to recent data shared by the SWRCB.[17,18] Avoiding the emerging "seventh undesirable result" requires acknowledging this reality that a large number of farmers are likely low-impact water users. Due to economies of scale, these smaller operations tend to have fewer financial reserves, less access to capital, and more limited ability to absorb new costs or comply with complex reporting requirements. As a result, uniform regulatory approaches risk accelerating farm exit among those least responsible for groundwater overdraft.



More than **2/3** of surveyed small-scale farmers farm less than 50 acres

Dulce Organic Farm, Santa Cruz County



Acreage alone is not a sufficient indicator of these dynamics. While farm size can signal relative regulatory burden, vulnerability is more meaningfully characterized by factors such as financial resilience, market access, land tenure, crop type, and social context (Figure 5). Part of what makes defining small farms so challenging is the inherent diversity of what is considered "small" around the state. **In the context of SGMA, there are three core characteristics that distinguish a broad group of small-scale farmers: minimal impact on groundwater extractions, substantial community value, and high financial vulnerability- all relative to their neighbors.**

Figure 4. Distribution of California farms and cropland according to farm size. While 50 acres is not a set definition of small farms, this demonstrates that many individuals are operating farms on small acreage. These farms are responsible for limited quantities of groundwater pumping based on their relatively small amount of acreage in production. Source: USDA Census 2022.[19]

SONOMA COUNTY

"Three quarters of our farmers are on less than 50 acres with half of those on less than 9 acres. Frankly it seems there's a higher demand for veg/fruit/specialty crops than can be produced and it's only getting tougher for small-scale operations to take hold. The value of these farmers to the community really strikes home here in Sonoma County."

- ACREAGE DISTRIBUTION
- SPECIALTY CROPS
- COMMUNITY VALUE

TEHAMA COUNTY

"A large percentage of small orchard folks in my area are mono-cropping and do not sell direct to market. These farmers contribute to the agricultural nature of our county and support local economies in their inputs, labor and processing. They are highly vulnerable to SGMA, operate with shallow wells, and when these small businesses fail, it will likely lead to consolidation."

- MONO-CROPPING
- SGMA VULNERABILITY
- CONSOLIDATION RISK

TULARE AND KINGS COUNTIES

"The size of small farms depends on several factors. For example, ranchers are usually in the hundreds of acres. Towards the foothills you see smaller acreage and it is citrus, stone fruit and some vegetables which can range from a few acres to a hundred. These small farms often have operating loans or mortgages, no crop insurance, and limited access to surface water. Many are tenant farmers and have little access to grant resources."

- CROP-TYPE VARIATION
- FINANCIAL PRECARITY
- GRANT ACCESS GAPS

Figure 5. The Outreach Specialists capture the regional diversity of the small farm population.

Small-scale farmers are those who likely have **minimal impact on groundwater extractions** compared to neighboring farms. They often farm small acreages, grow crops with relatively low water use in combination with conservation practices, or pump relatively low volumes of groundwater. Despite their reduced-risk for contributing to groundwater overdraft, small-scale farmers are subject to the same regulatory frameworks, fees, and restrictions as relatively high-volume pumpers. Additionally, many small-scale farmers **provide substantial value to their communities.** They are often engaged locally, contribute to local food economies, and support food security and sovereignty. Production systems vary greatly throughout the state, with small-scale farmers near Fresno growing more than 70 types of vegetables, fruits, and herbs, while small farms in the Sacramento region grow strawberries, vegetables, and stone fruits for local consumption.[20] Lastly, small-scale farmers may be **highly vulnerable** to losing their livelihoods under SGMA implementation, as this report demonstrates through the range of financial risks they face. Compounding these challenges, many operate under social, operational, and financial constraints that limit their ability to adapt to groundwater restrictions, increasing the likelihood of farm exit. This risk is supported by results from state-wide surveys of small-scale farmers which found that **85% of respondents are concerned they may need to shut down their operations (n=54)** (Figure 6).

Farmers who meet these three characteristics are likely to be both least responsible for unsustainable groundwater conditions and most at risk under current implementation pathways. As such, they warrant **targeted accommodations**, such as adjusted fee structures, technical assistance, or flexible compliance pathways as described later in this report, to ensure that SGMA implementation does not disproportionately harm them.

3 out of 4

Surveyed small-scale farmers fear they may have to shut down their operations.

Figure 6. Many surveyed farmers fear they may need to shut down their operations.

Identifying a Subset of "Small Farm de minimis Pumpers"

Recognizing this broader group is a necessary first step, but is not sufficient. Within this population, there exists a smaller subset of farmers whose groundwater use is so limited that their impact on basin conditions is effectively negligible. For these farmers, even well-designed accommodations may be insufficient to protect their businesses and/or unnecessarily burdensome relative to their impact. This subset can be defined as "small farm de minimis pumpers" (Figure 7). For this group, equitable groundwater management may require not just accommodations, but **alternative requirements or exemptions.** This approach is consistent with emerging policy thinking, including recent recommendations from the Second Statewide Agricultural Expert Panel Report which recognize a category of "reduced-risk small farms" that could be defined as meeting a number of identified criteria associated with lower risk for nitrate leaching.[21]

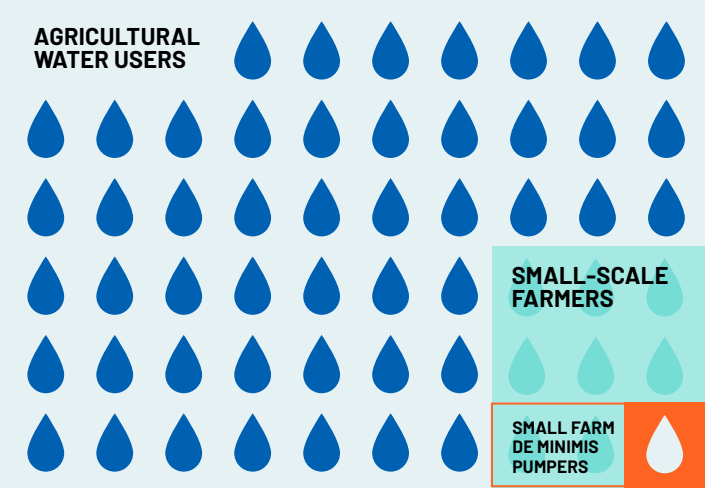


Figure 7. Conceptual subsets of beneficial groundwater users.

Farmer workshop at Laura's Apples, Sonoma County

Implementing such an approach requires a clear and defensible method for identifying eligible farmers. To support this process, we propose a **three-part identification framework** that GSAs can use to systematically identify the subset of "small farm de minimis pumpers". This framework is based on characteristics of groundwater use, community value, and vulnerability (Figure 8). Farmers would qualify by meeting a **minimum of two criteria** within each of the three characteristics (six total), ensuring that eligibility reflects a combination of criteria, rather than a single factor. In practice, GSAs could collect the information themselves, or small-scale farmers could volunteer the data to demonstrate eligibility. Providing sufficient documentation would require significant effort by the farmers, who would likely benefit from technical assistance to support this process. This framework is intended as a guiding structure; a formal protocol for implementation, verification, and documentation would still need to be developed to operationalize it at the basin level.

These criteria encompass the farms that truly have minimal impact on the groundwater basin. There are many other farming operations, particularly mid-sized farms, who contribute meaningfully to California agriculture and may still be vulnerable under SGMA. These farms are all integral to California, and would also be supported by the suite of recommendations detailed in Opportunity 3 of this report. They are not included in this "small farm de minimis" definition because their water use is not negligible in most groundwater basins. For these farms who are not "small farm de minimis," more opportunities are needed to positively value and reward practices or production changes toward soil management for water retention and irrigation practices that conserve water.

Using this framework, GSAs can accommodate the subset of small-scale farmers whose total groundwater use is negligible at the basin scale, but whose loss would have outsized social, cultural, and economic consequences. Many such farmers are tenant farmers or socially disadvantaged, with limited access to capital, insecure land tenure, and constrained participation in SGMA processes. Despite these challenges, they play an outsized role in sustaining local food systems and community wellbeing and warrant protective actions.

Proposed framework to categorize "small farm de minimis pumpers"

1 **Part 1: Verify the water user has minimal impact on groundwater extractions**
by continuously meeting at least 2 of the following criteria

SMALL FARM CRITERIA	"SMALL FARM DE MINIMIS" CRITERIA	DATA SOURCES FOR ASSESSMENT
Small acreage	The user's farm is in the bottom 3% of the farm sizes in the GSA, and under or equal to 80 acres	• GSA records • County Pesticide Use Reports
Low water use cropping system	The user grows a crop that requires 2 AF per acre or less per year	• Scientific documentation of crop water use • GSA records
Low-volume pumping (if data is available)	The user's groundwater use is below a threshold determined to be negligible by the GSA based on model error	• Flow meters • GSA records (from ET models) • Groundwater budgets

2 **Part 2: Verify the water user provides value to their local community**
by continuously meeting at least 2 of the following criteria

SMALL FARM CRITERIA	"SMALL FARM DE MINIMIS" CRITERIA	DATA SOURCES FOR ASSESSMENT
Local engagement	The user provides community building education events and programs OR the user lives in the county where they farm OR the user lives within 50 miles of their farm	• Self reporting • Documentation
Support local food economies and access	The user sells 50% or more of products to direct markets within California (e.g., schools, prisons, hospitals, farm stands, CSAs, farmers markets, restaurants, local grocery, and aggregators that sell locally)	• Certified producer certificate for farmers markets • Self reporting • Documentation
Contribute to food security and sovereignty	The user cultivates niche crops that are not otherwise widely accessible	• County Pesticide Use Reports • Certified producer certificate for farmers markets • Self reporting • Documentation

3 **Part 3: Verify the water user is vulnerable to losing their livelihood under SGMA**
by continuously meeting at least 2 of the following criteria

SMALL FARM CRITERIA	"SMALL FARM DE MINIMIS" CRITERIA	DATA SOURCES FOR ASSESSMENT
Depend on shallow groundwater	The user's well depth is more shallow than the nearest minimum threshold	• GSA records • OSWCR database • Self reporting • Documentation
Lack of adaptive capacity	The user is a sole proprietor or a business with 4 or fewer full time employees OR the user's household income is below the threshold for California Food Assistance OR the user rents more than 50% of their farmland.	• Self reporting • Documentation
Disadvantaged	The user is a member of a socially disadvantaged group as defined by AB 1348	• Self reporting

Figure 8. A proposed three-part framework for identifying "small farm de minimis pumpers" at the local level. This subset of small-scale farmers have minimal impact on groundwater resources relative to neighboring farms, contribute substantial benefits to their communities, and are highly vulnerable to losing their livelihoods due to the evolving regulatory landscape.

Because California agriculture is highly variable across the state, identifying both the broader group of vulnerable small farms and the narrower subset of "small farm de minimis pumpers" should occur at the local level. GSAs are best positioned to incorporate local knowledge, available data, and farmer input into this process, although state support will be necessary to ensure consistency and capacity. To this end, DWR should create a fund for "Building Small Farm Resilience Under SGMA" to support this (and other) work, with detailed suggestions provided throughout this report.

Distinguishing among water users based on impact and vulnerability is foundational to equitable groundwater management. Without it, SGMA implementation risks imposing the greatest burden on those who contribute least to undesirable outcomes. At the same time, identification alone is not sufficient. Recognizing a broader group of vulnerable small farms should lead to targeted accommodations (such as tiered fee structures), while identifying the subset of "small farm de minimis pumpers" should enable alternative requirements, exclusions or exemptions through the proposed framework. Together, these steps establish a pathway toward groundwater management that is both effective and equitable. Opportunity 2 builds on this foundation by outlining how GSAs, DWR, and small-scale farmers can work together.

At the same time, identification alone is not sufficient. Recognizing a broader group of vulnerable small farms should lead to targeted accommodations (such as tiered fee structures), while identifying the subset of "small farm de minimis pumpers" should enable alternative requirements, exclusions or exemptions through the proposed framework.

Pine Creek Farm, Butte County

OPPORTUNITY 2

Coordinate and Act to Keep Small-Scale Farmers in Business

Thao's Fruit Stand, Merced County

Identification alone is insufficient because small-scale farmers often operate with limited margins and adaptive capacity, therefore uniform allocations, fees, or reporting requirements may unintentionally impose disproportionate burdens.

Once small-scale farmers are recognized, GSAs should make deliberate choices to support their continued viability and state agencies should provide guidance, funding, and oversight to support this effort. This section examines the opportunity to make more equitable groundwater management decisions, starting with the complementary roles for stakeholders with interests that converge around SGMA.

While SGMA was designed to empower local groundwater governance, achieving equitable outcomes for all agricultural stakeholders requires coordination among key actors (Figure 9). Each stakeholder plays a distinct and complementary role. Although most implementation decisions occur at the GSA level, careful coordination among these actors is essential to ensure that groundwater sustainability is achieved without disproportionate harm to small farms.

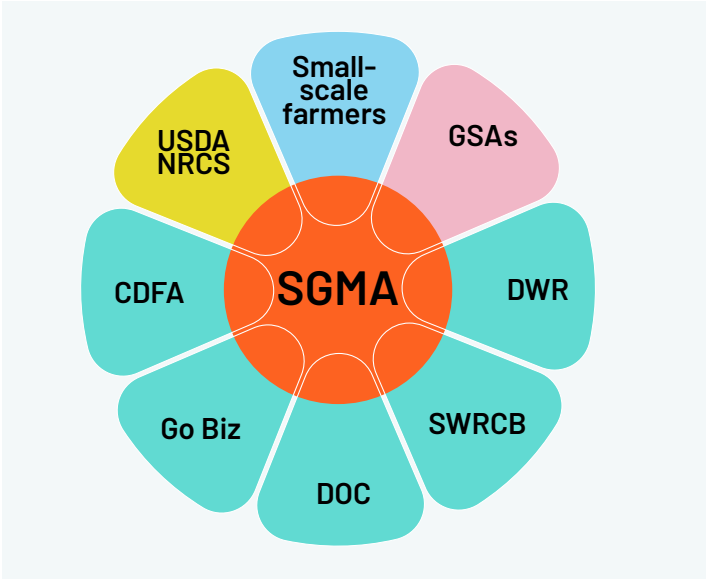


Figure 9. Each entity has distinct roles and priorities, but they share an interest in groundwater sustainability, agricultural viability, and community resilience that converge around SGMA. This common interest highlights a need for intentional coordination and alignment for sustainable and equitable groundwater management.

California Dept. of Water Resources (DWR), State Water Resources Control Board (SWRCB), Dept. of Conservation (DOC), Dept. of Food and Agriculture (CDFA), United States Dept. of Agriculture Natural Resources Conservation Service (USDA NRCS), and Governor's Office of Business and Economic Development (Go Biz)

Role of State Agencies

As the state agency responsible for overseeing SGMA, DWR plays a central role in advancing equitable implementation, an effort that will require dedicated resources. To support this, DWR should establish a "Building Small Farm Resilience Under SGMA Fund," targeted primarily to high- and medium-priority subbasins. By investing at the state level, DWR can prevent these costs from being shifted into local fee structures, which would otherwise exacerbate financial burdens for the very farmers these recommendations aim to support. The Fund would serve multiple purposes: sustaining and expanding programs such as URCTA that provide technical assistance to small-scale farmers, and directing resources to GSAs as they implement inclusive management strategies and identify small farms in their subbasins. In addition, DWR should create a small farms best management practice and guidance document for GSAs to support them in implementing best management practices for protecting small-scale farmers. This document could include a protocol for identifying "small farm de minimis pumpers" based on the proposed framework in Opportunity 1.

Another component of the "Building Small Farm Resilience Under SGMA Fund" is the "Equitable Transition Initiative" described further in Opportunity 4, a collaborative venture including California Department of Food and Agriculture (CDFA) and the Department of Conservation (DOC), two state agencies offering several important programs that can lead to positive outcomes for small farms. Through aligned funding, program support, and policy guidance, these agencies can empower GSAs to balance groundwater sustainability targets with the economic realities of small-scale agriculture. Similarly aligned federal agencies like the USDA's Natural Resources Conservation Service (NRCS) can also play an important programmatic and funding role.

Another state agency, the State Water Resources Control Board (SWRCB), provides an enforcement backstop in SGMA implementation. When assessing fees in probationary basins, SWRCB can provide exemptions for "small farm de minimis pumpers," consider forms of tiered fees, manage recharge permits to incentivize on-farm recharge basins near vulnerable wells, and ensure that programs like Irrigated Lands Regulatory Program (ILRP) and Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) are coordinated with SGMA implementation (as described in Opportunity 3 - General Operations).

Capay Hills Orchard, Yolo County

URCTA Program, Department of Water Resources

Launched by DWR in 2021, the Underrepresented Communities, California Tribes, and Small Farmers Groundwater Technical Assistance (URCTA) Program works to identify the needs, risks, and vulnerabilities of communities affected by SGMA implementation. The program provides localized technical assistance to help California tribes, small-scale farmers, drinking water well users, groundwater-dependent ecosystems, and underserved communities understand SGMA, participate in decision-making, and comply with emerging groundwater requirements.

URCTA operates through partnerships with locally based organizations, bringing trusted, community-connected support to those who need it most. The small farms portion of URCTA includes the Community Alliance with Family Farmers (CAFF), University of California Small Farms Network, the University of California Davis Small Farmer Water Justice Clinic, Cuyama Valley Small Farmer and Rancher Network, and others.

Role of Small-Scale Farmers

Small-scale farmers in California face a complex mix of operational, regulatory, and financial challenges that can limit meaningful participation in groundwater governance. Although SGMA calls for inclusion of all "beneficial users" of groundwater, these farmers often encounter barriers to engagement, including limited access to information, language and time constraints, and lack of familiarity with technical processes.[22] Recommendations made in the following pages will facilitate their participation in GSA meetings, advisory committees, and stakeholder processes. Engagement not only improves policy design but also strengthens their technical understanding and capacity to advocate for practical, fair solutions. Small-scale farmers who serve in representative roles can be essential bridges between GSAs and groundwater-dependent communities that may otherwise remain underrepresented. Effective inclusion of small-scale farmers in GSA processes will facilitate development of innovative strategies for groundwater management involving alternative crops, on-farm recharge, and land repurposing. Importantly, we acknowledge that all farms in California have a role to play in conserving groundwater use, and small farms can continue to innovate and implement strategies to reduce their water usage.

Mo'Jus Farm, Yolo County

Role of GSAs

The greatest opportunity for equitable SGMA implementation lies with the GSAs. Many GSAs are working in good faith under significant constraints, and examples of inclusive groundwater management already underway are highlighted as case studies throughout this report. However, further progress is possible. With financial and policy support from the state, GSAs should evaluate how their groundwater planning and implementation including outreach efforts, projects, allocations, fee structures, and regulatory processes uniquely affect small-scale farmers and adjust accordingly.

Equally important is including small-scale farmers in governance, not merely as regulated entities, as will be explored in detail in the following section (Opportunity 3 General Operations). By embedding inclusivity into core operations, GSAs can better fulfill SGMA's intent of locally-driven and representative groundwater management. Additional equitable actions by GSAs may include establishing a classification for small farms in their basin and adopting alternative governance conditions such as tiered or reduced water use rates.

Alignment Across Levels of Governance

Equitable groundwater management under SGMA depends on alignment across state guidance, local implementation, and farmer participation. DWR and other state agencies should provide the enabling framework and resources, small-scale farmers should contribute local knowledge and lived experience, and GSAs should translate those inputs into fair and workable policies. Strengthening coordination among these actors will be essential to achieving groundwater sustainability while preserving small-scale agriculture in California.

With roles clarified and a framework for coordination in place, the next section addresses the decisions GSAs are making every day. Opportunity 3 provides recommendations for GSA activities where the risks to small farms are greatest and the opportunities for equitable action are most concrete.

Evenson Family Farms, San Luis Obispo County

OPPORTUNITY 3

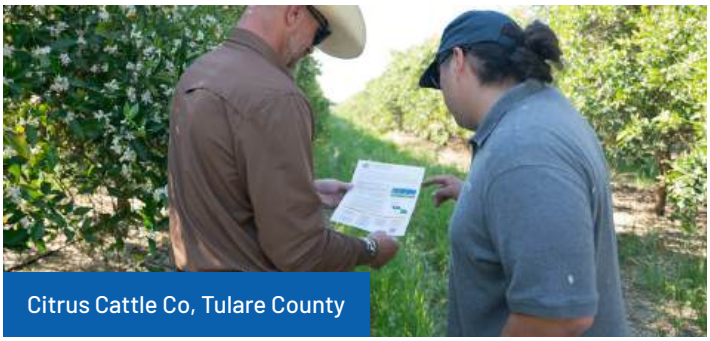
Implement Actions that Support Small-Scale Farmers in Groundwater Management Decisions

Cardoza and Cardoza Farming, Tulare County

Opportunity 3 drills down on GSA-level decisions and provides 50 actionable recommendations. It is organized across three critical domains where small-scale farmers face heightened risks:

- General operations, encompassing outreach, accessibility, GSA board composition, local capacity, and financing mechanisms.
- Management actions covering programs such as water markets, recharge projects, and land management initiatives.
- Groundwater use regulation including monitoring, allocation and fee structures, and appeal mechanisms such as adjudications.

Structural, technical, and financial risks are described in each domain followed by targeted recommendations. These recommendations are designed to reduce the risk that small farms go out of business due, in part, to regulatory structures that larger operations are better positioned to navigate.



Citrus Cattle Co, Tulare County

Outreach and Community Engagement

SGMA requires GSAs to develop outreach programs that engage a diverse range of social, cultural, and economic interests, including California Native American Tribes and disadvantaged communities.[23,24] Many GSAs have invested considerable effort into developing transparent, informative, and welcoming outreach programs. However, these efforts often fall short in meaningfully reaching and involving small-scale farmers, particularly those from historically underrepresented or socially disadvantaged backgrounds. A survey of disadvantaged communities across the San Joaquin Valley found that 87% of respondents were unfamiliar with SGMA, underscoring major gaps in public awareness and engagement.[25] Across outreach conducted in priority basins, more than half of small-scale farmers had not heard of SGMA before they met a SGMA Outreach Specialist. An even lower share were familiar with their local GSA or upcoming demand management actions.

Although SGMA calls for the participation of all "interested parties" and consideration of all "beneficial uses and users" of groundwater, research shows that groundwater-dependent users are often underrepresented in these agencies. A 2020 study on farmer participation in SGMA found that small and groundwater-dependent farmers were significantly under represented in GSAs and advisory committees.[26] The 2022 Underrepresented Farmers and SGMA report reviewed 14 GSPs and found no significant effort to identify, engage, or incorporate feedback from small-scale farmers.[27] Because of the multiplicity of GSAs in some counties, the use of acronyms and technical language, and the voluminous documents required to conduct SGMA business, becoming engaged in the process can be confusing and even intimidating.

GSAs typically send official announcements, ballots, and invoices to property owners, inadvertently creating a significant gap in outreach and coordination with tenant farmers who are the primary water users. **Statewide survey results found that 57% of respondents rent some or all the land they farm (n=63), a slightly higher rate than the results from CAFF's survey where 39% of farm owners/operators reported that they lease at least some of their land.** These results for small-scale and family farms are more than double the state average of 20% of farms operated by renters.[28]

Approximately

1/2

of surveyed small-scale farmers rent at least some of their farmland

C&R Farm, Merced County

Tenants may be unaware that GSA records need to be updated, leaving GSAs with outdated contact lists that fail to reach the individuals actually farming the land and making water management decisions. In some cases, there are multiple layers of rental agreements when a master tenant sub-divides their parcel to rent to others, further complicating the flow of information. Farmers also frequently experience confusion about how SGMA intersects with other regulatory programs, particularly the Irrigated Lands Regulatory Program (ILRP), including fees, reporting requirements, and overlapping missions. Currently, there is little to no coordination between the regulatory bodies overseeing SGMA (DWR and GSAs) and ILRP (SWRCB and third party water quality coalitions) or CV-SALTS (SWRCB), compounding this confusion.

CASE STUDY

Groundwater Bills Without Context

In early 2026, a small-scale farmer in Merced County received a large, unexpected bill from her GSA and did not understand what it was for or how to respond. An URCTA-funded Small Farm Outreach Specialist stepped in to help explain the process and purpose of the fee.

"She didn't know why the water district was sending her fees. I explained the process and once she understood she was fine with it. But she has a big bill because she hadn't known what the fees were and didn't know what to do. Additional explanations go a long way with these farmers." — Small Farm Outreach Specialist, Central San Joaquin Valley

With a clear explanation, the farmer understood the intent of the fee and didn't dispute it, illustrating the effectiveness of targeted outreach and the importance of clear communication. However, when the Outreach Specialist attempted to verify how the fee was calculated, she spent several hours trying to locate supporting data and could not clearly trace the methodology. While GSAs are working hard to implement complex groundwater accounting systems, this case highlights an ongoing challenge: When billing data and methodologies are not easily accessible or transparent, even well-supported farmers and experienced intermediaries may struggle to fully understand SGMA-related costs.

Grandpa's Trees, Tehama County

Risks

Outreach and Community Engagement

Missed communication with tenant farmers: Most GSAs communicate directly with landowners, so tenants who are actually farming the fields and making water management decisions may be left out. This limits their ability to participate in public meetings, provide input on proposed actions, and in some cases access essential groundwater data. Tenant farmers may be unaware of GSA actions, including penalty fees, if notices were only sent to the landowner or rental company.

Confusion between SGMA and ILRP: Unclear distinctions between fees, reporting requirements, and overlapping missions increase the risk that small-scale farmers misunderstand program requirements and view both programs negatively. As the CDFA Regulatory Alignment Study noted, without shared messaging across agencies, producers may receive fragmented guidance, leading to confusion, missed deadlines, or duplicated efforts — a challenge especially acute for small-scale and socially disadvantaged producers.[29]

Limited capacity for participation: Many small-scale farmers lack the time, staff, or resources to actively engage with GSAs. As the primary labor force on their farms, they have limited capacity to attend GSA meetings and activities, reducing the diversity and representativeness of participants.

Missed opportunities for local partnerships: GSAs that do not collaborate with local farm organizations risk missing critical opportunities to build credibility, ground-truth decisions, and expand outreach to the farming community.

Red Gate Ranch, Tehama County

Recommendations

Outreach and Community Engagement

1

Conduct targeted and coordinated outreach (GSA): Share materials in multilingual and multi-modal formats (fact sheets, video explainers, workshops, office hours), directly from the GSA and through local agricultural organizations (Resource Conservation Districts (RCDs), NRCS, nonprofits, UC Cooperative Extension, CAFF, etc.). Reach out to lessees and farm operators and leverage existing local networks to improve engagement with small-scale and tenant farmers.

2

Establish a small-scale farmer liaison (GSA/DWR): Using the proposed DWR fund for "Building Small Farm Resilience under SGMA," create small-scale farmer liaison positions to serve as a primary point of contact, coordinate outreach, and represent small-scale farmer interests to GSA Boards. The positions could be regional, not necessarily GSA-specific and the network of UC Cooperative Extension Small Farms Advisors offers an excellent model. A similar recommendation was made by the CDFA Regulatory Alignment Study.[29]

3

Develop cross-program coordination (GSA/DWR/SWRCB): Develop collaborations between state agencies to facilitate GSAs and ILRP watershed coalitions in streamlining and aligning processes and fee structures. Develop local outreach materials that explain the distinctions between SGMA and ILRP, and sponsor joint informational workshops covering multiple regulatory topics and agencies.

4

Invest in small farm technical assistance (DWR): Using the proposed DWR fund for "Building Small Farm Resilience under SGMA," continue to invest in the URCTA technical assistance program, empowering small-scale farmers to participate in local groundwater management.

5

Expand the Regulatory Alignment Study to include SGMA (CDFA): CDFA's Regulatory Alignment Study draft recommendations do not specifically include alignment across the SGMA program. The state should address this shortcoming by developing recommendations and best practices for coordination of SGMA, ILRP and CV-SALTS.

6

Encourage outreach to tenants (GSA): Encourage landowners to share all SGMA-related communications with tenants, including mailed materials, and enable tenants to have direct, co-equal access to GSA digital portals.

GSA Accessibility

As public agencies, GSAs are subject to the open meeting requirements of the Brown Act, which ensures the public's right to attend meetings, comment on agenda items, and access meeting materials in advance. Many GSAs follow these requirements rigorously - maintaining up-to-date websites, posting materials well in advance, and ensuring reliable online access - practices that build trust and community buy-in essential to SGMA's long-term success. However, accessibility varies across subbasins, and some GSAs, particularly those with limited staff capacity and resources, struggle to consistently meet these requirements, creating barriers for farmers with limited time to engage.

> *"The board isn't getting documents in advance of the meetings which makes the meetings less productive. The website has no straightforward calendar, agendas aren't posted, meetings are cancelled. It's like the flow of information is getting blocked."*
>
> — Small Farm Outreach Specialist, Sacramento Valley

GSAs often use Memoranda of Understanding agreements to establish working groups or committees that address issues such as demand management or coordination across subbasins. Because these meetings typically do not include a quorum of any one GSA's board members (sometimes by design), they are not subject to the Brown Act and are not always open to the public, limiting transparency and restricting opportunities for meaningful early-stage stakeholder participation.

Language can also be a significant barrier for small-scale farmers. **In a recent statewide survey, 44% of respondents prefer to communicate in a language other than English (n=61).** In one high priority subbasin, a Proposition 218 public hearing to count Benefit Assessment ballots had to be postponed because many farmers were unable to read their ballots without a Spanish translation. The ballot ultimately failed, underscoring the consequences of insufficient language accessibility.

Access to online groundwater platforms and data reporting tools presents additional challenges. Many GSAs have transitioned to digital systems for managing groundwater use data, monitoring reports, or checking allocations. However, digital literacy and access to reliable internet varies widely among farmers, particularly among older growers, immigrant farmers, and non-English speakers. Data access is further complicated by the landowner-tenant divide: GSA systems typically link accounts to property ownership records, meaning tenants - often the primary water users - cannot access groundwater data or reporting portals unless the landowner explicitly grants permission. Improving accessibility requires not only functional websites and transparent governance, but intentional design of digital tools that account for the diversity of users, varying levels of digital proficiency, and the realities of tenant farming in many subbasins.

Evenson Family Farms, San Luis Obispo County

Risks

GSA Accessibility

Limited participation undermines SGMA: When meetings, materials, and processes are not accessible, small-scale farmers are less likely to engage and valuable insights may be missed. This failure to include all relevant stakeholders reduces local ownership of SGMA goals.

Closed committee discussions erode transparency and trust: When working groups and committees are not public, small-scale farmers and community members lose opportunities to weigh in on key decisions early in the process. This lack of transparency can foster mistrust and opposition to GSA decisions.

Digital barriers increase noncompliance risk: Farmers without reliable internet access or digital literacy may miss reporting deadlines or misunderstand requirements, leading to inadvertent noncompliance and penalties.

Language inaccessibility reduces effective communication: When outreach materials, ballots, or reporting instructions are not available in languages commonly spoken by the farming community, key information may be misunderstood or ignored, increasing the risk of procedural failures or nonparticipation.

Recommendations

GSA Accessibility

7

Require Brown Act training and facilitation support (GSA): Local agency officials are required by AB 1234 to take an Ethics Training that includes the Brown Act. The training is only required for Boards where members are compensated in any way but the requirement should be enforced for all GSA board members. Likewise, facilitation support via DWR-funded Facilitation Support Services or other facilitation training should be encouraged.[30]

8

Establish and maintain inclusive information sharing (GSA): GSAs should establish and maintain user-friendly, mobile-compatible websites with an up-to-date calendar of meetings with online accessibility, an archive of meeting agendas and recordings, and multilingual outreach materials in languages commonly spoken by small farmers in the region (e.g., Spanish, Punjabi, or Hmong). They should also establish regular, automated (when applicable) communications to distribute announcements, materials, and deadlines directly with farmers and through local farmer-affiliate organizations.

9

Support digital literacy (GSA): Offer workshops and training to help small-scale farmers navigate GSA websites, applications, and monitoring and reporting tools, including online portals.

10

Hold open meetings (GSA): Working group and committee meetings should be open to the public and follow Brown Act guidelines even if they are not technically subject to them.

Jelly's Ferry Ranch, Solano County

GSA Board Composition

SGMA was enacted during one of the most severe droughts in California's history, a period that brought public attention to declining groundwater levels, subsidence, and dry wells — especially in low-income rural communities. In response, SGMA directed implementing agencies to engage disadvantaged communities and include participation from those most affected by groundwater overdraft. However, the legislation limited GSA eligibility to local public agencies with water supply, water management, or land use responsibilities. As a result, GSA boards are largely composed of representatives from counties, cities, and reclamation, water, or irrigation districts.

These entities — particularly water and irrigation districts — have become key regulators of groundwater at the local level, yet many restrict participation to landowners through acreage-weighted voting. Only landowners can sit on boards and vote in elections in water, water storage, and reclamation districts, giving large landowners disproportionate influence while small farms, tenants, and non-landowners are effectively excluded. A recent Yale Law Journal analysis found that in most California groundwater basins, landowner-dominated entities hold major roles in groundwater governance.[31] In many areas, they are the primary or even the only local entities controlling implementation of a crucially important regulatory program. These systems of representation may weaken accountability and create conflicts of interest in decisions about water markets, recharge, or allocation of SGMA funds. In one high-priority subbasin, the GSA delegated responsibility and funding for developing demand reduction plans to a water district dominated by large growers.

In several cases, water districts with non-democratic voting structures were created after SGMA passed, specifically to gain landowner access to GSA boards. When these districts form, small farmers with limited voting rights can become responsible for new fees while receiving few direct services beyond basic SGMA compliance. Because votes in these districts are allocated in proportion to land ownership, larger landowners become the decision-makers while smaller landowners are effectively shut out of the governance process. Outreach Specialists have identified five such districts created in direct response to SGMA, and additional cases likely exist statewide.

Many GSAs make a sincere effort to bring a wider group of stakeholders into their decision-making process, usually by incorporating them into advisory committees. However, the effectiveness of this approach depends on the commitment of the GSA and the resources and structure provided to those committees.

PROACTIVE SMALL-FARMER OUTREACH IN ACTION

Sonoma GSAs

Sonoma GSAs hired a small farm Outreach Specialist (through a contract with CAFF) to engage farmers who had been difficult to reach. The result: broader participation across the "Measure Up!" water monitoring program, the Water Use Efficiency Program, and the Groundwater Users Information Data Exchange. Farmers valued having someone from their own community offer approachable, practical ways to engage with the GSA.

North Kings GSA

Coordinated with UC ANR Fresno Small Farms bilingual team to provide targeted SGMA outreach and education to South East Asian small-scale farmers — creating space for inclusive small farm engagement.

Yolo Subbasin Groundwater Agency

Executive staff held periodic informal gatherings at a local coffeehouse, creating a forum for casual community dialogue at convenient hours and a comfortable, accessible location. Community members appreciated the opportunity to connect outside of formal meeting settings.

Covering Ground Farm, Butte County

Risks

GSA Board Composition

Governance structures limit small farmer input: Boards dominated by large landowners may lack awareness of small farm realities, leading to policies that unintentionally favor larger, better-resourced operations over small-scale and tenant farmers.

Lazaro Organic Farms, Monterey County

Recommendations

GSA Board Composition

11

Establish small-scale farmer standing committees (GSA/DWR): Using the proposed DWR fund for "Building Small Farm Resilience under SGMA," support establishment of standing SGMA outreach committees if regional committees representing small-scale farmers do not already exist. Provide committees with regular GSA updates, staffing support, and a formal pathway for recommendations to be itemized on GSA board agendas and discussed publicly.

12

Adopt a feedback structure for tenant farmers (GSA): Adopt a structure to solicit and incorporate feedback from small-scale tenant farmers since they are not represented on GSA Boards.

13

Adopt equitable voting structure for districts (Legislature): Adopt equitable voting structures for water and irrigation districts. Require one-vote governance, given the importance of these districts in regulating groundwater, a common-pool resource.

Turkey Tail Farm, Butte County

Build Local Capacity

The formation of California's 250+ GSAs has created a sustained demand for local knowledge of hydrology, engineering, and outreach to enable GSAs to understand their subbasins and meet SGMA regulatory requirements.[32] With limited budgets, many GSAs operate lean and rely on consultants from private firms and public agencies to cover their core functions. Consultants provide a deep bench of expertise that may not be replaced by staff. However, if science, planning, and outreach are handled primarily by consultants with limited meaningful local engagement, the results may not reflect on-the-ground conditions and local priorities. In these cases, key decisions are made with limited oversight, accountability is weakened, and recommendations fail to reflect local realities.

In the Sacramento Valley, overreliance on external consultants without parallel investment in local capacity has had tangible consequences. These include hydrologic analyses based on outdated data, limited understanding of local agricultural and cultural conditions, and parcel misclassifications that have produced flawed groundwater allocations and fee structures. In one case, a recharge pilot program was planned using outdated Army Corps of Engineers specifications that failed to reflect current creek flow dynamics, leading to incorrect flood-risk assumptions that damaged public trust and slowed community participation in the GSP process.

Building local capacity — through staff hiring, training, and partnerships with organizations like RCDs and farm-facing nonprofits — is essential to grounding GSA decisions in local realities. GSAs that invest in this manner are better positioned to develop realistic plans, maintain community buy-in, incorporate the interests of small farms and disadvantaged communities, and implement SGMA effectively over the long term. The ability of local organizations to effectively reach out to small-scale farmers was illustrated when CDFA staff from the Office of Agricultural Resilience and Sustainability compared funding through block grants to local organizations with direct-to-producer grants chosen by staff. In their programs, local organizations administering block grants gave significantly more funding to smaller farms than when CDFA staff made the decisions.[33]

Risks

Build Local Capacity

Over-dependence on consultants excludes local input: Dependence on consultants without frequent and meaningful incorporation of local feedback risks excluding local stakeholder input into GSA operations. Furthermore, insufficient knowledge of local conditions, including soils, crops, and community dynamics, can result in unrealistic plans and breed distrust between the groundwater users and the GSA.

Bespoke tools drive up costs: Bespoke tools (e.g., groundwater accounting platforms developed for individual GSAs) drive costs that flow directly to higher fees for groundwater users, while also creating a single-point of failure where a sudden vendor departure can stall critical programs.

Weak local partnership limit reach: Lack of partnerships with local organizations (e.g., RCDs and local farm-facing non-profits) limit a GSA's reach and threatens successful GSP implementation.

Recommendations

Build Local Capacity

14

Incentivize local hiring and training (DWR): Use the proposed DWR fund for "Building Small Farm Resilience under SGMA" to provide incentives for GSAs to hire and train local staff for outreach and engagement.

15

Encourage collaboration across subbasins (GSA): Explore opportunities for collaboration across subbasins on shared services (e.g., data systems, vendor contracts) to reduce prices, thereby reducing budgets and ultimately fees paid by farmers.

Evenson Family Farms, San Luis Obispo

Financing GSA Activities

Implementing SGMA has been costly, and long-term management will require sustained funding for decades. Although GSAs have cumulatively received over $500 million from DWR, these funds are declining while groundwater management obligations continue to expand. As a result, GSAs must increasingly rely on local revenue sources, often shifting financial burdens onto growers and rural communities, with disproportionate impacts on small-scale farmers. GSAs have several potential revenue-generating mechanisms, including Proposition 218 property-related fees, Proposition 26 regulatory fees, special taxes, grants, loans, and bonds.[34] These funding mechanisms vary in complexity, procedural requirements, and appropriateness to local needs - for example, special taxes require two-thirds voter approval while benefit assessments require only a majority vote.

Proposition 218 fees are frequently recommended by consultants despite their complexity, requiring detailed engineering and financial analysis to demonstrate that each parcel's charge reflects its proportional benefit. A recent surge of Prop 218 elections includes several that have failed by wide margins. Proposition 26 fees offer an alternative, allowing GSAs to adopt regulatory charges without voter approval as long as revenue does not exceed the cost of providing the service, though these funds cannot be used for infrastructure.[34]

Some GSAs have also explored tiered pumping charges to encourage conservation and align costs with groundwater use. However, this approach is subject to legal uncertainty. In Patz v. City of San Diego (2025) a trial court decision raised concerns that tiered water rates could violate Proposition 218 if they were not clearly tied to the cost of service.[35] This ruling was later overturned in December 2025, when the California Court of Appeal affirmed that budget-based tiered rates were consistent with Prop 218, as long as relative costs were properly allocated among users.[35] GSAs would benefit from clarification on their ability to tier fees. The February 2026 introduction of AB 2180 would allow local governments to charge tiered rates to parcel or customer classes based on common characteristics indicative of likely water use. If this bill passes, it could enhance the ability of GSAs to create tiered fee structures.

Technical assistance from an independent party, combined with local feedback and strong outreach, is essential as GSAs navigate complex funding processes. As noted by the UC Berkeley Center for Law, Energy, and Environment, "an otherwise carefully designed [Groundwater Sustainability] Plan could be infeasible without a clear financing pathway."[36] Particularly in the current moment, faced with a difficult state budget and shrinking federal resources, GSAs are left to "navigate tricky, time-consuming, and resource-intensive public processes."[36] Meeting SGMA requirements in this environment will depend on thoughtful, proactive planning and sustained community engagement.

Risks

Financing GSA Activities

Poor planning drives up costs: GSA boards that do not fully understand their financing options or take ownership of the process may overlook simpler mechanisms or face costly failures on first attempts at passage.

Failed financing due to limited engagement: GSA financing efforts fail due to inadequate local outreach, leadership, and ownership of the process, potentially leading to litigation, confusion, and breach of trust between the GSA and the community.

Legal complexity discourages equitable fee structures: The legal uncertainty and detailed analysis required for tiered fees can deter GSAs from developing progressive rate structures that protect small-scale farmers and reward conservation.

Recommendations

Financing GSA Activities

16

Update financing guidance (DWR): Revise the March 2024 Funding SGMA Implementation resource guide to address GSAs' ability to tier fees and provide additional guidance on funding strategies.[37]

17

Integrate outreach into all financing efforts (GSA): Outreach about budgeting and funding should be incorporated into ongoing GSA engagement efforts and initiated before any vote to levy new fees or assessments. Budget development should be transparent and in the case of tiered rates, the methodology for parcel-level analysis should be thoroughly explained, with ample opportunity for questions and appeals.

18

Diversify and balance funding options (GSA): Ensure funding mechanisms do not disproportionately burden low-volume pumpers. While larger farms can leverage economies of scale to manage fee costs, small-scale and low-income farms are less able to absorb additional fees and warrant intentional protections in how funding structures are designed.

Farmer workshop at Laura's Apples, Sonoma County

Groundwater Markets

Groundwater markets allow water rights holders to buy, sell, or lease groundwater extraction allocations within a basin. Under SGMA, GSAs can assign pumping allocations and, in some cases, permit transfers between users. The intent is to give farmers flexibility, directing water to its "highest value use," while keeping overall pumping within sustainable limits. In practice, oversight of groundwater markets has proven challenging, with instances of markets increasing undesirable results in sensitive areas and concentrating control of market trading (Figure 10). An October 2025 survey found that while many GSPs include water markets as a strategy, almost none have been implemented successfully so far.[38] The McMullin Area GSA market has stalled at the allocation creation stage. The Madera County GSA market stalled after a 2021 trial. The Fox Canyon Groundwater Management Authority market was halted in 2021 after the discovery of increased pumping in sensitive areas (see case study below). There are no set prerequisites for what guardrails a groundwater market must have, creating an oversight challenge.

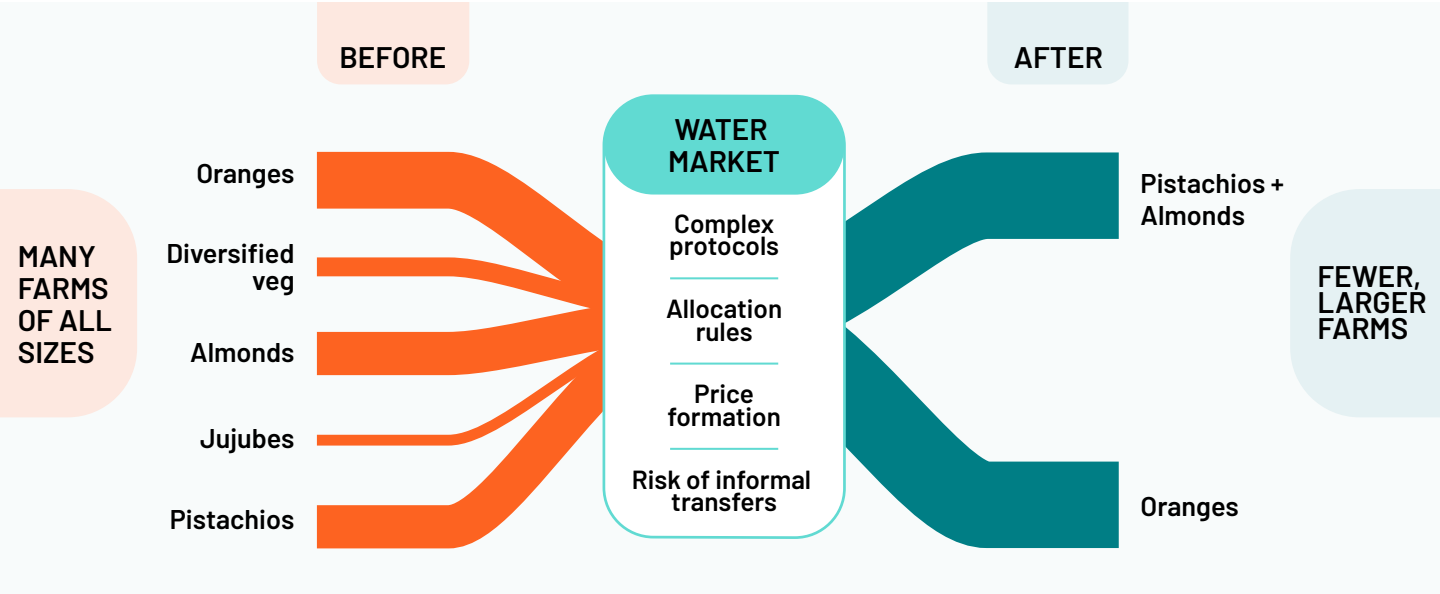


Figure 10. Conceptual diagram illustrating how water market design can influence water access and agricultural outcomes. The diagram depicts a shift from a diverse landscape of farms and crops (left) toward fewer, larger farms specializing in high-value, water-intensive crops such as almonds and pistachios (right). Line thickness represents relative groundwater pumping intensity.

While markets may create opportunities for efficiency, they also present significant risks, especially for small and medium-sized farms. Smaller producers may face barriers to participation, lack of representation in decision-making, or potential loss of water for those who lease land. Complex trading rules and difficulty in managing accounting of trades further complicate transparency and can lead to unintended consequences.[39] While transfers may sound straightforward in theory, in practice, managing the accounting of where traded water is going, who is doing the trading, how much one has to trade, and the resulting impacts of these trades is a huge administrative challenge. Any groundwater market requires the prerequisite of comprehensive accounting of allocations so that it is possible to track how those allocations are later traded. It can be expensive and difficult to implement accounting platforms and challenging to mandate their use.

Of particular concern is the capacity of large-scale operations farming across multiple, noncontiguous parcels to aggregate their allocations. This means that a single entity could pump in various places across a subbasin, and report all pumping together instead of specifically where groundwater extraction occurred. By allowing a single user to combine and obfuscate their pumping in this way, operations can essentially bypass the groundwater market and any rules structured within this market to mitigate negative consequences, such as increased pumping in stressed areas. Preventing negative impacts requires both structural protections — such as inclusive governance, annual evaluations of the market, and transparent decision-making — alongside practical investments in accurate accounting systems, reliable data, and long-term funding for enforcement.

CASE STUDY

Fox Canyon Groundwater Market, Ventura County

The Fox Canyon Groundwater Market was the first developed under SGMA and widely viewed as a pilot project for groundwater markets in the state. Backed by a $1.8 million grant secured by The Nature Conservancy, the market launched in 2017 but halted in late 2021 after significant problems emerged.[40] Landowners aggregated allocations across wells, including noncontiguous properties.[41] The market power exerted by certain landowners, combined with the complexity of trading across multiple wells, led to accounting challenges for the GSA, confusion about who was selling what, and ultimately an inability to maintain transparent and enforceable trading rules. **The basin saw an 8.5% increase in pumping in the most depleted area of the basin.**[41] Even with robust rules in place, **unregulated transfers of allocation that occurred outside of agency oversight** exacerbated overdraft in areas that most needed protection.

The Fox Canyon example demonstrates that even with significant financial and institutional support, groundwater markets face persistent challenges around accurate accounting, preventing market power abuse, ensuring transparency, and avoiding unintended increases in pumping. The Oxnard and Pleasant Valley Subbasins, under the Fox Canyon Groundwater Management Authority, are now in an adjudication process, triggered by plaintiff concerns about groundwater allocations.

Risks

Groundwater Markets

Resource and oversight limitations: Markets require extensive administrative resources for management, monitoring, enforcement, and stakeholder engagement. GSAs are already tasked with a wide range of SGMA implementation responsibilities and may lack sufficient staff, funding, and technical capacity to manage a market effectively. Limited oversight capacity increases the risk of market abuse, delayed response to adverse impacts, and inequitable outcomes for small farmers. Given the resource-intensive nature of this accounting and tracking, a market system may also be a more expensive management option.

Market power concerns: Small farmers may not wield sufficient market power, allowing more powerful entities to dominate the trading program and control how allocations are used.

Impacts on sensitive areas: If large landowners can aggregate allocations across multiple wells, including noncontiguous properties (as seen in Fox Canyon Groundwater Market), pumping may shift into sensitive areas causing further depletion, subsidence or damage to groundwater dependent ecosystems.

Lack of representation in market design: Small and mid-sized farmers are often underrepresented in committees designing groundwater markets, leading to rules that do not reflect their needs or realities. Without strong representation, trading programs risk favoring large landowners and exacerbating inequities.

Barriers to entry: Language access, digital literacy, and limited time or capacity can prevent small farmers — especially immigrant or underserved farmers — from participating effectively in online markets. Lack of technical assistance may leave smaller operations unable to understand trading rules, prices, and compliance requirements. Small farmers may have limited capacity to purchase allocations, putting them at a disadvantage relative to larger operators. The market may prioritize large volume trades, making it difficult for small farmers to secure sufficient water, contravening the intent to provide flexibility.

Impacts to farmers who lease land: Landowners may find it more profitable to sell or trade water allocations than to lease farmland, threatening tenant farmers' access to land and water. Lease agreements often lack protections for water use, creating uncertainty and risk for those reliant on short-term leases.

Covering Ground Farm, Butte County

Recommendations

Groundwater Markets

19

Pursue alternatives first (GSA): Prioritize other demand management strategies before groundwater markets. If pursued, alignment with recharge efforts, well registration programs, and regional land use planning is key.

20

Apply a "Do No Harm" principle (GSA): Design markets that do not worsen inequities or push small-scale farmers out of business. Markets should recognize California's Human Right to Water and prioritize safe and sufficient drinking water. Ensure that large-scale pumpers are not able to combine allocations across noncontiguous parcels. Establish non-tradable allocations for small-scale farmers. Cap trade volumes per entity and require blind trades through third-party administrators, as proposed by the California Water Commission.[39]

21

Mandate engagement with small-scale farmers, small water systems, and drinking water users in the design process (GSA): Require meaningful inclusion of small farms, small water systems, and drinking water users in market design, with targeted capacity building and hands-on technical assistance to address barriers related to broadband access and digital literacy.

22

Prohibit credit transference into sensitive areas (GSA): Bar trades that move pumping into areas experiencing subsidence, lowered water tables, proximity to groundwater-dependent ecosystems, small drinking water systems, or shallower wells vulnerable to interference.

23

Require state oversight of all groundwater markets (DWR): Establish state regulations to protect vulnerable communities and small-scale farmers. Implement monitoring triggers to halt trading if harm occurs, ensure tenant farmers are appropriately protected, and place limits on trading to prevent market power concentration.

Silver River Vineyards, San Luis Obispo County

On-Farm Recharge

Groundwater recharge is a process of replenishing aquifers through infiltration of water into the subsurface. This can occur in various ways:

- Natural percolation into the aquifer from farm fields or unlined canals and streams.
- On-farm recharge occurs by flooding farm fields with surface water, usually during wet periods. Used in orchards during dormancy or during fallow periods in annual crops.
- In-lieu recharge or conjunctive use refers to replacing groundwater use with surface water.
- Dedicated recharge basins are designed to capture excess surface water so that it can soak into the aquifer.
- Managed aquifer recharge encompasses many approaches as well as engineered methods to increase water infiltration beyond natural processes. Flood managed aquifer recharge (Flood-MAR) is a statewide network working to integrate flood and groundwater management.

Interest in groundwater recharge has grown substantially under SGMA as it is often considered the most direct strategy to improve water table levels and reduce subsidence. Executive Order N-16-25 reduced permitting burdens in some cases and despite legal, financial, and hydrologic feasibility concerns, recharge remains central to many GSA efforts. A quarter of all Project and Management Actions (PMAs) listed in DWR's SGMA portal as of April 2026 are categorized as direct aquifer recharge across 73 subbasins.[42] Among the subset of those PMAs that list both costs and benefit estimates, the combined projected costs exceed $6.4 billion, with an anticipated water benefit of approximately 1.2 million acre-feet annually. **Given this scale of investment, it is critical that small-scale farmers have equitable access to participate in and benefit from recharge programs.**

A 2018 Public Policy Institute of California report found that "active recharge on farmland may be one of the most promising ways to capture water cost-effectively in wetter years, but [its use] is low relative to its potential."[43]

Significantly ramping up this practice will require addressing a suite of technical and infrastructure issues. One of the key challenges for expanding on-farm and in-lieu recharge is the need to improve existing conveyance facilities. Many small farms have old surface water infrastructure that has not been maintained or modernized to deliver water when and where needed. Others who are located near canals may lack connections.

INCENTIVE-DRIVEN ON-FARM RECHARGE

Recharge Net Metering Program (ReNeM), Pajaro Valley Water Management Agency

Launched in 2016, ReNeM incentivizes private landowners to build recharge systems on their land by offering rebates based on the volume of water infiltrated, helping to offset operation and maintenance costs. Participants benefit directly through the rebate program and indirectly through improved groundwater supply and quality. Because favorable sites for recharging water are often on private land and on-farm recharge spread throughout a basin costs less per acre-foot than centralized recharge locations, it is a cost-effective strategy worth replicating - and one that makes investing in small farm participation a smart use of limited resources.[44]

Tensiometer for soil moisture measurement

LOW-COST RECHARGE OPPORTUNITY

Storm Water Retention Ponds

Small-scale farmers and ranchers, especially multi-generational operations invested in maintenance and tenure of land and infrastructure, are well positioned to adopt storm water retention ponds as a low-cost recharge strategy. Non-irrigated rangelands are particularly well suited: their rolling topography naturally captures and conveys runoff, and the land is often not viable for intensive commercial agriculture. Beyond recharge, retention ponds improve water quality by allowing pollutants to settle out and can create valuable wildlife habitat. For ranchers already accustomed to using ponds for livestock watering, incentives to build or expand them offer a natural entry point — delivering cascading environmental benefits with relatively modest investment.

Retention Pond

Risks

On-Farm Recharge

Infrastructure and permitting barriers limit participation: Research shows that large landowners are significantly more likely to own parcels with surface water access.[45] Having no access to surface water, outdated infrastructure, or high permitting costs can impair the opportunity to realize the groundwater benefits of recharge and conjunctive use projects on small farms.

Pumping credits and incentives may undermine overdraft reduction: In 2023, half the agencies where growers were practicing on-farm recharge were incentivized with pumping credits that allowed the grower to use the water at a later time.[43] When recharged water is credited for later pumping, there will be limited reduction of overdraft and the aquifer functions as private storage, accessible only to entities with the resources to implement complex recharge projects. Financial incentives that reduce the cost of water, and/or pay for the cost of infrastructure and equipment, managed by public entities, are more equitable and allow the recharged water to be allocated for collective benefit.[46]

Water quality concerns discourage conjunctive use: Uncertainty about surface water quality can discourage small-scale farmers from using it when available. Interviews with organic mixed vegetable producers in the San Joaquin Valley and the recent UC ANR survey both found that many rely exclusively on their well water, even if surface water was available, due to concerns about surface water contaminants impacting food safety or organic certification, and the risk of losing plantings if contaminated.

Overemphasis on recharge may crowd out other strategies: A significant gap exists between proposed recharge volumes and what is practically achievable - limited infrastructure, unsuitable soils, and the short windows when excess water is available all constrain recharge capacity. Agencies may also be overestimating long-term water availability across dry and wet cycles.

Lockewood Acres, Solano County

Recommendations

On-Farm Recharge

24

Prioritize recharge near small farms (GSA): Locate groundwater recharge sites near small farms with shallow irrigation wells or groundwater-dependent communities, when feasible.

25

Lower barriers to recharge participation (GSA): Lower participation barriers by supporting small farms with incentives and technical assistance. A useful resource is the On-Farm Recharge Methods Manual published by Sustainable Conservation.[47]

26

Invest in surface water infrastructure (GSA/DWR): Use the proposed DWR fund for "Building Small Farm Resilience under SGMA" to finance surface water connections and on-farm irrigation equipment improvements in order to facilitate cost effective on-farm recharge and conjunctive use on small farms. For many small-scale farmers close to canals, enabling connections to existing surface water sources would support SGMA goals as well as the economic viability of the operations.

27

Avoid 1:1 pumping credits for single-user recharge (GSA): Do not allow water credits for recharge by a single water user. Instead, offer financial incentives that allow the recharged water to be allocated for collective benefit.

28

Provide grants and technical assistance for retention ponds (GSA): Support small-scale farmers and ranchers with the earthworks, permitting, and planning necessary to develop on-farm retention ponds.

29

Offer guidance on safe surface water integration (GSA): When surface water quality is a concern, educate farmers about appropriate timing and conditions for using surface water in ways that protect food safety certifications and organic status.

30

Prioritize demand management alongside recharge (GSA): Ensure demand management programs include aggressive water use efficiency improvements, including drip and microirrigation, soil moisture monitoring, cover cropping and other emerging technologies.[48]

Alternatives to Bare Ground Fallowing

Achieving groundwater sustainability under SGMA will likely require some land fallowing and shifts in cropping patterns. Estimates suggest between 500,000 and 1 million acres of irrigated agricultural land may be fallowed statewide, and many GSAs have already incorporated land fallowing into their demand management programs.[49] As of April 2026, DWR's SGMA portal lists 56 PMA entries categorized as temporary or permanent fallowing across 29 subbasins, representing over $230 million in estimated costs to generate approximately 130,000 acre-feet in annual water benefits. However, fallowed land without an alternative purpose often becomes bare soil and a significant dust source, leading to public health consequences such as Valley Fever and respiratory disease, impacting snow formation, and causing broader economic losses.[50] Since bare soil is the cause of the majority of annual evaporation from irrigated agricultural land, it is not a practice that is consistent with SGMA goals.[51] The income and job losses from land fallowing fall unevenly across farm sizes. For small or leased operations, fallowing even a few acres can threaten their entire livelihood, while larger operations can spread the burden across a broader land area.

Fortunately, practical alternatives to bare ground fallowing can reduce groundwater demand while delivering environmental co-benefits. Practices such as cover cropping, the use of stubble or soil mulches, dryland farming, non-irrigated rangeland, land repurposing, transitioning to less water intensive crops, and temporary land fallowing offer viable pathways. Many farmers, especially small-scale, multi-generational family operations, are already engaged in stewardship-oriented practices, reflecting their reliance on the long-term productivity of the same acreage. **A recent statewide survey found that 71% of respondents use at least one water conservation or regenerative agricultural practice including drip irrigation, growing drought tolerant crops, cover cropping, agroforestry, or permaculture (n=63).** These results underscore the important role of small-scale farmers as environmental stewards in California's agricultural landscape.

Among these strategies, cover cropping is particularly promising. Cover crops can be grown in the winter months during dormancy of permanent crops or between annual production cycles, or on fallowed land. This practice increases infiltration and reduces runoff by 40% or more, often while improving soil water holding capacity, reducing dust and particulate matter in air, and moderating soil temperatures.[52,53] Incentivizing adoption of cover crops and other healthy soils practices aligns with California's climate goals. The California Air Resources Board 2022 Scoping Plan Update includes targets to scale these practices to 190,000 acres annually by 2030.[54] The same plan targets increases in certified organic acreage (up to 20% of total by 2045). On organic farms, where significant investments in soil health are made, avoiding prolonged bare ground fallowing helps preserve long-term productivity and prior investments.

> *"For a small two-acre farmer who is leasing the land - how will they practice fallowing? The GSA said they could fallow one year and not the next. But for that grower, those two acres are their entire livelihood. For a 500-acre almond field, you can just fallow a few acres."*
>
> — Small Farm Outreach Specialist, Sacramento Valley

Bouldin Family Farm, Glenn County

More than **2/3** of surveyed small farms practice water conservation and/or regenerative agriculture

CASE STUDY

Incentivizing Cover Crops Through Accounting, East Turlock Subbasin GSA

The East Turlock Subbasin GSA (ETSGSA) developed an innovative groundwater-accounting approach that recognizes the water benefits of growing cover crops. To calculate the groundwater consumption of crops, the GSA uses remote sensing tools to estimate total crop water use and then subtract a percentage of rainfall ("effective precipitation") and surface water deliveries to arrive at estimated consumptive groundwater use. For grower-reported cover cropped land, ETSGSA increases the effective precipitation to account for the increased infiltration and reduced runoff that cover crops provide. The higher the effective precipitation, the more rainfall is assumed to be available for plant use. This means less of the crop's total water use is assumed to come from groundwater and the grower is credited for the water value that the cover crops provide.[55]

Risks

Alternatives to Bare Ground Fallowing

Bare fallowing creates environmental and public health harms: Increased bare ground fallowing results in increased dust, dust-associated diseases, poor air quality, water runoff, increased evaporation, soil erosion, and economic disruptions.

Regenerative practices remain underutilized: Cover cropping, transition to less water intensive crops and other practices are underutilized due to lack of funding to implement these changes for farmers not already using them. However, interest in these resources is high: Demand for the CDFA Climate Smart Ag programs consistently outpaces available incentive funding. At a March 17, 2026 Senate Agriculture Committee and Senate Environmental Quality Committee joint informational hearing, CDFA reported that the programs are oversubscribed by 161% to 876%.[56]

Loss of small farms and organic acreage: Small farms and certified organic land are lost due to abandonment or fallowing.

Recommendations

Alternatives to Bare Ground Fallowing

31

Incentivize alternatives to bare ground fallowing (GSA): Discourage bare ground fallowing with education and incentives for dry farming, transition to less water intensive crops, cover cropping, and rotational fallowing (with cover cropping). Protect small farms and certified organic land in line with state conservation goals.

32

Distribute guidance on water-efficient cover cropping (DWR): Share guidance on water-efficient cover cropping for growers and GSAs. For example, the Western Cover Crop Council's Cover Crop Decision Tool recommends cover crop types based on objectives, climate, and soil type.[57]

33

Facilitate practice adoption (DWR/GSA): More opportunities are needed to positively value and reward existing practices or production changes toward practices that conserve water. This can be coupled with connecting farmers with resources for improving soil health and water use efficiency including NRCS Conservation Stewardship Program, CDFA Climate Smart Agriculture Program, and local mobile irrigation labs available through many RCDs. In some instances, GSAs may be well positioned to apply for block grants from these programs. Additional research and work is required to identify ways that GSAs can value and reward the specific practices of farms toward water conservation.

Groundwater Use Monitoring

The GSP Emergency Regulations mandate the monitoring and estimation of groundwater use in high and medium-priority subbasins to prevent undesirable results. Farm-scale regulatory tools used in SGMA implementation, such as groundwater allocations, depend on accurate, spatially-explicit data to determine how much groundwater each subbasin, and each farm within that subbasin, is "using". Many GSAs are relying on satellite-based evapotranspiration (ET) estimates, with a few relying on flow meters, to generate groundwater use data that is adjusted to calculate consumptive groundwater use.

The Pajaro Valley Water Management Agency (PV Water) for instance is using flow meters, and the majority of agricultural groundwater use has been measured using flow meters since 1993. Well owners are billed according to their groundwater production and quarterly measurements are taken by PV Water staff, either physically or by remote telemetry. Staff follow a meter maintenance program for their approximately 800 meters that includes routine accuracy tests to check that meters are working properly. According to Brian Lockwood, General Manager of PV Water, "We trust the meters to accurately record the volume of water being extracted from the basin."[58]

Many more recently formed GSAs are using satellite-based ET estimates, which are calculated by models that use remote sensing to estimate the amount of water "lost" from land and vegetation through evaporation and transpiration.[59] ET models vary in their assumptions and methodology, but they generally use satellites, meteorological data, reference ET, and land cover information. ET model performance can depend on identifying the correct crop being grown in each field and generally assumes uniform, monoculture fields that persist over a year. They are calibrated using data from heavily monitored fields of major commodities (e.g., almonds, processing tomatoes) and assume consistent canopy development, management practices, and physiological responses. The final output of ET models is generally calculated at quarter-acre resolution and can be aggregated at larger scales for reporting to GSAs.

The satellite-based ET monitoring services commonly used by GSAs include OpenET, LandIQ, and Hydrosat, each of which varies substantially in the transparency of their model development, calibration, and performance. In the subbasins served by UCANR and CAFF as part of the URCTA project, satellite-based ET monitoring services are used by at least 36 GSAs, with a majority using LandIQ.

SB Farms, Fresno County

SNAPSHOT OF REMOTE SENSING TOOLS FOR ET MONITORING

Madera Verification Project

One of the few efforts to compare ET monitoring services to one another, and to compare them to applied water, drawing from dozens of growers farming thousands of acres over several years.[60] The crop composition of the monitored land has been generally representative of the region and therefore dominated by major commodities of almonds, pistachios, and grapes. The average field size of monitored land is not reported and there is no mention of the inclusion of small, diversified cropping systems in publicly-available reports or presentations. **The project has repeatedly found substantial variability when comparing remotely-sensed ET from Hydrosat, Land IQ, and OpenET to flow meter measurements of applied groundwater across cropping system, irrigation unit size, and years.**

OpenET

A free, publicly-funded platform launched in 2021 by a consortium including NASA, USDA, and Environmental Defense Fund. OpenET uses an ensemble of satellite-based models and prioritizes transparency and public access. An accuracy assessment of cropland sites in Mediterranean zones reported a mean absolute error for the OpenET ensemble value of 13.3 mm per month (14.2% of mean observed ET).[61] Forthcoming research which reports on the water use of diversified small farms in Fresno County finds **systematically higher** water use rates estimated by OpenET compared to water use estimated by flow meters, even for those small (in size) farms growing common commodities such as almonds.[60]

LandIQ

A private California-based firm operating since 2007, providing high-resolution crop mapping and field-level ET estimates via a subscription service. Its proprietary methods rely on local field calibration of actual ET and are not publicly available. Their modeling priorities are reflected in their calibration data sets, such as was used for East Kaweah GSA in 2023, which mostly reflects perennial crops that are less common on diversified small farms and **lacks detailed data from crops commonly grown by small farms.**[62]

Hydrosat

A commercial satellite-based ET monitoring service developed in 2019, it uses proprietary satellite imagery and crop modeling to deliver daily ET estimates at 10m^2 resolution. It operates globally via a subscription service. Hydrosat is being used to **measure consumptive water use and enforce allocations.** They were recently awarded a three-year contract renewal with Madera County to continue delivering a water use measurement on 220,000 acres.[63]

Covering Ground Farm, Butte County

Risks

Groundwater Use Monitoring

Accuracy limitations compound across parcels: Even under ideal conditions and for well-studied crop systems, satellite-based ET models have limitations when estimating the amount of water "lost" from an individual field. Small discrepancies can compound across parcels and seasons, leading to inaccurate groundwater accounting. These errors may be amplified in more complex settings which ET models were not designed for or calibrated to, such as diversified farms with variable crops and canopy structures.

Sources of error on small farms: There are many possible sources of error when using remote sensing to estimate ET on small farms, including: a spatial scale that may obscure mixed diversified cropping patterns, exclusion in crop calibration data sets, heterogeneous canopies shaped by short-season crop rotations that challenge model assumptions, and a simplification of land use on farms where multiple crops and fallow periods exist in both time and space. These mismatches between model assumptions and real-world diversity can lead to miscalculations of consumptive groundwater use for small-scale operations.

Financial inequity: Without correction, inflated groundwater accounting using satellite-based ET could result in overcharges of groundwater use fees and place an unfair financial burden on small-scale farmers. For example, a 20 acre small-scale farmer who is over-charged at a rate of 0.1 AF/acre in a GSA with a $300/AF groundwater use fee would overpay $600 a year (above and beyond their base fee).

Lockewood Acres, Solano County

Recommendations

Groundwater Use Monitoring

34

Allow meter-based appeals (GSA): GSAs using ET models to monitor groundwater use should allow farmers to appeal groundwater use estimates with their own flow meter data through a streamlined appeal process. While not all growers are required to install meters, GSAs should recognize the value of flow meters as the most accurate way to know how much water has been withdrawn from an aquifer when they are calibrated and well maintained.

35

Provide free or subsidized meters (DWR): Using the proposed DWR fund for "Building Small Farm Resilience under SGMA," provide free or subsidized flow meters to small-scale farmers and assist with irrigation system retrofits as needed to ensure accurate measurement.

36

Clarify meter reporting protocols (GSA): GSAs with mandatory metering or flow meter-based appeal processes should provide specific guidelines for reporting flow meter readings (e.g., frequency, recording format) and offer technical assistance to help small-scale farmers meet those expectations.

37

Increase modeling transparency (GSA): Improve transparency in modeling. Publish key modeling assumptions, record meetings of groundwater hydrologists explaining the model and parameters, and provide local calibration summaries for ET-based monitoring.

38

Improve data and monitoring integrity (DWR): Use the proposed DWR fund for "Building Small Farm Resilience under SGMA" to support independent studies comparing ET and flow meter-based measurements on small-scale farms. This will serve to refine monitoring accuracy and inform policy decisions. Also, provide funding for research and development of ET models that capture small farm cropping systems.

Monitoring Networks

GSAs are required to establish monitoring networks to collect data on groundwater levels, storage, land subsidence, and water quality — the foundation for evaluating whether a basin is achieving sustainability. While DWR sets minimum requirements, it allows flexibility in network design, leaving site density and distribution to local professional judgement.[64] In practice, networks often rely heavily on preexisting wells rather than strategically sited new monitoring points. Because these networks depend on existing infrastructure, coverage gaps are common, particularly in areas with no access to state surface water projects, locations where some small-scale farmers operate. GSPs are not required to explain how monitoring locations are selected or what local conditions they represent, such as proximity to shallow irrigation wells or small farm clusters. Consequently, critical indicators of undesirable results on small farms may go undetected in many basins. Research shows that shallow irrigation wells on small farms are more likely to be protected when these stakeholders are integrated in governance processes.[65]

GSAs that rely solely on their formal monitoring networks miss an opportunity to incorporate community-reported data on dry wells. DWR's online Dry Well Reporting System provides a platform for individuals to report well failures, helping agencies track drought impacts on household and certain agricultural supplies.[66] However, there is no formal mechanism linking this database to GSA planning or monitoring activities. The system is primarily used for household wells since farmers may be reluctant to report their dry wells due to concerns about data privacy or regulatory repercussions. County agencies note that they are neither mandated or funded to collect information on agricultural well failures, further perpetuating data gaps.

Nickler Acres, Tehama County

CASE STUDY

Hungry Hollow, Yolo County

Hungry Hollow illustrates how monitoring gaps can carry real consequences for small-scale farmers. The local GSA flagged this area as high-risk due to shallow wells, limited monitoring data, and declining groundwater levels - yet the current monitoring network remains insufficient to understand localized water table behavior or the specific conditions affecting the farmers in the region. While Yolo Subbasin Groundwater Agency (YSGA) plans to increase monitoring and data analysis in Hungry Hollow, research, funding, and regulatory timelines may not converge in time to protect the region's shallow wells. Currently, YSGA is collaborating with CAFF to include small-scale farmers in its voluntary groundwater monitoring program by installing sensors on participating farms in data gap areas. The sensors provide continuous or semi-annual data, and allow both the GSA and the farmers to monitor the wells.

In response to concerns from small-scale farmers, a one-year moratorium on permits for new agricultural wells was adopted by the Board of Supervisors. Local farmers advocated for the pause as a temporary safeguard while additional data was gathered, and have since been working with the County to update well permitting regulations.[67]

Risks

Monitoring Networks

Many monitoring networks overlook vulnerable areas: Monitoring locations are typically selected for ease of access or hydrologic representativeness, not social vulnerability (e.g., small parcels and shallow wells common on small farms), resulting in inadequate early-warning systems for drying wells in areas with small farms.

Data gaps limit basin understanding and management: These monitoring network design limitations create data gaps, constraining the understanding of basin conditions or the ability to evaluate whether the basin is being sustainably managed.

Dry agricultural wells remain undocumented and unaddressed: The absence of systematic data collection on dry agricultural wells and integration into evaluation of sustainability indicators means that small farm problem areas may go unrecognized until more severe undesirable results, such as widespread well failure or subsidence, are already occurring.

Recommendations

Monitoring Networks

39

Strengthen monitoring network equity and coverage (GSA): Ensure that monitoring network coverage includes water quality monitoring, covers a diversity of groundwater users and well types, and encourages placement of new monitoring wells in socially-vulnerable and agriculturally-sensitive areas.

40

Expand dry well data collection and reporting (DWR): Redesign the DWR Dry Well Reporting System to include data on dry agricultural wells and conduct outreach to encourage dry well reporting that includes assurances that there will be no negative repercussions for reporting. Create a system for gathering reports of dry agricultural wells from county agencies.

Soul Food Farm, Solano County

Allocation Models

A groundwater allocation is a limit on the volume of groundwater that may be withdrawn from a subbasin, with a policy goal of discouraging extractions above sustainable yield.[68] A common approach distributes sustainable yield proportionally across irrigated agricultural acreage. Some GSAs include "transition water" or phased reductions that ease economic impacts by gradually stepping allocations down over time. Sustainable yield estimates are often based on limited historical pumping data and groundwater models that require ongoing refinement. Because long-term pumping records are often incomplete, model assumptions play an outsized role in estimating available groundwater. While these models rely on current science, they still require refinement and calibration to reflect local hydrogeologic realities. The uncertainties inherent in these models are rarely explicitly reflected in allocation schemes. As a result, farmers may be assigned pumping limits that could change significantly as models are updated, creating uncertainty for long-term farm planning.

Allocations are commonly tracked as consumptive groundwater use, estimated through simplified parcel-level water budgets, which vary depending on water use estimation tools (e.g., ET or applied water). Calculating consumptive use with satellite-based ET estimations requires knowing volumes of surface water deliveries, other developed water sources, and precipitation, all at the parcel level. Calculating consumptive use with flow meter-based applied water estimations requires making assumptions about the fraction of applied water 'lost' through runoff and percolation. To introduce operational flexibility, some GSAs also allow credits, carryover, or pooling of allocations across parcels. However, as Matthew Fienup, Executive Director at the Center for Economic Research and Forecasting at Cal Lutheran University notes, "tracking the different components of an individual's allocation over successive water years can prove especially challenging, even with custom-built water accounting software."[69] This underscores that even with sophisticated tools, the administrative and technical complexity of allocation tracking can strain both agency capacity and farmer understanding.

GSAs must make various assumptions when calculating consumptive groundwater use to enforce allocations. For example, one GSA may credit 100% of on-parcel precipitation, while another applies a 50% reduction to account for runoff, interception, or timing losses (e.g., effective precipitation that plants can access). Each GSA's methodology for calculating, tracking, and administering allocations needs to be accurate enough to enforce compliance and assess the effectiveness of overall GSP implementation. DWR has not yet defined what level of accuracy is required. In the absence of clear guidance, GSAs are left to determine their own standards for precision and enforcement, resulting in inconsistent approaches.

According to DWR's SGMA portal, only 53 entries in the PMA Module are categorized as "allocations," representing 29 subbasins statewide. This indicates that while groundwater allocations are becoming an increasingly common management tool, they currently account for a small fraction (3%) of all projects and management actions listed on the portal. If this type of demand management tool becomes more dominant, it will be increasingly important to address its risks.

Mora Farms, Fresno County

CT Farm, Merced County

Risks

Allocation Models

Complexity excludes small farmers: Allocation logic is complicated and potentially inaccessible for small-scale farmers. Furthermore, flexibility tools (e.g., carryover, pooling, credits) add layers of accounting that increase complexity and may make water accounting more challenging for small operations, possibly increasing administrative risk and error.

Uncertainty creates false confidence: A false sense of accuracy exists around allocations when in fact there are many sources of uncertainty (e.g., modeled inputs, uniform assumptions, stacked accounting).

Uniform assumptions ignore farm diversity: Broad, uniform assumptions in consumptive use calculations disincentivize farm-level agricultural management practices that improve soil water retention (such as cover cropping), and consequently reduce groundwater pumping. For example, a single effective-precipitation factor for every parcel in a GSA can misrepresent actual conditions across soils, canopy structures, and management styles, particularly for small farms.

Tenant farmers face additional complications: When allocations are tied to landowners, calculating and tracking individual pumping for multiple tenants on the same parcel becomes administratively complex and opaque (see Recommendation 6).

Recommendations

Allocation Models

41

Recognize relative groundwater use (GSA): Design water allocation models that guarantee the minimum amount of groundwater needed for small farms to remain viable, recognizing their limited contribution to basin-wide pumping as low-volume pumpers. This could include adopting progressive allocation structures to ensure small-scale farmers continue to access sufficient water, as well as special consideration for the "small farm de minimis pumpers" category.

42

Simplify accounting and reporting (GSA): Establish a streamlined groundwater accounting pathway for small-scale farms, including simplified compliance requirements, transparent reconciliation between flow-meter and ET-based methods (e.g., agreed conversion factors, return-flow credits), and simple avenues for farmers to report farm-specific evidence (e.g., soil type, crop, irrigation timing) to refine consumptive-use estimates.

43

Improve transparency and support (GSA): Provide and promote multi-lingual outreach and technical assistance focused on allocations, water-use accounting, and data corrections.

44

Issue statewide best practice guidance on allocation models (DWR): Provide standardized guidance to GSAs on developing groundwater allocation models.

Fees

Under SGMA, GSAs are authorized to collect fees to fund their activities, including data collection, monitoring, planning, studies, enforcement, and project implementation. These fees provide essential revenue for GSA operations while sometimes discouraging over-extraction of groundwater. GSAs can assess several types of fees — most commonly administrative, extraction, and well registration fees — depending on local needs, priorities, and management approaches. These fees are charged per acre, per parcel, per acre-foot, or using other metrics; they vary widely across the state and can change annually. Fees per acre-foot of groundwater can be as high as $500 with significant penalties for water used over the allocation. Some of the most expensive groundwater and some of the smallest allocation levels are in the critically overdrafted basins of the San Joaquin Valley. In northern California, in high priority basins where conditions are currently less critical, fees are lower. For example, a base fee of $12.62 per parcel plus an additional $4.22 per cropped acre in one northern subbasin.

Fee structures can be fairly complex, incorporating tiered levels that differ depending on various attributes deemed significant by local agencies: districted versus undistricted, cropped versus rangeland, or groundwater versus surface water use. The fees can be hard to manage, and are often subject to challenge by farmers who believe their land or business has been misclassified. However, the kind of detailed analysis needed to succeed in a challenge is likely not available to farmers that have not been engaged in the fee-setting process and are not privy to the details of how the fees are calculated.

Because fee structures apply uniformly regardless of farm size, they are inherently regressive - placing a proportionally larger burden on smaller, less-resourced operations (Figure 11). This is particularly concerning given that many small farms pump low volumes of groundwater in a subbasin and contribute minimally to groundwater overdraft. Small-scale farmers are particularly vulnerable to the financial pressures created by fees if they depend on groundwater. **A recent statewide survey found that 94% of respondents use groundwater for irrigation (n=63), with a median well depth of 250 ft (n=41)**, consistent with findings from Fresno County a decade ago.[70] This reliance means they have fewer alternatives and even modest groundwater use fees can add up to significantly affect their operating costs. The SWRCB's April 2026 recognition of an exclusion for minimal-impact pumpers in two San Joaquin Valley probationary basins points toward a more equitable approach that could be adopted statewide.[71]

Over
90%
of small-scale farmers irrigate with groundwater

Bless'd Blossom Farm, Solano County

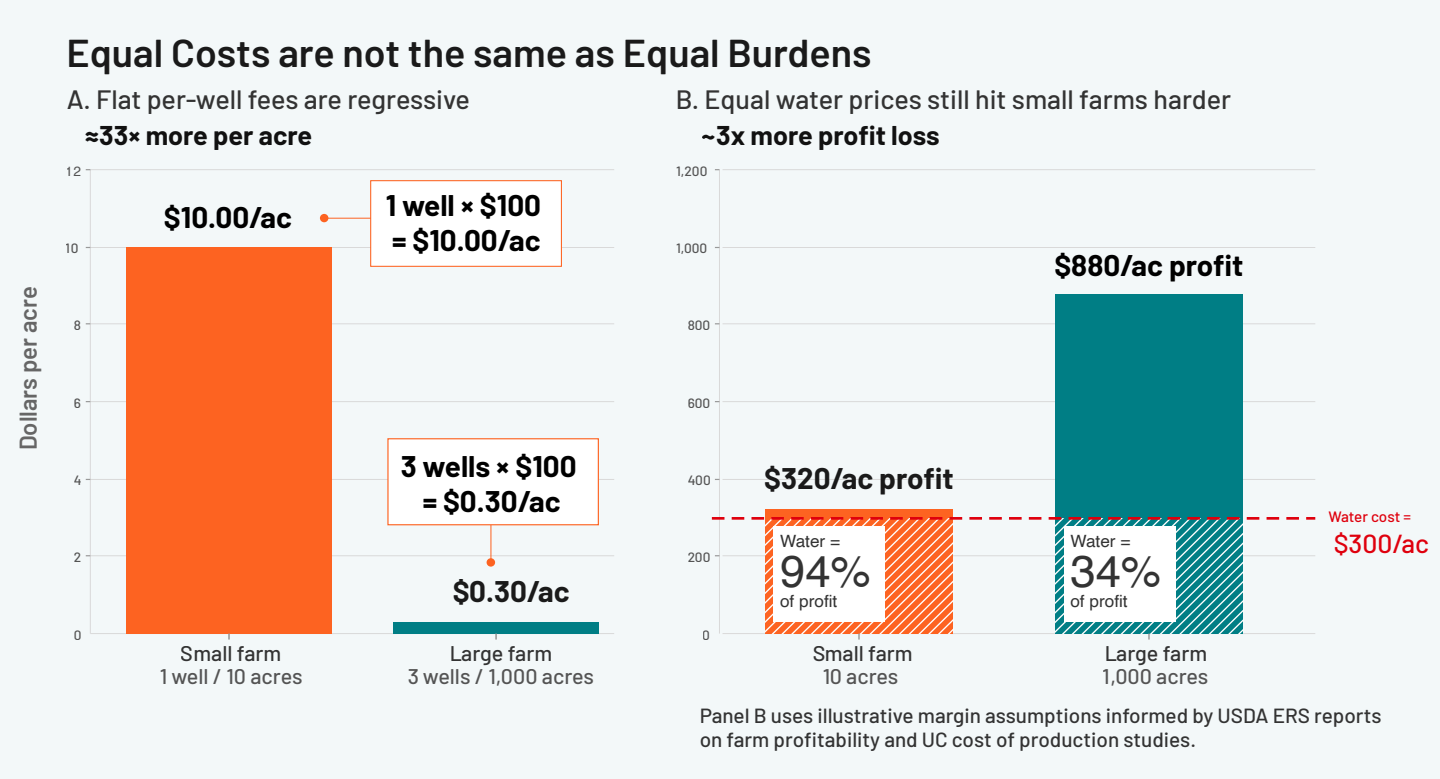


Figure 11. Two ways that scale creates unequal groundwater cost burdens for small farms.

Risks

Fees

Flat fee structures are regressive: Flat fees place a disproportionate financial burden on small farms. Even modest well registration fees can have disproportionate impacts on small farms which tend to have higher well densities than their larger neighboring operations. Fees based on uniform water use rates are regressive because the marginal fee (as a percentage of total revenue) is much higher for smaller operations (Figure 11).

Inaccurate volumetric billing: Volumetric groundwater extraction fees calculated based on ET may risk inaccurate billing (and overcharges) for small farms with mixed cropping systems. Without site-specific calibration or reconciliation, small farms may be overbilled relative to their consumptive groundwater use.

Cumulative financial strain: As multiple fees accumulate, the combined costs can erode small farms' already narrow profit margins, potentially forcing some out of production.

Recommendations

Fees

45

Support GSAs in establishing a "small farm de minimis pumpers" category (DWR/SWRCB): GSAs will need funding and technical assistance to support their work in identifying this category of groundwater users.

46

Implement fair, protective fees (GSA): Implement fee structures that protect small-scale farmers and exempt "small farm de minimis pumpers". Offer fee credits or reductions for small farms that demonstrate verified adoption of water-saving technologies or management practices that support basin sustainability. There is precedent for this approach, for example the SWRCB Resolutions adopted on April 7th, 2026 to exclude "minimal impact" pumpers from reporting and fee requirements.[17,18]

Adjudications

When there are legal disputes over the right to groundwater, a court can conduct an adjudication — a legal process to define and determine the rights of users to extract groundwater. While adjudications fall outside of DWR's direct authority and are separate from the GSPs created under SGMA, DWR does require that adjudicated basins meet SGMA's sustainability goals and GSAs may participate as parties to the adjudication. It would be incomplete to discuss small farm risks under SGMA without referencing adjudications, but a detailed discussion is not provided here given that adjudications are the responsibility of the courts, not DWR or GSAs.

There are several examples of conflicts between established GSPs and a subsequent adjudication process. Adjudications are filed in court by plaintiffs who have a stake in the outcome of how water is allocated. The plaintiffs may be large-scale pumpers who are concerned that GSP allocations will limit their capacity to extract groundwater. Adjudications take many years to resolve in court and every landowner with a well must participate or risk losing their water rights. Small-scale farmers, even when they group together and hire an attorney to represent them, face an extremely costly process. Groundwater adjudication cases, once filed, are assigned to a Superior Court outside of the county or counties that have jurisdiction over the basin, which can pose a challenge to farmers who might struggle to attend relevant court processes. Without the resources of large pumpers, small pumpers risk losing their water rights simply due to the difficulty of participating in a multi-year legal process. Without careful safeguards, these processes can threaten the viability of small farms.

Dulce Organic Farm, Santa Cruz County

Risks

Adjudications

Adjudications may be used to bypass existing GSPs: Large-scale operations will use adjudications in an effort to declare a greater sustainable yield quantity for pumping than what the GSP has approved.

The process is inaccessible and costly for small farmers: Generally, success in any legal process requires a skilled attorney. Finding attorneys who will take on the case of a small-scale farmer, or of multiple farmers, is difficult and costly. A small farmer in Cuyama cited a $5,000 bill for a single month of work, posing an unsustainable amount for a years-long process. Small-scale farmers in adjudicated basins are in danger of giving up their water rights in an adjudication because they cannot pay the cost of continuing in court.

Reliance on historic water usage: Courts often reference historical use to determine allocations. This can be damaging to new and small-scale farmers who have prioritized water saving efforts in their operations.

Cali-Dad Farms, Monterey County

Recommendations

Adjudications

47

Support implementation of AB1466 (Legislature): Ensure successful enactment of AB 1466, signed by the Governor in 2025, which authorizes courts to treat claimants of minor water quantities separately in comprehensive adjudications and establishes a streamlined process to register and administer such claims.

48

Pass legislation to protect sustainable yield (Legislature): Pass legislation to ensure that large pumpers cannot use adjudications to increase their pumping above sustainable yield levels. Courts should review and take into account the past years of work under SGMA, including the subbasin-specific sustainable yield levels, minimum thresholds, and measurable objectives.

49

Provide education for Court Judges (Judges): Provide education to Superior Court Judges tasked with ruling in an adjudication. This could include hydrology, history of pumping dynamics in a region, and detail on the existing GSP.

50

Ensure that watermasters are impartial (Judges): Once an adjudication is issued by a court, it is implemented under the supervision of a designated Watermaster. It is essential Judges choose a Watermaster who is free of conflict of interest and trusted by different classes of plaintiffs.

OPPORTUNITY 4

Support Equitable Transition Pathways

C&R Farm, Merced County

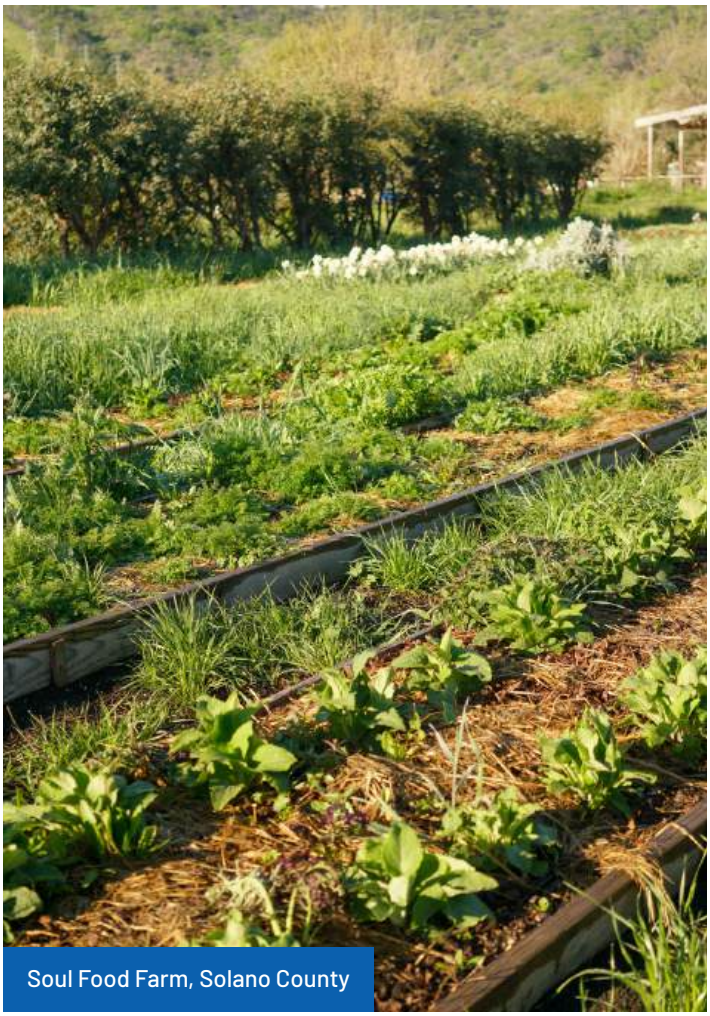
Converting large amounts of agricultural land to other uses — as needed to achieve groundwater sustainability — carries with it a high risk of increasing inequity in land ownership, water access, rural livelihoods, and food security.

This risk is especially acute in the San Joaquin Valley, where the scale of expected land transition is greatest. Rather than allowing unmanaged land abandonment or economic displacement, California can design transitions that preserve farming opportunities, sustain rural economies, and maintain the agricultural character of affected regions while increasing the sustainability of groundwater use. Even with thoughtful identification and targeted accommodations, some small-scale farmers will not be able to continue their businesses as they currently function under long-term groundwater constraints. For these farmers, equity requires structured and dignified alternatives, within a broader just transition framework for rural livelihoods.

La Buena Tierra, Monterey County

Priorities

The Public Policy Institute of California estimates that at least "500,000 acres of southern Central Valley cropland will need to be taken out of irrigated production to reduce groundwater demand".[72] Currently there is no established strategy around what this entails. Without intentional transition planning, California risks unmanaged land abandonment, further consolidation of agricultural land, and the disproportionate loss of small farms that sustain local food systems, preserve cultural heritage, and provide ecosystem services. This section identifies priorities for land transitions that engage small farms in groundwater management while preserving the social and economic benefits of diversified, small-scale agriculture. The goal is to **keep working lands and working people on the landscape** when possible, and support small-scale farmers who have no other option but to transition out of farming.



Soul Food Farm, Solano County

PRIORITY 1

Strategically transition farmland from large-scale, water-intensive commodity agriculture to lower water use crops including small-scale diversified cropping systems

While land repurposing programs should be accessible to farms of all sizes, efforts should prioritize large commercial acreages of high water-use crops. This strategy would meaningfully reduce groundwater demand for the benefit of all regional users, particularly those with limited resources and shallower wells. Programs such as LandFlex demonstrate how targeted farmland fallowing near disadvantaged communities can preserve access to groundwater for drinking water wells and reduce the risk of shallower wells going dry (and the associated costs of replacing wells, which can be prohibitive for small-scale farmers with limited resources), while paying the farmers bearing the cost of fallowing. This approach also reduces the pressure on small farms to fallow their own farmland, which has a disproportionately larger impact on smaller operations than on large farms with multiple options to manage their assets in a land fallowing program.

Smaller operations with lower-water-use crops can be seen as one of the solutions for the land repurposing required for groundwater sustainability. For land with current water-intensive crops that is considered for fallowing, creating opportunities for small-scale farmers to cultivate lower water use crops like annual vegetables, sorghum, millet, or cowpeas on this land would both reduce regional groundwater demand and contribute to ongoing economic activity. For example, converting 500 acres of almonds into 20 parcels of 25 acres each of diversified vegetables creates regional economic opportunities and public health co-benefits through keeping farmland in agricultural production, rather than fallowing land that may become a source of dust and pest problems if unmanaged. This strategy could be combined with support for beginning farmer training programs near disadvantaged communities. In contrast with alternate land uses, such as solar power that would eliminate jobs for farm workers, repurposing land to be available in small plots near disadvantaged communities would provide economic opportunities for farm workers interested in transitioning into small-scale farm operations that provide food for communities with fewer resources.

PRIORITY 2

Support transitions of crops and practices within existing small-scale farms that reduce groundwater demand and/or increase supply

Many small farms can remain viable with support to transition into crops and practices that require less or no irrigation. These transitions include increasing water use efficiency through updated irrigation infrastructure or improved irrigation scheduling, shifting to less water-intensive or dryland crops, incorporating strategic fallow periods in crop rotations, and increasing use of surface water through improved infrastructure. However, these changes often require new markets, technical expertise, and/or upfront investment.

State programs can help support these shifts. The DOC Multibenefit Land Repurposing Program can provide technical assistance for land-use transitions, while CDFA programs such as State Water Efficiency & Enhancement Program or Healthy Soils can support adoption of water-saving practices. Short-term income support paired with training opportunities, market development, and equipment access would help farmers and their employees to smoothly transition to new systems.

PRIORITY 3

Strategically transition land out of irrigated production while equitably supporting the farmers and farmworkers who depend on it

As previously reported, 85% of surveyed small-scale farmers are concerned they may need to shut down their operations (n=54). This concern reflects a broad reality that some farmers, despite limited water use and strong stewardship practices, lack the financial or technical capacity to adapt to reduced groundwater availability. In some regions, particularly those without surface water access, permanent land repurposing or conservation may be the most sustainable long-term option.

A coordinated state-level approach is essential to support these transitions. DWR, DOC, CDFA and the Governor's Office of Business and Economic Development should jointly establish and fund an "Equitable Transition Initiative" to align SGMA implementation with rural economic development, land stewardship goals, and existing conservation programs. By coordinating their efforts, these agencies can help prevent fragmented or inequitable outcomes for small-scale farmers navigating water scarcity, while supporting transitions for the many communities impacted by SGMA.

Laura's Apples, Sonoma County

The "Equitable Transition Initiative" builds on existing efforts for equitable land transitions, which should include farmworkers, rural communities, farm businesses, and long-term sustainability for land, air, and water resources.

Existing programs such as DOC's Sustainable Agriculture Lands Conservation Program (SALC), MLRP, county land-use initiatives, land trusts, and USDA NRCS conservation easements can facilitate equitable land transitions. Repurposed land can support habitat corridors, renewable energy development, groundwater recharge, or recreation, depending on local priorities.[73] However, transitions must also account for broader economic impacts, including the local tax base and farmworker livelihoods. Land repurposing transitions must be strategic to avoid decimating county budgets from reduced property taxes, and should incorporate transitions for farmworkers who currently rely on irrigated agriculture. Programs such as UC ANR Innovate, UC SAREP, UC Small Farms Network, California's Jobs First initiative, and CDFA's Beginning Farmer and Farmworker Training Program should be expanded to support the emerging transition needs resulting from SGMA implementation, as should programs of the Center for Land Based Learning (CLBL), the CLBL Farm Academy and the Agriculture and Land Based Training Association.[74]

The "Equitable Transition Initiative" would ensure that SGMA implementation coincides with opportunities for small-scale farmers and rural economic development. When planned with intention, actions shaped by these three priorities could reduce groundwater pumping while generating long-term social, environmental, and economic benefits.

Cali-Dad Farms, Monterey County

Recommendations to DWR, DOC, and CDFA:

1

Target land repurposing to reduce groundwater demand and expand small farm access: Coordinate SGMA-related land repurposing to prioritize large, water-intensive acreage for transition to lower-water-use systems. Where appropriate, support subdivision or leasing of repurposed land into smaller parcels accessible to small-scale farmers dedicated to low-water use crops, particularly near disadvantaged communities. Ensure repurposing strategies maintain land in productive use where feasible and avoid unmanaged fallowing.

2

Invest in small farm transition pathways and workforce development: Expand funding for technical assistance, training, and financial support to help small-scale farmers adopt low-water-use crops and practices. Pair farmer support with workforce development programs that enable transition into new production systems, land uses, or adjacent sectors. Align and scale existing programs (e.g., MLRP and CDFA Climate Smart Ag) to meet growing transition needs.

3

Establish a coordinated "Equitable Transition Initiative": Create a multi-agency initiative to align SGMA implementation with rural economic development and land stewardship goals. The initiative should provide integrated technical assistance, financial resources, and planning support for farmers and farmworkers navigating land repurposing, crop transitions, or exit from irrigated agriculture, with a focus on equity and regional coordination.

The transition pathways described in this section will not unfold on their own. They require deliberate investment, interagency coordination, and a shared commitment to ensuring that SGMA's sustainability goals do not come at the expense of the farmers and farmworkers who have the least ability to absorb their costs. Taken together, the four opportunities in this report — from identifying negligible pumpers to supporting strategic transitions — form a coherent and actionable agenda. Getting this right matters not just for small farms, but for the long-term health and integrity of California's groundwater governance.

CONCLUSION

Ald & Y Organic Farm, Monterey County

Bless'd Blossom, Solano County

Small-scale farmers across California are navigating an increasingly difficult environment. Volatile commodity markets, rising input costs, land consolidation, climate-driven drought, and now the added challenge of adapting to groundwater management under SGMA are converging on producers who already operate with limited financial reserves and few pathways to adapt.

SGMA is a necessary and important step toward long-term water security, and this report affirms that goal. But as implementation moves forward, there is a growing risk that these overlapping pressures — with SGMA adding new compliance costs and constraints to an already strained system — could contribute to the loss of small farms that anchor rural communities, local food systems, and cultural heritage across California. That outcome is not inevitable but, rather, makes thoughtful SGMA implementation critical to the future of these farming communities.

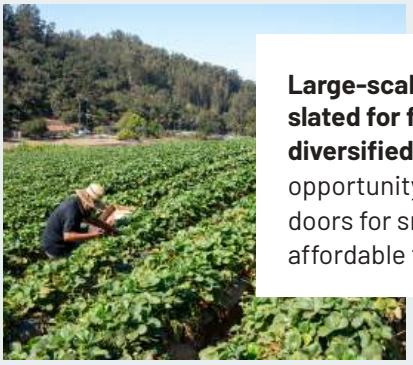
This report documents both the challenges and the opportunities that SGMA implementation presents for small-scale farmers. Limited SGMA awareness, complexity in reporting and fee structures, monitoring tools calibrated for large commodity farms, and governance processes that can be difficult to access all create additional challenges for small-scale farmers who are already managing multiple pressures. Thoughtful, targeted adjustments to how SGMA is implemented can reduce these barriers without compromising sustainability goals.

Equitable groundwater management is not a distant aspiration — it is already happening across the state. Sonoma GSAs are working with a small farm Outreach Specialist who directly supports farmers, expanding meaningful participation across monitoring and water use programs. East Turlock developed a groundwater accounting approach that credits cover crop adoption, directly rewarding the stewardship practices small farms tend to employ. Pajaro Valley's ReNeM program could make on-farm recharge financially viable for smaller operations. These examples demonstrate that SGMA implementation and small farm viability are not in conflict, and that practical, inclusive approaches are within reach for GSAs across the state. The opportunity is to scale what is working. An important area of future work will be developing stronger mechanisms to incentivize and reward farmers — including mid-sized operations — who are already reducing water use and adopting sustainable practices, so that SGMA implementation actively supports those doing the right thing.

Vision for the Future: Small Farms as Part of the SGMA Solution

Groundwater basins are sustainable and small farms are thriving with access to reliable water supplies; local food remains accessible, and rural drinking water is protected.

GSAs are funded through tiered fee structures ensuring that the costs of groundwater management do not fall disproportionately on those who pump the least.



Large-scale acreage currently in water-intensive crops slated for fallowing is transitioned to lower water use, diversified crops preserving working lands and economic opportunity rather than leaving land bare, and opening doors for small-scale farmers to expand access to affordable farmland.

Retention ponds across dozens of small farms allow conjunctive use of pond water with groundwater to irrigate and passively recharge the aquifer during the winter - turning small farms into active partners in basin sustainability.

Farmer liaison staff work collaboratively with local small farms ensuring they understand demand management actions and are able to actively adapt to and participate in SGMA implementation.

Figure 12: Examples of what the future of SGMA could look like with small farms as part of the solution.

The four opportunities this report identifies offer a practical and constructive path forward. **First,** GSAs can establish locally grounded, transparent processes to identify small-scale farmers who contribute minimally to overdraft yet face disproportionate risk. **Second,** state agencies, GSAs, and farmers each have a distinct role to play: DWR can establish a dedicated "Building Small Farm Resilience Under SGMA" fund to sustain technical assistance and support equitable local implementation; GSAs can evaluate how their outreach, fee structures, and management actions affect small producers and adjust accordingly; and small-scale farmers, who bring invaluable on-the-ground knowledge, can participate actively in the governance processes that shape their futures. **Third,** the fifty actionable recommendations in Opportunity 3 offer a concrete roadmap for embedding equity into GSA operations at every level. And **fourth,** for farmers navigating difficult transitions under long-term groundwater constraints, a coordinated "Equitable Transition Initiative" can support crop transitions, land repurposing, and workforce development in ways that keep working lands and working people on the landscape.

Equity and sustainability are not competing goals under SGMA — **they are mutually reinforcing.** Small-scale farmers contribute least to overdraft yet face disproportionate risk under current implementation, and their loss would undermine the rural economies, food systems, and cultural heritage that they sustain. By embedding equity, transparency, and support into SGMA implementation, California has the opportunity to build a groundwater governance system that protects both its water resources and the farmers who depend on them. **The future success of SGMA will be measured not only by hydrologic indicators, but by whether California's agricultural communities remain viable, diverse, and resilient.**

Gonzalez Huerta Organic, Monterey County

ADDITIONAL RESOURCES

Executive Summary

Reference

UC ANR Survey Questions

Key Takeaways

Communities

GSAs

State Agencies

CAFF
COMMUNITY ALLIANCE with FAMILY FARMERS

UC Small Farms Network
University of California
Agriculture & Natural Resources

Cali-Dad Farms, Monterey County