Farmer Perspectives on California Water Management and the Implementation of the Sustainable Groundwater Management Act

Research Brief

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Issue

In 2014, the California legislature passed the Sustainable Groundwater Management Act (SGMA), the State's effort to achieve the sustainable use and management of groundwater by 2040. The act requires that local agencies establish governance structures known as Groundwater Sustainability Agencies (GSAs), tasked with developing plans to achieve groundwater sustainability by 2020. The SGMA process is complex and involves diverse stakeholders. Farmers are one critical component of this effort, with agriculture the largest human use of water in the state. Groundwater is especially important in dry years[1], so farmers are a large part of the solution to sustainable groundwater use.

This work details farmer perceptions of water management and sustainability in Yolo County, California, with a particular focus on SGMA implementation and future water sustainability. Data were obtained from four focus groups of 20 farmers held in Yolo County, California in October 2016. Focus group participants represented a broad range of farm types, water sources and geographic locations throughout Yolo County. Interviews were transcribed and double coded, then analyzed for key themes related to the Drivers, Pressures, States, Impacts and Responses (DPSIR) framework[2] on the issue of sustainable water management. We explored, from the perspective of farmers, what are the **drivers** of recent water use, what **pressures** current water use faces, what changes in the **state** of water have farmers observed, what **impacts** these changes have had, and what **responses** farmers have implemented. We also explore farmer perceptions of SGMA as a response to water management.

Figure 1. *Drip irrigation on a California almond orchard. Many farmers expressed concern over expanding almond acreage and the potential impacts of increased irrigation, even if it was drip irrigation. Photo credit: Phil Hogan, USDA Natural Resources Conservation Service, Woodland, CA.*

> *"I actually call this California's second gold rush because everyone is so driven by that shining gold - that in this case it's a nut"*
> *– Yolo County Farmer*

Drivers

Farmers stated that both agricultural and non-agricultural uses are important drivers of water use in Yolo County and California. Agricultural water uses stem from a diversity of farm sizes, cropping patterns and livestock types. While agriculture has existed in the region for hundreds of years, new drivers are changing the landscape. These include an increase in permanent crops, urbanization, and new agricultural development of previously uncultivated areas. Most farmers reported a mix of surface and ground water sources in use on their land, although in certain parts of the region, farmers only have access to groundwater (e.g. Zamora). Farmers expressed that there has been an increasing reliance on groundwater irrigation, driven by drought in the past several years, and by new agricultural development served by new wells and the lowering of existing wells.

Pressures

Most farmers expressed that land use change and irrigation technologies were exerting pressure on groundwater. In particular, farmers felt that agricultural development in Yolo County has been driven by the price of almonds, and developers have planted permanent crops in new areas and have the funding to drill deep wells. Further, some farmers expressed that the land being developed is often marginal and there may be unexpected impacts caused by this development. Farmers who have been in Yolo County prior to this agricultural development don't believe they can compete with the rising costs of land and with developers. There was a sense amongst focus group participants that non-locals don't have the same sense of stewardship or responsibility.

"We have a classic tragedy of the commons when you have groundwater down there and we can't all pump, pump, and pump forever." – Yolo County Farmer

Many farmers expressed that the increase in orchards has put drip in places that wouldn't have previously been irrigated. There is a perception that drip may not be decreasing overall water use as expected because it has facilitated this new development and doesn't allow for the capture and reuse of tailwater in the system. However, other farmers also acknowledged that drip is increasing yields, which means that less water is producing more food overall, though the systems are expensive.

States

The current state of water quality and quantity are affected by these drivers and pressures. New orchards and wells are being developed in erodible areas and subsidence is evident in regions that rely exclusively on groundwater for irrigation. Farmers expressed that soil salts and Boron in the irrigation water are quality issues. There is a perception that the lack of water has resulted in an increase in "salts" in the soil and groundwater. Boron in water is an issue in parts of the county, especially for toxicity in trees. Additionally, farmers expressed that surface water is often challenging to pump and filter because of sediments and algae; thus, cleaner surface water might alleviate pressures on groundwater. Surface water availability in the county ebbs and flows, and farmers' acknowledged that one rain event can change a whole season. However, sometimes even when lakes and dams are full, farmers near the Sacramento River expressed that they can't get access to water, which can occur when water is prioritized for environmental use and becomes unavailable to agriculture.

Impacts

Farmers felt that the current state of water quantity and quality is impacting access to water, economic returns and the functioning of local ecosystems. According to farmers, recent good rain years have led to better water availability; however even in wet years, some farmers felt surface water availability for agriculture is inconsistent. When surface water is available, farmers felt that groundwater wells were positively affected. Most farmers expressed the opinion that groundwater use should be second to surface water use. While some wells have been dug deeper in recent years, farmers reflected that many have remained productive. Some domestic wells have been negatively affected by new or deeper funding. Given recent changes to water availability and shortages statewide, a small number of farmers are pumping groundwater to send south or trade out of the County.

According to farmers, water quantity changes have also had economic and ecosystem impacts. Water is very expensive to pump, and too costly to let run off their fields. Land is becoming a new limited resource in the County due to rising costs. If farmers fallow land because of lack of water, they say the economic impacts to farming would reverberate across the county through support industries, other businesses and farmworkers. In terms of ecosystem impacts, farmers mentioned that the lack of water has had negative effects on habitat, fish, and waterfowl (particularly because farmers have less access to water to create habitat) and springs in the County are drying up.

"It's present. It's real. And whether we address it ourselves or – it will get addressed somehow. I mean, if we don't come up with something sustainable, then someone will for us. And we may like that even less."
- Yolo County Farmer

Responses

Thus far, farmers expressed that they have responded to the lack of water by buying crop insurance, fallowing land, growing crops that use less water, purchasing water, cover cropping, monitoring wells, and digging new wells. In addition to adapting on-farm management to changing water availability, farmers mentioned that they are responding to a range of other policy demands that affect agriculture. Farmers expressed the perception that regulations are often a greater challenge than drought. Agencies have competing issues which, according to farmers, result in heavy regulatory burdens.

Perspectives on SGMA

SGMA Regulatory Design

Farmers expressed a number of perspectives related to the SGMA process. GSA formation is currently occurring in Yolo County, and in light of this process and farmers' experience using water in the county, farmers expressed that they would like to see common sense design for SMGA. This means SGMA needs to make sense on the ground, not just on paper, with a long term perspective for sustainable water use and a sustainable agricultural

> *"I'm not sitting here saying I want government in my life. I don't. But I also want water in the long term. And if it takes a little government regulation to force everyone to participate, as they well should. It might take some of that."*
> *-Yolo County Farmer*

industry. Farmers also mentioned that they would prefer to see bottom-up processes, but they already felt that their voices were written out the process because they cannot officially be part of the GSA. They suggested that there is not a one size fits all solution to groundwater management in the state, so a focus on local context and needs is important. Farmers expressed that they would like SGMA to take a solutions-oriented approach, integrating development and efficiency improvements. However, they acknowledged that the success of SGMA may be a challenge because it is difficult to regulate stewardship. Farmers also mentioned that SGMA success may require a new paradigm of water rights and water use priorities. Finally, farmers mentioned that for sustainable management of groundwater, there needs to be a better understanding of the groundwater systems in the county. According to farmers, this increased understanding should include farmer intuition and experience combined with science.

Definition of Sustainability

SGMA seeks to create sustainable groundwater management for California. For farmers, sustainability has multiple meanings. Farmers expressed that sustainable groundwater use involves thinking beyond single use to ensure water can be captured, reused, and transferred between users, emphasizing reasonable use and water balance. This could mean, as farmers suggested, a recognition that not all water uses are equal, such as water use for food production compared to watering lawns. Most farmers also suggested that the current planting of perennial crops on previously non-irrigated land in the county is most likely unsustainable and will be more so in the long-term as trees mature. Finally, some farmers suggested that sustainable groundwater use needs to be achieved much sooner than 2040.

Potential Policy Mechanisms

Farmers suggested a number of potential mechanisms that could be incorporated into groundwater sustainability plans under SGMA. The sustainable groundwater plans could encourage the use of surface water over groundwater. One way to aid in implementing this prioritization would be if surface water was cleaner for easier irrigation use. Many farmers also mentioned that electricity contracts could be changed so that farms are not contracted into pumping groundwater when surface water is available.

> *"I think we can engineer our way out of a lot of problems. But then it becomes a money problem." - Yolo County Farmer*

Many farmers mentioned the potential for drilling moratoriums, but with mixed opinions. Some farmers see it is a necessity to control developers from outside the County coming in and drilling new wells on marginal lands. Others see it as a threat to their farm business. An alternative option is control mechanisms for overdrafting

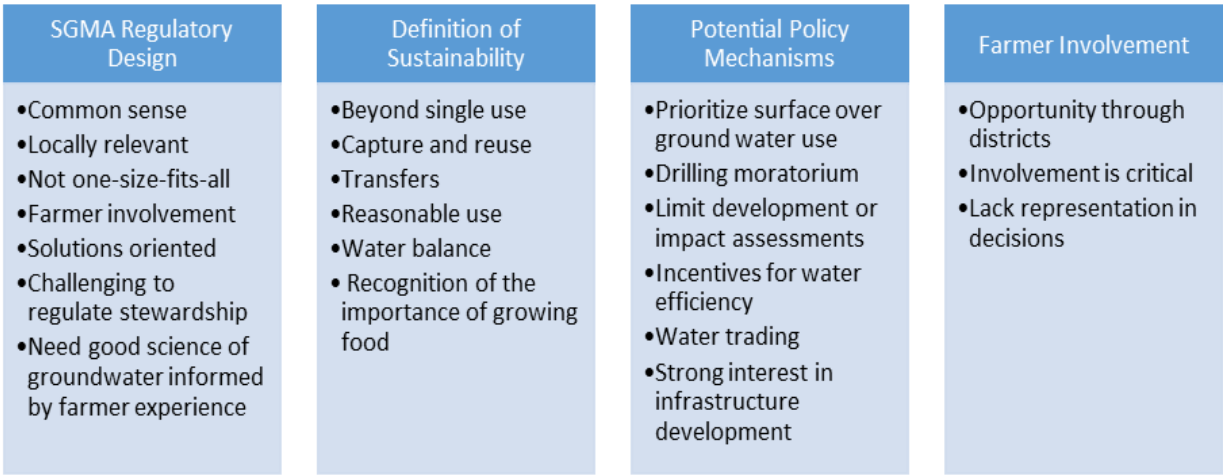

***Figure 2**. Key perspectives from farmers related to SGMA.*

Figure 3. *A groundwater meter assists farmers in understanding their groundwater use and associated costs. Photo credit: Phil Hogan, USDA Natural Resources Conservation Service, Woodland CA.*

of wells. Additionally, farmers expressed that there could be restrictions on new acreage in water intensive crops like almonds. Similarly, farmers also mentioned that new developments could require some type of cost-benefit analysis or environmental impact assessment.

Farmers suggested that they could be paid for saving water and/or acknowledged for the efforts they make to conserve groundwater. Some farmers also mentioned intra-county water exchange and trading. With water trading, there was fear expressed that cap and trade could turn into pay-to-play with larger developers controlling water.

Finally, farmers enthusiastically supported infrastructure solutions to groundwater management. These include upgrades to existing infrastructure and new dams, pipes, winter storage, and increased gate automation. Farmers would like to see funding for local infrastructure projects through SGMA. However, farmers expressed that funding in the past for infrastructure improvements has been difficult to acquire because of regulatory red tape.

Farmer involvement

Farmers see themselves as important participants in the sustainable management of water. They anticipate that the transition to county-wide sustainable use will be a painful process for farmers. They also expressed an imperative to be proactive and involved. According to farmers, they are able to participate in the SGMA process through irrigation districts and with Farm Bureau representation. However, they have thus far felt outnumbered in the decision-making process. Farmers felt that most representatives are from cities or boards of irrigation districts that don't have a lot of farmer representation. They see this is as a real concern with consequences for their businesses. If someone is going to create a policy, farmers suggest that they should be a key part of the process.

Conclusions and Future Work

Farmers are a critical part of the SGMA process and seek to be involved. This brief provides an overview on farmer's perspectives related to water management in Yolo County, California and specific ideas related to SGMA implementation. Overall, farmers acknowledge that there are impacts and real issues that need to be addressed related to surface and groundwater management. Many of these are driven by development, lack of infrastructure, and other existing policies in addition to climate and drought. They provided many potential perspectives on sustainability and strategies to achieve sustainable water management including the critical role for infrastructure maintenance and development. They suggested regulatory designs that are bottom-up, solutions-oriented, and locally relevant Farmers intend to be involved in the process to the extent they can.

Contact

If you are interested to learn more about this project, and related research on groundwater hydrology and agricultural economics of SGMA, please contact Meredith Niles at mtniles@uvm.edu

"I don't want to get the state involved. I think that's why we need to be very proactive, as locals to make it happen and to bring all the parts together."
- Yolo County Farmer

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