

# David Mas Masumoto: Mapping Valley water

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In this drought year, it's my only hope. Yet I can't see it, hear it or feel it. It lies hidden deep beneath my farm. Without it, my farm and neighbors go thirsty. All my senses focus on groundwater.

With a depleted snowpack in the Sierra and record low reservoirs, thousands of Central Valley farms will depend on water extracted from wells to keep their plants alive and to grow food. Pumps in Valley cities and towns also supply water to thirsty households. Both farmers and city folks will pray that our machines will continue to suck water from aquifers below our lands.

We are forced to visualize a new landscape. We will desperately learn how to read maps to determine groundwater depths under our homes and farms and make educated guesses of how much longer our wells will provide us with the life-giving elixir.

Like an explorer of uncharted seas, I've spread out hydrology maps of groundwater levels on my kitchen counter, trying to make sense of the curving lines cutting across our Valley floor. It's a topography chart of the unseen and concealed treasure under my feet. I run my fingers over the lines, hoping to acquire a feel of this unknown landscape. I have to learn how to read this new terrain and see the invisible.

Location. Location. Location. Real estate with a twist: where a farm or city lies and the water deposits (or lack of) will determine survival or death.

My farm is just south of Fresno and happens to be in a good water zone. (I think I'm lucky — this is all unexplored territory). My water table sits about 50 feet beneath the ground's surface. I have two wells, each dropping 200 feet, and good pumps. In the last 15 years, my water table has dropped 20-30 feet. I'm lucky. I thank my father who happened to buy this farm with unknown buried treasures of liquid gold.

Yet in the last few years, the water table has receded at a much quicker pace due to a lack of rainfall to recharge the underground aquifers and farmers forced to tap underground pools because of very limited supplies of surface water. How long will our water last? Who regulates this hidden asset? Who owns this fortune? These questions will haunt me for the future and impact my children's dreams of farming.

In California, groundwater operates with very little regulation. The next great debate will challenge private property rights versus governmental regulation. I believe we must first explore

monitoring systems and create local districts to establish protocols for reasonable and sustainable groundwater use. This will force cities and farms to adopt a regional approach to groundwater management — we all contribute to a liquid savings account. Yet a future challenge will arise — must regions cooperate with one another? Perhaps then a water marketing structure will be established with dollars as the determining factor. This troubles me because then my worth as a farmer may only be determined by the price of water. Will I then become a prospector and miner, part of a saga such as depicted in the film "There Will Be Blood"?

Twenty miles to the west of my property, farms sit on a cliff. Literally. The groundwater crashes downward to 220 feet. The underground terrain radically shifts and aquifers collapse. Those farmers will struggle, forced to employ deeper wells with huge pumps and very, very expensive water. Some of that water has high mineral accumulation and is not the best for irrigation. The landscape beneath those farms is not kind.

Yet in other parts of the Central Valley, like the Sacramento area, it's like living on another planet. Water tables there are higher than in the San Joaquin Valley and have not collapsed with this drought. It's the luck of geography and planning, more rainfall and rivers recharge the land; a land where two rivers, the Sacramento and San Joaquin, converge. These aquifers are different, fed for eons by different flows of water. I can't read their maps — they don't make sense to an "arid" farmer to the south with my coarse soils. Groundwater acquires a different meaning for them. They are on Mars. I am on Venus.

We reside and farm in a groundwater oasis. The Central Valley Aquifer system blesses our lands. An aquifer is not a river but more like pools of water squeezed between layers of rock and earth. They are fed by rain, seepage from rivers and reservoirs and snowmelt. Also by irrigation — we forget that not all the water I apply to my fields is taken up by plants. In fact, when we furrow irrigate, the majority of the water is not lost but percolates into the earth and recharges the aquifer.

Just as surface water feeds our aquifer, the opposite is true: Pumping can deplete groundwater supplies. Overdrafting means more water is taken than given, and like at the bank, we will pay for it in the long run. We think of this drought being a few years old, and quickly ignore decades-long droughts that are part of our history.

We live in a geography of hope. Hope for adequate rain and snow, hope for a short-term drought, hope our groundwater will last long enough to weather this thirst. At times, optimism blinds us. Already I anxiously read long range weather reports and the potential for El Niño next year — which can mean rain.

But the hidden landscape beneath us will quickly become visible, dividing our lands and landowners into the haves and have-nots. Water will gradually be depleted — not just on farms

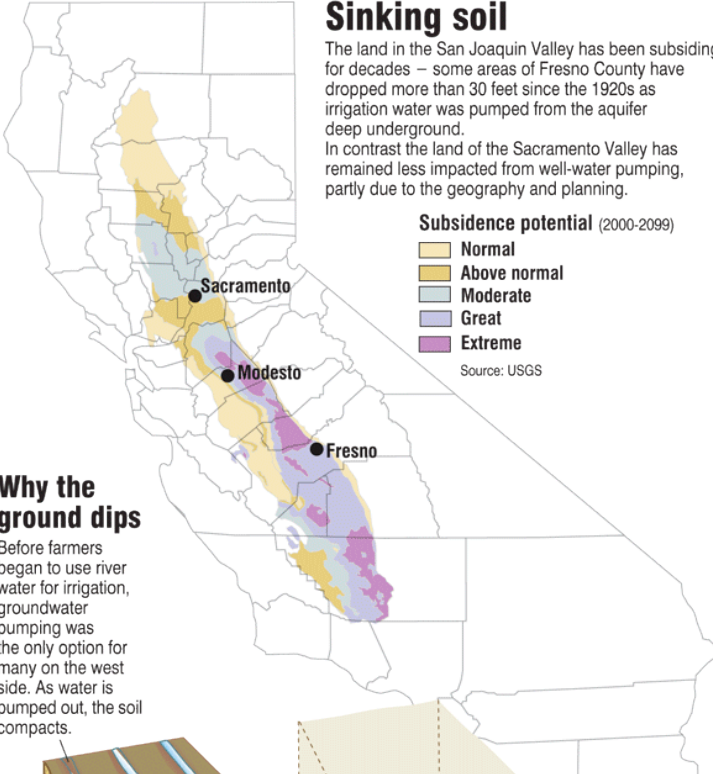
but also small towns and cities. When we turn on our taps and pumps and only a trickle flows, the curse of limited groundwater will be felt.

We are not dinosaurs who blindly faced a changing climate and environment. We can learn to read maps and see the future. We can begin to address this crisis with planning, policy and sacrifice. (On our farm, we've retired 20% of the land and are experimenting with fallowing some of our perennial crops). We may all have to share in this solution. The dreaded "C" word escapes from our dry lips and parched throats: "compromise."

## Sinking soil

The land in the San Joaquin Valley has been subsiding for decades – some areas of Fresno County have dropped more than 30 feet since the 1920s as irrigation water was pumped from the aquifer deep underground.

In contrast the land of the Sacramento Valley has remained less impacted from well-water pumping, partly due to the geography and planning.



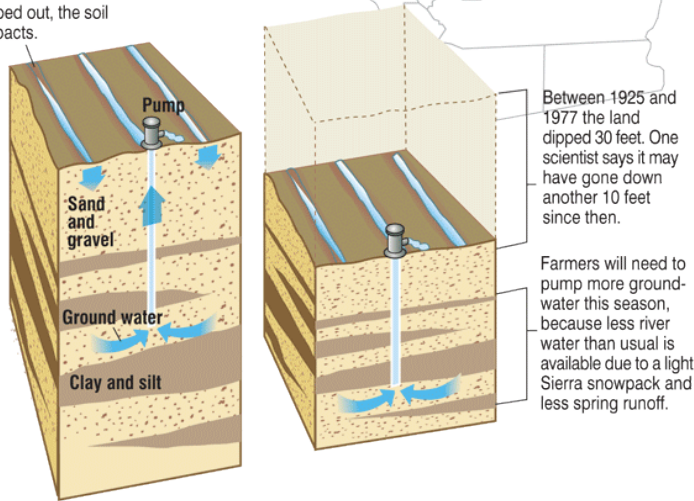
**Subsidence potential (2000-2099)**

- Normal
- Above normal
- Moderate
- Great
- Extreme

Source: USGS

## Why the ground dips

Before farmers began to use river water for irrigation, groundwater pumping was the only option for many on the west side. As water is pumped out, the soil compacts.

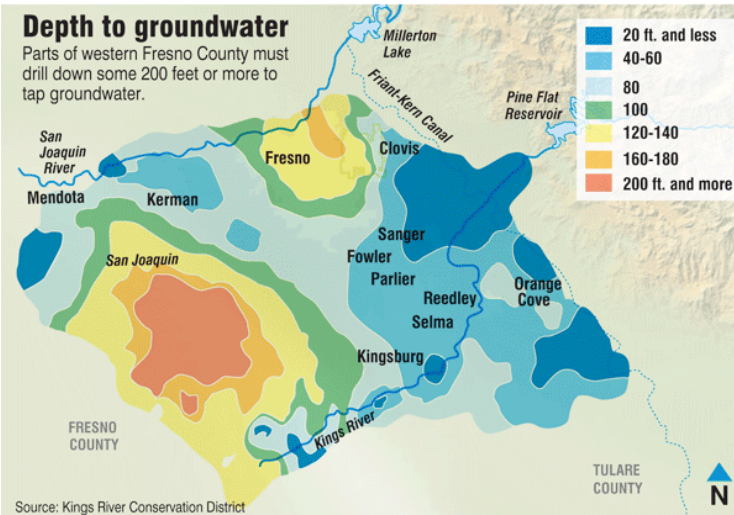


Between 1925 and 1977 the land dipped 30 feet. One scientist says it may have gone down another 10 feet since then.

Farmers will need to pump more groundwater this season, because less river water than usual is available due to a light Sierra snowpack and less spring runoff.

## Depth to groundwater

Parts of western Fresno County must drill down some 200 feet or more to tap groundwater.



Source: Kings River Conservation District

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