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# “We live in an agricultural death zone”: A post-growth approach for ensuring farmer and lake livelihoods in the Great Salt Lake Basin

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## ABSTRACT

Since their peak in 1986, water levels in Great Salt Lake have steadily declined due to human consumptive overuse combined with increased evapotranspiration from rising temperatures associated with anthropogenic climate change. Agricultural activities, accounting for 67% of total water withdrawals, are central to any solutions aimed at restoring the lake. However, proposed solutions are often generated outside of agricultural circles, resulting in a lack of farmer perspective, input, and buy in. This study is the first to use qualitative interviews with Great Salt Lake Basin farmers to explore their perspectives on transitioning their operations to lower water consumption. Findings reveal that while farmers' disproportionate water usage may imply a primary responsibility for Great Salt Lake's recovery, they see economic and developmental pressures as severely constraining their environmentally conscious choices and also putting undue pressure on the lake. These insights suggest that beyond changes in agricultural practices, success in restoring Great Salt Lake water levels will also depend in part on the state's ability to shift toward a post-growth paradigm that supports both ecological sustainability and farmer autonomy, as opposed to unfettered urbanization.

## 1. Introduction

The Intermountain West increasingly faces a future defined by water scarcity, aridification, and drought (Wise, 2012). Epitomizing this threat, the desiccation of Utah's Great Salt Lake—driven largely by human consumptive overuse—endangers the ecosystems, economies, and cultures of the surrounding Basin and its people (Khatri and Strong, 2020). For example, the lake supports between 10 and 12 million migratory waterfowl who require the lake's brine shrimp and brine flies to refuel on their long journeys (Baxter and Butler, 2020). Further, without healthy lake levels, the lakebed's toxic dust, which already levies detrimental respiratory consequences on neighborhoods closest to the lake, will only worsen (Christian et al., 2023; Steed, 2024). Potential annual costs of the health consequences arising from continued declines in water levels at the lake total up to \$22.3 million annually (ECONorthwest and Martin & Nicholson Environmental Consultants, 2025). When combined with other monetized costs such as the loss of mineral extraction output, landscape mitigation, loss of recreation, decline of the brine shrimp industry, and decrease of ski resort spending,

twenty-year totals of the economic costs of lake decline are projected as high as \$32.6 billion (ECONorthwest and Martin & Nicholson Environmental Consultants, 2025). Yet even these extraordinary projections fail to account for other devastating externalities that may result, such as life outcomes associated with decreased school performance among children affected by respiratory or neurological consequences, or dampened home value accrual due to the dangerous environment. Increasingly, scholars recognize the spiritual implications to the decline of our habitat as well (Sponsel, 2012); if the lake deteriorates, so too will the Intermountain West.

Facing such dire consequences, policymakers, researchers, and the media have focused their attention on the behavior of those using the most water: farmers. Certainly, agriculturalists bear some responsibility for the problem, given that they consume roughly two-thirds of the water that might otherwise flow into the lake (Steed, 2024). Moreover, 56% of the basin's water grows alfalfa (Richter et al., 2024), which, with its prolonged growing season, deep root system, and dense vegetation requires intensive watering as compared to other crops (Undersander et al., 2016).

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Yet to suggest that alfalfa farmers alone hold the key to solving the problem of the lake's desiccation overlooks a host of other contributory factors, namely the impact of growth on current and projected water demands. While water levels in the lake decline, Utah's population continues to rise. Projections for the next forty years show Utah's population doubling or even tripling (Kem C. Gardner Policy Institute, 2022). With economic growth set to mirror this demographic boom (Kem C. Gardner Policy Institute, 2022), increased housing will need to keep pace. This growth is likely to increase stress and strain both on healthy lake levels and Utah's agricultural communities, as it will require increased water consumption and increased land use transitions from open space to housing developments.

Accordingly, in order to address lake desiccation, it is essential to focus in part on water conservation opportunities in agricultural communities. Yet, it is equally important to explore how this can be done in ways that will also protect and support farmers' increasingly endangered livelihoods, which they see as being threatened in tandem with Great Salt Lake as result of explosive, unfettered growth in the Great Salt Lake Basin. With this in mind, this study seeks to advance research by asking: How do farmers view their role and the roles of others in the crises stemming from Great Salt Lake's desiccation? How do commodity farmers in the Great Salt Lake watershed perceive different land transitions toward unirrigated uses that maintain farmers' stewardship over the land? Finally, what leverage points do they see for productive intervention?

To address these questions, we conduct qualitative interviews with commodity farmers across the Great Salt Lake Basin, examining their connection to land, water and farming, their support for different land use transitions, and how they understand problems and solutions for Great Salt Lake. Ultimately, participants express concern for the role of growth and development plays in threatening both the lake and their own livelihood. These results suggest that the theory of post-growth may offer a bridge between the challenges the participant farmers expressed and the principles that might inform holistically sensitive solutions. In demonstrating this, our research advances literature by providing a concrete example of how post-growth sentiments emerge on the ground, moving the theory beyond the abstract. Further, we show how the theory is applicable for a geographic region where this theory has yet to be applied, emerging perhaps unexpectedly from members of an agricultural community in the western U.S. We suggest these findings can help guide the direction for future growth and water conservation policies in efforts to address Great Salt Lake's desiccation.

## 1.1. Literature review

### 1.1.1. Attribution of stressors for commodity growers

Globally, farm operations have and are projected to decline (Mehrabi et al., 2023). Since 1935, the number of farms in the United States fell sharply from 6.8 million at its peak to 1.88 million in 2024 (Keller and Kassel, 2024). Following this national and global pattern, Utah similarly saw a drop from ~25,800 farms in 1950 to 17,386 farms in 2022 (Utah Department of Agriculture, 1991; U.S. Department of Agriculture, 2024). As this large-scale agrarian decline takes place, commodity farmers must increasingly navigate challenges posed by dwindling resources, expanding urban development, and shifting food systems. As the consequent problems have become more pronounced, scholarship has identified a wide range of causes.

Some studies have sought to understand large-scale, commodity farmers' decision-making regarding their adaptation to climate stressors (Velten et al., 2015). Self-discipline (Zhang et al., 2018) and peer adoption (Brechtwald and Prinstein, 2011; Tran-Nam and Tiet, 2022) seem to influence farmer behavior more positively than government intervention. Other scholarship has pointed directly to systemic causes and effects in the farmers' broader environments (Hoek et al., 2021). Elsewhere, research has identified that a combination of these micro and macro considerations influences farmers' climate-smart decisions (Belay

et al., 2017). In the United States, recent governmental divestment from climate-smart agricultural incentives may further restrain farmers' ability and willingness to adapt (Lange, 2025).

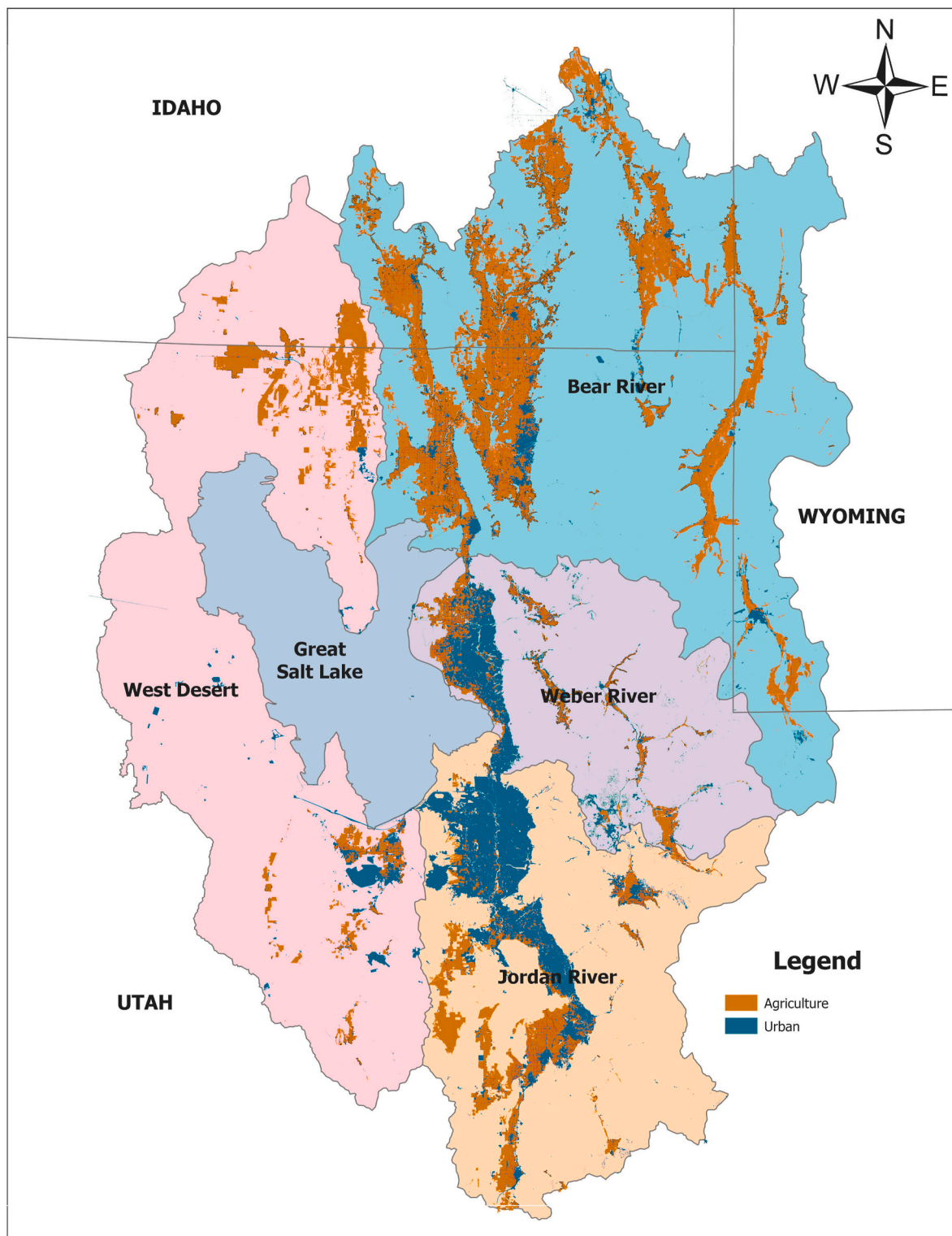
Beyond climate adaptation, farmers also face compounding stressors that affect their well-being, especially as they face systems crises outside of strictly environmental pressures. Across different studies, farmers' stress has been correlated with high work demands coupled with little control and a lack of social support (Lunner Kolstrup et al., 2013). Several studies examine the strains tied to farmers who irrigate in a desert climate, where farmers feel the pressure from finances and regulatory policy exacerbated by water scarcity (Wheeler et al., 2018). Among commodity farmers in terminal, saline lake systems like Lake Urmia in Iran, scholars agree that the pressures and solutions for farmers and their systems have no "best" solution; rather, interventions and supports must be place-derived and will be strongly constrained by past management decisions (Tussupova et al., 2020).

In the case of commodity farmers in the Great Salt Lake Basin (Fig. 1), stressors include (1) changes to water governance and targeted efforts to reduce agricultural water consumption to restore healthy lake levels and (2) increased growth that continues to encroach on historically agricultural lands.

In the legal landscape, water governance in the western U.S. is complex. It has historically operated on a Prior Appropriation Doctrine of "first in time, first in right," which assigns priority to the most senior water users in times of scarcity (Tarlock, 2000). It also demands that those rights holders either use the right or forgo it to downstream claims, encouraging users to draw upon the fullest extent of their right *regardless* of scarcity (Hewitson, 2024). As Great Salt Lake has continued to shrink in the face of the 21st century's megadrought, water laws in Utah have shifted somewhat to account for the new circumstances. In 2022, Governor Cox announced a moratorium on further water rights appropriations and the definition of "beneficial [water] use" expanded to include conservation (Cox, 2022; Utah State Legislature Budget Office, 2022). Additionally, the Utah Legislature has, since 2021, allocated significant expenditure on water metering, water reuse, desalination, aqueducts, and other resiliency projects (Utah State Legislature, 2022). Notably, the agricultural water optimization program aimed at improving irrigation has found robust support, as farmers filed over 1500 applications from its inception in 2019 to 2025 (Williams, 2025). In total, \$200 million has been appropriated to the optimization program, 80% of which has so far been dedicated to on-farm enhancements (Utah State Legislature, 2023). Still, it remains to be seen how the demands of these new laws will succeed in contributing to increased lake levels, impact commodity agriculture in Great Salt Lake Basin, or demonstrate any feasible uptake of widespread water conservation programs.

In line with these governmental efforts, as lake levels have declined, so too have agricultural withdrawals. Between 1985 and 2015, Utah's Great Salt Lake Basin saw a decline of 30% in its total agricultural withdrawals (Table 1). This decreased usage has reflected the concurrent statewide shrinking of agriculture's irrigated acres. Between 1982 and 2017, irrigated areas in Utah's Bear River Watershed fell by 9%; in the Jordan, 11%; and in the Weber, 13% (Zesiger et al., 2023). These farms, which frequently trace back five or six generations, have largely been replaced by housing developments (Ahmed and Jackson-Smith, 2019). And while municipal water usage pales in comparison to agricultural withdrawals (State of Utah, 2024), the mushrooming population must also contend with resource constraints (particularly food and water) to create a sustainable future (Table 2).

Indeed, complicating demands on farmers and Great Salt Lake, Utah's population continues to rise. Economic growth will mirror this demographic boom (Kem C. Gardner Policy Institute, 2022), and housing must keep pace. Utah's Office of the Legislative Auditor General reported that Utah will need to build 27,900 houses or apartments per year for the next thirty years if it hopes to meet demand (2023). Accordingly, the prices of land and housing, central to the ongoing



**Fig. 1.** The constituent watersheds comprising the Great Salt Lake Basin, with agricultural areas highlighted in orange and urban areas highlighted in blue. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

housing crisis throughout urban and suburban centers across Utah, will likely continue to increase U.S. Census Bureau, 1992.

Thus, Utah farmers lie at the center of two primary pressures: ecological water scarcity from broad aridification and lake desiccation, and economic strain as historically agricultural land is increasingly valued for the houses it can support instead of the crops. These dual pressures compound existing pressures for Utah commodity growers

who already face national-scale issues of dwindling agricultural land and shrinking financial margins beyond local systems demands. Utah farmers find themselves with unique challenges as they sit at the center of that complexity: the region expects and depends upon continued growth while also needing to reduce its consumption to preserve the lake and the livable environment it creates. Increasing growth while decreasing consumption would be unprecedented in our current social

**Table 1**  
U.S. Geological survey estimates of annual agricultural irrigation withdrawals for the GSL basin in 1985 and 2015 (Zesiger et al., 2023).

River Basin	1985	2015	Percent Change
Bear River (UT) <sup>a</sup>	733,000	727,000	-1%
Jordan River	672,000	410,000	-39%
Weber River	538,000	218,000	-60%
UT GSL Basin Total	1,943,000	1,355,000	-30%

<sup>a</sup> Notably, by relegating this reporting to Utah only, the table does not paint a complete picture of water usage across the Basin. In Idaho, agricultural irrigation withdrawals have increased 30% over this period, meaning that the cross-state Basin total has only declined 4% over the period of lake desiccation.

structure (Parrique et al., 2019), suggesting the need for society, and Utah in particular, to contemplate a shift in how we think about and engage with growth in the Anthropocene.

1.1.2. Post-growth theory

The burgeoning ecological economic theory of post-growth is an appropriate framework for addressing human-environment tensions (Kallis et al., 2025), such as those expressed by farmers at the intersection of commodity agriculture, water scarcity, and increasing urban growth and development. Post-growth proposes to invert the mechanisms of capitalism which encourage consumption, profit-orientation, and perpetual economic expansion. Instead, it reorganizes the economy around sufficiency and well-being, rejecting accumulation and commodification. Notably, while degrowth proposes an agenda to halt and even contract from current growth patterns, post-growth is an umbrella term that has fewer prescriptive certainties. Post-growth does not propose a specific strategy but instead proposes to replace the drive towards accumulation with an agnosticism about it (Savini, 2024). In the context of this study, growth is explored through the express experiences of farmers while also situating those experiences in a broader problem of systemic orientation; post-growth offers an alternative systemic approach to consider.

Post-growth draws from ecological economics and thermodynamic critiques of capitalism (Georgescu-Roegen, 1971; Meadows et al., 1972), emphasizing the material limits of economic expansion. At its core, it criticizes the capitalist presumption that healthy societies must grow economically in perpetuity (Purdey, 2010). Post-growth identifies the growth paradigm and logics as dangerously utopian and, in fact, anomalous in the history of human markets, which only recently began to regard the economy as a preeminent institution (Polanyi, 2002). Today, GDP serves as a synecdoche for national sovereignty and global power (Speich-Chassé, 2013), with or without the accompanying well-being per capita that it presumes to represent (Schmelzer, 2016).

Post-growth must also be distinguished from green growth, which, in the context of this research would propose a certain bridge between material limits, like a waning water budget, and the present systemic design. Green growth itself stems from consonant ideologies with post-growth; its conclusions, however, diverge. Green growth acknowledges that human societies consume too many resources for sustainable survival on a finite planet, but that with technological innovation and

resource substitution, GDP growth can decouple from resource use and carbon emissions (McAfee, 2019). Even the United Nations Sustainable Development Goals implicitly orient towards decoupling to justify continued economic expansion, though continued economic expansion presently underpins many, if not all, of the problems other goals endeavor to redress (Fletcher and Rammelt, 2018; Hickel and Kallis, 2020). While relative decoupling—slowing the rate of resource throughput while GDP continues to soar—does exist among many developed nations, absolute decoupling remains elusive (Parrique et al., 2019). In fact, as efficiencies improve, societies can expect to increase resource use over time (Alcott, 2014), a paradox which survives the scrutiny of history in a way decoupling cannot (Kallis, 2017). Specifically, 1% growth of a nation's economy ushers in a roughly 0.8% increase in both carbon emissions and resource use (Burke et al., 2015; Steinberger et al., 2013). Indeed, for the planet's human population to survive the current polycrisis, there is likely no future that includes economic growth (Schneider et al., 2010; McBain et al., 2017; Jackson, 2009).

1.1.3. Post-growth in agri-food scholarship

A growing number of agri-food scholars are exploring the implications of post-growth—a return to Georgescu-Roegen's initial thinking about the effect of biophysical limits on food production (1971). Accordingly, post-growth has begun to intersect with critical agrarian studies (Gerber, 2020) and alternative systems explorations (Nelson and Edwards, 2020) as a way of envisioning the convergence of human metabolisms and the social metabolism in which they are embedded. Others have not gone so far as to connect agri-food systems with a specifically post-growth approach but instead have called for an “un-making” of capitalism that draws from the same observations and principles (Piccoli et al., 2023). Intersecting areas of scholarship have explored rural sociology (e.g. Marsden, 2004), critical agri-food transformation (e.g. Radu et al., 2020), political economy (e.g. Vincent and Feola, 2020), peasant movements (e.g. Roman-Alcalá, 2017), and materialist perspectives on the more-than-human (e.g. Contesse et al., 2021). These areas expand the boundaries of what food systems research can encompass and establish a foundation from which that research can connect to post-growth discourse broadly. Though these bodies of literature are inarguably influential to this study, the scope of this research will remain centered on its directly constituent parts.

From within the well-established branches of agri-food systems, food sovereignty and agroecology, scholars have begun exploring how peasant modes of food production and growth-agnostic policy deliberation have laid the groundwork for post-growth logics to emerge from producers' own sovereign movements (Roman-Alcalá, 2017). *La Via Campesina*, spanning 81 countries, leads the charge in exploring this relationship between food sovereignty and degrowth priorities emerging from self-organization (Campesina, 2021). Similar vanguards in the Cree Nation of Chisasibi have tied decolonization through food sovereignty to degrowth by recentering historical relationships between generations and within its cultural ecology (Radu et al., 2020). In Cuba, farmers have begun demonstrating the relationship between agro-ecology and post-growth simply by their geopolitical exclusion from supply chains of

**Table 2**  
Changes in human Population Between 1990 and 2065 in Utah's GSL basin (Zesiger et al., 2023).

River Basin	1990 <sup>a</sup>	2020 <sup>b</sup>	Percent Change	2025 <sup>c</sup>	2065 (Projected) <sup>c</sup>	Percent Change
	<i>Primary period of lake desiccation</i>			<i>Period planned for lake recovery</i>		
Bear River (UT)	102,200	193,900	+90%	210,369	320,055	+52%
Jordan River	1,026,100	1,952,000	+90%	2,136,781	3,393,349	+58.8%
Weber River	367,200	679,300	+85%	711,233	1,035,197	+45.5%
UT GSL Basin Total	1,496,000	2,825,000	+89%	3,058,383	4,748,601	+55.2%

<sup>a</sup> 1990 population data are from the U.S. Census Bureau (1992).

<sup>b</sup> 2020 population data are from the U.S. Census Bureau, Population Division (2022).

<sup>c</sup> 2025 and projected 2065 population data and projections are from the Kem C. Gardner Policy Institute at the University of Utah (2025).

carbon intensive agricultural inputs (Cederlöf, 2016). Across Europe, too, post-capitalism and post-productivism, founded on comparable propositions as post-growth, have emerged through agricultural grass-roots initiatives and regenerative agriculture (Beacham et al., 2023; Spanier, 2025). These case studies and the scholarship that explores them tie established theories grounded in critical agri-food systems studies with existent practice among agriculturalists, similar to what this study aims to do.

To frame these and other case studies at this intersection, scholars have alternately deployed a variety of critical theoretical positionings. From ecological economics, post-growth scholars have argued against the use of biotech-based agriculture and even occasionally against the use of organic agriculture, based on metabolic need in some densely populated regions (Gomiero, 2018). As an alternative model, other ecological economists have explored and validated the microeconomic implications of community-supported agriculture (Bloemmen et al., 2015). From within political ecology, post-growth thinkers have connected power differentials and injustice to the experience of Faroese whalers (Bogadóttir and Olsen, 2017), as well as to the experience of the global growth imperative by fishermen in Turkey (Ertör-Akyazi, 2020). Critical scholars from within social practice theory, community economics, agrarian studies, and ecofeminism have brought the post-growth conversation to resolve the paradox between present social infrastructure and future need (Boonstra and Joosse, 2013); to explore self-provisioning support networks as observed in the Czech Republic and elsewhere (Daněk and Jehlička, 2020); to argue against an assimilation of growth logics into agri-food scholarship broadly (Gerber, 2020; Scheidel et al., 2021); and to embrace the role of women in degrowing food systems (Brückner, 2020; Prieto and Domínguez-Serrano, 2017). This diverse theoretical framing has paved the way for a better understanding of the roles of cooperatives (Öz and Aksoy, 2019), short supply chains (Voget, 2009), and locavorism (Boonstra and Joosse, 2013) in feeding people without economic growth logics.

In line with post-growth research more broadly, agri-food post-growth scholarship is expressly normative in its approach, centering on the values and mechanics of transformation within agri-food systems. This positioning can range from radically leftist scholarship exploring the role of farmer-consumer cooperatives in overthrowing the capitalist state (Skclair, 2021) to more politically institutionalized, public policy-oriented approaches to degrowing food systems (de Molina Navarro, 2015). Geographically, discourse on this transformation alternately ranges from urban centers (Cederlöf, 2016; Manteuffel, 2014) to the Global South (Dengler and Seebacher, 2019). Across publications, agri-food post-growth scholarship tends to amplify functionally successful case studies—though almost entirely in the Global North (Dengler and Seebacher, 2019)—in mapping transformative possibilities.

Conspicuously, few studies apply to the United States, and few, if any, consider drying lake systems as the context for research. No studies examine the Intermountain West, a region with unique ecological constraints that make it particularly relevant to both considerations.

#### 1.1.4. Post-growth and Great Salt Lake Basin dynamics

Given this study transpires in the waning Great Salt Lake Basin, post-growth must not only validate the socioeconomic experiences of farmers, but it must also effectively address problems created specifically by drought. Despite ambitions to decouple economic growth from resource use, water consumption continues to rise with GDP (Hernandez et al., 2020), underscoring the relevance of post-growth analysis in drought-prone regions. Urbanization, too, has a negative and consumptive effect on water resources, in addition to degrading land, soils, and ecosystems once enlivened by agriculture (Garrick et al., 2019). In fact, some research suggests that while water footprint follows an inverted-U-shaped Environmental Kuznets Curve initially—meaning water consumption increases with development before tapering off and decreasing at a point of sufficient wealth—continued economic growth

and income inflation leads to an N-shaped environmental Kuznets curve over time; indeed, increased economic activity long-term ultimately leads to a surge in water consumption that overwhelms the shorter-term benefits of development (Sebri, 2016). Ultimately, the precedent demonstrates that growth and water consumption can only decouple relatively, as societies become more efficient; the two seem never to decouple absolutely. This validates other critical reexaminations of the environmental Kuznets curve (De Bruyn et al., 1998; Wang et al., 2024) which questions the very foundation of green growth that otherwise undergirds a typical dismissal of post-growth thinking.

Water serves a unique role among other natural resources as it is non-substitutable and critical for life (Daly and Farley, 2011). For this reason, water's function in even un-agricultural throughput correlates directly with other physical capital used to grow an economy (Hernandez et al., 2020). Decoupling a growth-oriented economy from increasing natural resource usage—in this case, water—may only be possible in the short term through yet-nonexistent efficiencies and it would be “physically impossible to maintain in the long term” (Hickel and Kallis, 2020, p.475). Accordingly, post-growth offers a compelling lens through which to examine the experiences of farmers situated amid rapid development in the Great Salt Lake Basin.

#### 1.1.5. Gaps in the literature

Post-growth scholarship remains nascent and theoretical. Very little research explores the material conditions and relationships between existing systems and their potential transition towards post-growth. Similarly, very few post-growth scholars have pushed beyond the boundaries of Europe; fewer still have applied post-growth to the United States, despite its disproportionate responsibility for material and economic throughput globally. No existing studies we are aware of consider post-growth in the context of the Intermountain West or in the context of drying lake systems. Accordingly, this study examines the lived experiences of Utah farmers embedded in capitalism, in an effort to incorporate applied, qualitative sociology with the theoretical, normative work typical of post-growth discourse. This work is the first of its kind to apply a post-growth lens to any industry in Utah. As the data will demonstrate, the application also finds post-growth relevant for farmers' experiences both inside their industry, as their production is beholden to the whims of the global supply chain, and embedded in other industries beyond agriculture, as increased development allows urban land encroaches on historically agrarian lands. This two-pronged application of post-growth offers a unique and persuasive contribution to the literature. Further, in focusing on the experiences of commodity farmers, it also leads the field in applied, agri-food research to offer a more complete blueprint of the bridge between systems of neoliberalism and systems of sustainability.

## 2. Materials and methods

### 2.1. Sample and data collection

This study seeks to explore how farmers perceive their roles relative to Great Salt Lake desiccation, particularly in terms of different land transitions toward unirrigated uses and productive leverage points for intervention.

To address our stated research questions on these topics, we conducted in-depth, semi-structured interviews with participants who met two criteria: 1) growers using water diverted from the Bear, Weber, and Jordan River watersheds (the Great Salt Lake Basin), and 2) those self-identifying as primarily cultivators of alfalfa or other commodity hays, given how these grasses disproportionately draw upon the watershed relative to other land uses.

In collaboration with seven Utah State University extension agents who act as trusted gatekeepers in the Basin's agricultural communities, we identified nine research participants through purposive case sampling (Patton, 2015, pp. 236-238). We continued recruitment through snowball sampling (Tongco, 2007), by asking participants to

recommend people within their networks who also farmed alfalfa in the Great Salt Lake Basin and may be willing to offer insights about their experiences with aridity. Sensitive to and respectful of the community's time constraints and potential research fatigue given the coming growing season as we collected data, we relied upon this method of snowball sampling until the start of the growing season. While in an ideal world more time would have allowed for more interviews, we concluded data collection confident we had adequate data to address our research questions (Mwita, 2022; Seidman, 2019). Ultimately, we spoke with 15 farmers: six from the Bear River watershed, six from the Weber River watershed, and three from the Jordan River watershed (though the Jordan River hosts the greatest population, the Bear hosts the greatest agricultural production by a factor of two (State of Utah, 2024)). In the end, we interviewed every farmer who agreed to our interview from our list of contacts. Given our purpose, strategies, and imperfect response rate among the farmers we invited, there are limitations in the insights we can draw. Nonetheless, the participants became predictable in their answers to our questions and in the themes they introduced, which lends confidence to our analysis that follows. We also argue that the depth and richness of the data compensate for the relatively small sample size, as qualitative rigor is assessed not by scale but by credibility, dependability, confirmability, transferability, and reflexivity—criteria which this research meets (Stenfors et al., 2020). Anecdotally, this research also received media coverage and led to subsequent discussions with other members of the agricultural community in the watershed who reached out to us to discuss this research. In these conversations they echoed many of the sentiments expressed by participants in this research.

Participants ranged from 25 to 82 years old, with an average age of 54.7. In addition to the alfalfa that qualified them for the study, participant farmers also variously grew onions or winter wheat, or raised cattle. All were white men, although in three interviews, wives and/or siblings sat in on the conversation and occasionally offered additional commentary. Given their commentary was minimal and/or we did not gain IRB consent from the auxiliary commenters, we used their contributions only to inform and contextualize our analysis of the formal participants' perspectives. While lacking in ethnic and gender diversity, the sample reflects the demographics of those running the 17,300 farms statewide: 94% of farmers are white and have an average age of 56.6 (Department of Agriculture & National Agricultural Statistics Service, 2022).

The study design, including the recruitment materials and interview protocol, was approved by Utah State University's Institutional Review Board (IRB) with protocol #13937. To obtain this approval, we took steps to ensure an ethical approach and mitigate interview bias, including adjusting the language of our questions to be sensitive to farmers' culture and receptive to their answers. For example, we were advised by Extension agents not to say "fallow" in reference to deliberately uncultivated land (we might say "rested" land instead); to approach the question of how to price water with sensitivity for its incommensurability to farmers; and not to reference any firm notion that farmers "must" transition some irrigated land to another use in order to preserve the region's ecology. Instead, we used less direct language both to decrease the bias of our questions and increase our rapport. In the process of conducting the research, we also learned that in many situations, we could cultivate rapport and engender trust with the farmer we were interviewing by indexing Author 1's shared Mormon heritage. To ensure our research outputs protect participant confidentiality and anonymity in line with our ethics-approved protocol, here we assign each participant a pseudonym with all other identifying details redacted to prevent deductive disclosure.

In using a semi-structured interview process (see supplementary material), we could adapt the conversation to the emergent interests of each participant as well as to other lines of inquiry beyond the protocol, informed by the insights of those with whom we spoke. This created an atmosphere of social ease and mutual trust, wherein the farmer,

appropriately, could feel less like a test subject and more like a discussant (Seidman, 2019; Weiss, 1995). The interview protocol we followed wound through their family heritage in agriculture, experience with the past decades' drought, irrigation preferences and strategies, perspectives on land use transition, and expectations for the future. In true fashion of abductive research, it is worth noting that our interview guide (see supplemental materials) did not include any questions about development, growth or urbanization; we only coded for post-growth themes after consistent repetition indicated the interviewees found these themes crucial to their perspectives and experiences. Each interview lasted between 45 and 90 min, and took place wherever they preferred. Most often, we spoke in person at the participant's farm—occasionally at the kitchen table, in the tractor garage, or inside the farmer's office. Often, this allowed us to look out on the farmers' fields, which we feel enabled the farmers to tap into the pride and intimacy they experienced with their work. It also enhanced our ability to observe and understand farm operations as an outsider. Following the written consent of each participant, each interview was audio recorded by the transcription software Otter.ai for later analysis. We also followed our interviews with our own recorded and transcribed thoughts detailing our immediate impressions of what farmers had shared, as a means of documenting stream-of-consciousness, post-interview observations and connections.

## 2.2. Data analysis

We rely on qualitative thematic analysis to comb through the interview data, identifying relevant and meaningful themes that emerged across interviews (Bailey, 2018). Using the initial transcription generated by Otter.ai, we edited the text for clarity and accuracy and removed all potential participant identifiers. We then uploaded the text to NVivo, a qualitative coding software, to develop our codebook. We relied on abductive analysis to create codes, which we simultaneously derived from the structure of the interview protocol (deductively) as well as from reoccurring emergent themes presented (inductively) (Timmermans and Tavory, 2012). After generating an initial codebook from the first six interviews, we returned to those initial interviews to ensure all interviews were ultimately coded for all concepts; then, we cross-checked it collectively as a research team to ensure our interpretation fairly represented the information provided by participants and limited overlap between categories (Elo et al., 2014). This triangulation process of relying on the subjectivities of multiple researchers helped create precision in generating representative codes, consistency in applying codes across interviews, and thoroughness in deeply reading the data to ensure credibility and trustworthiness in analysis (Nowell et al., 2017). Having achieved consensus within our team, the codebook included codes relevant for this paper, such as *anxieties*, *development threat*, and *growth*; a table of all parent and child codes generated follows in the supplementary material.

## 3. Results

Across interviews, farmers interviewed expressed deep connection to water and land, reflected on a variety of potential land use transitions and impacts on their operations, and discussed issues around water consumption and Great Salt Lake beyond agriculture in the basin. To address our research questions, in this section we review findings that reflect participants' perceptions of: (1) water, land, and Great Salt Lake; (2) land use transitions (particularly regarding attendant insolvency, ecological consequences, institutional skepticism, and loss of lifestyle); and (3) alternative leverage points (beyond agricultural land use change) for addressing water consumption and Great Salt Lake. Across these discussions, farmers highlight the extent to which growth-based logic creates pressures at the intersection of conservation, agriculture, and lake desiccation.

### 3.1. Complexities of farmer roles and relationships to land, water & Great Salt Lake

In order to successfully reduce upstream diversion from Great Salt Lake, it is essential to understand and incorporate the perspectives and values of those using an outsized share of it. Broadly, farmers in this research express a deep and emotional care for and connection to the land and water under their stewardship—"the land is literally my first-born child... and the water is right there," in Joseph's words—though they seldom extend this intimacy to the lake at the water's terminus. In the public sphere, these connections to land and water are often sidelined as they feel scapegoated by the media and scientists who blame them for environmental problems like Great Salt Lake's desiccation (the consequences of which they view with skepticism). From their perspective, the primary culprit of problems plaguing Great Salt Lake is the same one that threatens their own livelihoods—unrestrained growth. Further, these farmers feel deep responsibility for feeding their communities and rue the ignorance of those same communities about the importance of their work. They recognize many positive externalities farming provides; accordingly, these farmers yearn to be seen as protectors of the land and water rather than destroyers.

James encapsulated this attitude in sharing:

I just love the valley and what it has to offer ... We can't just vilify agriculture and say, let's just get rid of agriculture and take all the water from them. Because one, they're a huge producer for the state. And there's all those other benefits, they have the open space, the wildlife, all those values that people don't think about until they drive through there, and now it's all homes and businesses. And they're like, *Oh, sure was prettier here 20 years ago.*

Andy echoed this sentiment in emphasizing the disconnect between common perceptions of farmers, on the one hand, and his experience in the industry, on the other, stating, "Always farmers get the bad rap, you know, on stuff like I've seen on social media and whatnot. We're destroying the environment and this and that, and it's like, farmers are one of the better stewards of the land that take care of things. If [people] just knew how things are done ..."

Regarding Great Salt Lake, participants feel threatened by the crisis, seeing their livelihoods as the sacrifice Salt Lake City would make to protect its own. Joseph expressed a desire to participate in irrigation optimization programs—referenced here as "the pipe"—as a way of helping conserve water, but noted his wariness to cede his resources to an urban institution he mistrusted to respect his work.

We did apply for the pipe, trying to help with the water ... But then I feel like if I do take the money, [Salt Lake City/ the government is] gonna take my water. And it's a serious battle all the time. And I know without a doubt they are going to take water. For the lake. There is no ifs, ands, or buts. They are going to do it and it's just—we're all waiting for it to get shoved to us.

He continued, pointing out that the growth his region has seen has not centered on agriculture. He said, "Everybody gets mad that the farmers use all the water. Tell me what, there's one thing changed in 100 years since Bear Lake and this water system got put in 120 years ago. One thing has changed. *Farming's* not getting bigger. Why do we have a water problem now?" Joseph implies here that urbanization and development have escalated while farming—historically a mainstay in the region—has not. Accordingly, he points to development as more obviously responsible for the diminishment of upstream flows instead of farming.

Joseph reserves his greatest anxieties for the threat he sees to Utah's food systems, however. At one point during the interview, upon sharing that hardly any of his son's school friends knew where their food came from, he openly wept. He expressed profound unease with this diminishment of agriculture both physically and from the community's awareness, which he connected it directly to the lake.

And how do you get mad at a guy trying to feed his family... if it's growing wheat, feeding the community, and this hay feeds cows that make milk?... You can't have your pie and eat it too... I think we need to do what we can to help the lake. But if it gets to that point, what are you going to do? You can't eat straight salt. And last time I checked I didn't know anybody with a brine shrimp diet.

He closed by reiterating the loyalty he felt to the landscape, in spite of perceptions. "It's hard. Because you just, we want the same thing as everybody else. We want to be successful. We want to take care of things. Nothing gives me more joy than seeing the green crops and doing a good job and a bountiful harvest. Take the water away, you take that with it."

Joseph is not alone in this complexity of pride, anxieties, defensiveness, accountability, and suspicion. Mike underscored these feelings in advocating a broader, more farming-friendly perspective to address drought:

Not everyone can [sell] out. We still need to have dairy farms. We still need to have beef operations. We cannot let agriculture go, because, you know, getting onto the water side of this... I think that we need to look at everything as a whole, not just [agriculture] to do it ... It's just not a Utah problem. It's an Idaho, it's a Wyoming problem... Ag is not truly the problem. We all need to work together, and I think ag is generally doing a good job because they are actively trying to conserve. They're looking at different ways to irrigate.

Several farmers who participated in this research brought up the reasons alfalfa thrived here in the first place, and how it contributes to rather than detracts from the environment and community. Two noted the potent carbon sequestration alfalfa offers because of the depth of the root and its function as a nitrogen-fixing legume. Others mentioned the correlation between increased wealth from new residents that brought more horses to the area and the high-quality alfalfa only a dry climate like Utah's could grow. Charles emphasized this more balanced perspective in understanding farmers' approach to irrigation:

We grow alfalfa and everybody has in their mind that alfalfa is this horrible crop—100% wrong. That's why we grow it here. It does good in the desert climate. We water it four times a year. So I have water assigned to those acres for every week of the summer—I only water it four weeks. I'm saying that three weeks a month of my water shares for that property, they go right out to the lake.

Overall, farmers expressed a relationship with the land and water they feel is obscured by the conversation about who bears disproportionate responsibility for restoring Great Salt Lake. Robert repeated a common refrain among his peers, expressing dignity and guardedness about his stewardship. "Farmers are the biggest environmentalists there is. We destroy our ground, our livelihood is gone. Government needs to back off." Others washed their hands of the problems unfolding at the urbanized shore of the lake, emphasizing loyalty to their community instead. David said, "I'm nervous about the folks down along the Wasatch Front and wanting water [from] up here ... I just don't really care a lot about the Wasatch Front." James agreed, saying, "[Great Salt Lake] is not our biggest concern. Our biggest concern is how do we keep our environment and our community healthy and vibrant and our ecosystems functioning well here while still trying to send some extra water to the Great Salt Lake. We're not going to abandon you. But that's not our number one priority." James went farther than many others in acknowledging the importance of restoring the lake; most participants, like David, expressed disdain or at least incredulity for this idea.

These expressions indicate the degree to which farmers in the Basin must balance a host of ecological issues which does include but is not exclusive to Great Salt Lake. Further, while farmers expressed deep connections with land and water that don't necessarily extend to the lake, their approaches to stewardship often include engaging in water conservation efforts that could positively impact the lake. Despite their stewardship ethic and conservation efforts, they struggle with being

painted as the problem in the context of Great Salt Lake, primarily by people who are unable to see the benefits that they provide to the community while the threat of growth looms large both for them and the lake.

### 3.2. Perspectives on potential agricultural land use transitions to increase lake flows

Farmers in this sample feel as protective of their role in Utah's food systems as they do of the intimacy with the land ingrained in their work. In fact, most interviewees already had previously bought into government programs designed to optimize irrigation technology or preserve biodiversity on the cropland, demonstrating a measurable willingness to prize conservation if given the opportunity. In interviews, participants discussed various ideas for land transition—including solar photovoltaics (PV), rangeland, dry farming, alternative crops, and conservation easements—focusing on shifting away from irrigated use while developing alternatives that still protect farmers' stewardship of the land. Notably, not a single interviewee expressed enthusiasm for any alternative. This pervasive trepidation stemmed mainly from concerns about insolvency, the transitions' ecological consequences, general institutional trustworthiness, and most of all, a loss of their traditional lifestyle.

#### 3.2.1. Insolvency

When posed with the idea of transitioning from growing alfalfa to siting low-carbon energy, James wondered, "Is the landowner going to be compensated enough to justify that?... If that's his grandkids' retirement to develop that ground, now it's never developed, so you've got huge probably land acquisition costs up front, which then I don't know when that ever pencils out to have solar on there." In considering a rangeland transition, Bill brought up similar concerns: "If the value of the animal ... is made up to replace the crop produced— that's total economics. But I think you're really depleting the potential and value of the land." James also echoed this anxiety in pointing out, "You have really great land and you're going to use it for probably its least profitable crop of dryland pasture and grazing."

The economies of scale associated with land transitions felt particularly acute for interviewees because as inputs (namely water) decrease, farmers need more land to yield the same profit. In a market giving priority to real estate development, no farmer in our sample felt optimistic about acquiring the amount of land that could empower less intensive use. Charles expressed that any transition must acknowledge this pressure to make more money, rather than less, in order to survive in the marketplace. He said, "I think as you shrink, as you have more growth around you, it gets harder. And your margin... you can provide efficiencies by larger. I think as you get tighter you have to get paid a little bit more." Charles understands intuitively that while Utah's growth proliferates, the economy will become increasingly inhospitable for a farm like his to survive without the production and scale that makes it competitive.

#### 3.2.2. Ecological consequences

Also at the heart of our participants' resistance to land transition was their proclivity towards lush, productive landscapes. For any land transition that moved away from this value, farmers expressed concern over the weeds and dust that would proliferate instead. Bob put it this way: "You gotta keep the weeds down and if you don't, you either gonna have a weed explosion or a dust problem. You're moving one dust problem from another." He implicitly acknowledged twin problems: the dust from the drying lake or anticipated dust from the loss of agriculture upstream.

Andy expressed worry that transitioning out of irrigation would affect the health of the water table: "It brings the groundwater up when all the farmers are watering the fields... that's what a lot of people don't realize once they start building all these houses on this ground. That water... it goes in the ground, somewhat, but not like if you're flooding a

field, you know, farming it. I mean, *that* builds the groundwater up." Andy sees real estate encroachment as a direct threat to a healthy water table, especially as he compares it to his own stewardship, which he understands from experience creates positive externalities for the hydrology as a whole.

Other interviewees invoked the positive air quality and even carbon sequestration effects of their present land use, and worried that transitions might have the opposite effects. Aaron said defensively, "They don't know the amount of good that alfalfa does for the air, for the soil, everything." Indeed, negative ecological externalities abound when land moves away from water-fed ecosystems, even in an effort to prevent more concentrated ecological externalities elsewhere. Water-limiting land transitions do increase dust and weeds (Ayres et al., 2022; Peterson et al., 2022) and transitioning even towards less water-intensive irrigation technologies does decrease groundwater recharge (Pool et al., 2021). Despite their demonstrable literacy in holistic ecosystems thinking, our participants remained resistant to land transitions.

#### 3.2.3. Institutional skepticism & distrust

Despite promises that farmers would receive financial and infrastructure support from the government to manage their landscape without irrigation, none believed that support would be actually manifest. Even if they were to agree to a transition, farmers doubted that the water they gave up would actually reach the lake.

Bill's mistrust of a hypothetical proposed program stemmed from what he anticipated would be the government's dishonesty. "They want it from us, but how do we know our water is actually going to get there and not go to some home building or something... downstream? Are they going to be honest about that?" Joseph echoed Bill's suspicions, referencing the diminishment of agricultural land in saying:

You know what's the first thing that happens with my water, if I sell that to a developer? Does it go to the lake? Absolutely not. It goes to the city, and what do they do with it? They put it in secondary water. Does it go to the lake [then]? No, it doesn't ... So not only did they take every drop of water I was putting on that field. Then they plant say 30, 40 houses out there and hook up to culinary water ... So I get a little frustrated.

Aaron even offered a rare acknowledgement that the lake does require more than it currently gets but remained skeptical that conservation measures would amount to much: "[Great] Salt Lake's everybody's problem. Get water in there. And all you can do is conserve as much water, but you need to understand, even though farmers up here conserve water, the chances of that making it to the Salt Lake is slim to none." Mike even saw this issue as the superlative issue among many in the basin's drought issue, saying, "The biggest problem is shepherding water. It's huge." While farmers offered varying degrees of willingness to conserve on behalf of the lake, mistrust that their efforts would matter dominated their responses. This undercurrent of institutional mistrust—grounded in technological, financial, ecological, and economic uncertainties—permeated all respondents' reactions to proposed land transitions, regardless of the type.

#### 3.2.4. Threats to purpose & way of life

More than any other concerns, however, questions about land use transition triggered our participants' indignation that such transitions fundamentally misunderstand what motivates farmers. For every respondent, purpose—and its attendant culture, community, identity, and heritage—proved their predominant value. Our farmers referred to this intricate place-attachment as lifestyle, although the diction belied a greater complexity. In responding to the idea of a solar transition, Bob interrupted to say, "We kind of like doing what we do. That's why we're here. We're not here for all the money."

John framed this value even more intimately, indicating that his purpose centered on family, an idea laden with cultural and religious significance linked to the way the Church of Jesus Christ of Latter-day

Saints has shaped Utah's culture (Heaton, 1994). He explained, "It's a way of life ... [My son] reminds me periodically, he'll say... Dad, we're raising boys. We're not making money. We're just raising boys." Other farmers shared this position, tying their identity to their forebears. Bob said, "I can't think of doing anything else. It's farming. It's been a good way of life. I followed my grandpa around my whole life. I was probably two steps behind to see what was going on and learn." Aaron also saw farming extend to multiple generations, saying, "I like the lifestyle because you spend a lot of time with your family, your grandkids, your kids." Here, Bob and Aaron both see their tie to farming as a cross-generational legacy, for which they bear responsibility. As their grandfathers farmed before them, so too they hope their children will farm after them, as an expression of reverence for God's plan for them and as a safeguard for the family values they hold dear.

Daniel emphasized his personal choice saying, "I mean, agriculture is a benefit, but it's also a lifestyle. So if you know we can't enjoy our lifestyle, is there really any benefit to it? Money is one thing but being content with your life is far more valuable in my mind." Matt echoed this, saying flatly, "I like what I do and I couldn't tell anybody anything different."

Bill illustrated the passion he feels for his work in response to a question about what he might do instead of irrigating:

I would probably still go and still participate in some agricultural pursuits that I do. I love to watch things grow. I love animals. I love raising the calves and feeding cattle and I love my chickens. Need eggs?... No, you don't have to buy them. I've got eggs. I don't sell them; I just give them. We never sell them. One of the best ministering tools you'll ever have ... That kind of shares to you why we do what we do. We don't—there's certain things that I do, we do, because we enjoy them and it fulfills something within our life ... Help someone else. A lot of young families, and students. There are a lot of young families that just, I tell you, you bring four dozen eggs to them, and they're just like—!

Then Bill handed Author 1 a dozen eggs. He explained that eggs were the best tool for taking care of his community, which he ties to his spirituality and God's charge for him. For him, his participation in agriculture derives from so much more than money-making and business. Rather, he believes in feeding people as a purpose and calling tied to both his self-worth and his duty to his community.

Joseph indicated that his identity is bound up specifically in his position as a farmer who irrigates. In thinking about a dry farming transition, he said, "But at the end of it, I'm not a dry farmer. I let the dry farmers do the dry farming. They are phenomenal at what they do. You hand them water and tell them to irrigate. They're not going to do what I can do. It's hard." Further, he shared that his spiritual purpose would be lost in a land transition. "If [my land's] got solar panels all over it? You take my water, put it in the Salt Lake. Yeah, if I steal all that, I get a rent check. But what the hell do I do all day? I feel useless. In farming, it's not a job. It's a calling."

Across their shared perspectives, farmers feel more deeply about the ways in which agriculture ties them to community, family, and God than they do about its economic virtues. They referred to these complex values as *lifestyle*, however, greater scrutiny reveals that their meaning aligns more closely with notions of culture, legacy, heritage, and spiritual purpose.

### 3.3. Alternative leverage points for ameliorating Great Salt Lake

Unmoved by land transition ideas, the farmers in our study instead expressed a common frustration: the problem of water decline in the Great Salt Lake Basin is poorly understood, and the role of growth and development in increased water consumption and strain on agricultural communities deserves more critical scrutiny. To this end, farmers repeatedly underscored the role of both economic and developmental growth in creating, perpetuating, and exacerbating the system's ills—in

direct challenge to the dominant narratives about water use. Bob articulated this position simply:

We're getting to have a lot of growth around here. And we can't compete with the prices of land ... Our biggest problem is—and I wish Salt Lake [City] would take a minute and look in the mirror—is the growth ... They need to get all these... developers out of the House [of Representatives] and start letting some—well I don't know who to put because there ain't no farmers left anymore, but... they need to slow the population growth... I know it's impossible but they're blowing up and then they're pointing fingers at us.

Bill built upon this observation by adding his own lived experience:

Just the past few years, we've seen an influx of growth. And it's, you know, and you hear these people, they've done these studies, and then you talk to the real people. The boots on the ground people and even the realtors themselves and all. And we have had a lot of outside influence coming in and, and really, it's driven our prices way up... but there's a lot of demand for homes. And so they're building a lot and to be able to find homes, they're really expanding. So, you know, we're turning quite urban in some areas and we're losing a lot of that open space, that everyone, they all cherish. But sometimes they don't quite cherish [it] enough.

Mike noted the growth's correlation with the waning water budget and underscored it with a plea for a greater conservation ethic: "We've had instances out on the west side of the valley where they've had to shut down growth because they could not find the water to sustain them. And so water, no matter where you are, is everything ... You got to have it where you're at, and you've got to conserve and you got to utilize it as the precious resource that it really is."

This wrestle with economic and sub/urban real estate proliferation affects the overhead pressure farmers articulated as well. In Mike's case, when asked if he sells his hay locally, he shared an anecdote about how his neighbors with livestock operations, to whom he once sold his crops, have each slowly gone out of business since 2005. As recently as last year, Mike's neighbor went under before being able to pay Mike back for the product he took. "That's a sad story," he said. "I haven't seen money for my grain or hay." Mike does not attribute this loss to his neighbors; instead, he blames the economic position they share, immobilized by exogenous economic growth, personal solvency, and insufficient institutional support.

James understands how the economy faced a growth imperative itself and resigns himself and his fellow producers to some necessary tension between competing priorities. As Utah's economy expands around him and his land, he knows that his operation has to keep pace in order to remain afloat, even as he condemns the growth that drove him to do so:

And we're going to keep growing, right? No one's going to shut the gate and say no one else moves [here] ... We have to grow. We can grow differently, but we're gonna grow ... If [farmers] were still doing what they did 50 years ago, all of them would already be out of business. Right? Growing more crop, becoming more efficient on your farm, whether it's a better tractor that you know covers more ground faster in a day or a sprinkler system that grows more crops, you do that to be profitable and to stay in business.

Charles echoed this problem by saying simply, "I would have grown over time and expanded, but you need land to do that and we're kind of in an agricultural death zone ... I think sometimes we're putting [urban] growth ahead of the stability of everybody else who lives here." In a particularly salient description of this tension value-oriented farmers face within a growth-oriented economy, Brian explained:

When the mayor tells you, "You just want to get rich." It's like, I've got to. I'm not gonna take this money and just go piss it in the wind. We've got to go buy another farm. Yeah, farming is here [points to

heart]. It's here. It's not here in our wallet. It's here. If we didn't have passion for it, hell, I should have had a job at Hill Field 35 years ago, and I'd be retired with probably five grand a month, or ten.

Our participants shared that the burden of growth motivated a sense of despair as they feel no power to correct or resolve the position it puts them in. Dave ultimately surrendered to the trend, saying, "Oh, I'd like to see [farming] stay. I'd like to see it not get any worse than it's getting now. But that's not gonna happen ... We're just gonna keep growing. We're just gonna keep building ... There's no stopping it. It's gonna happen. I'm to the point where I'm done. You know, I've got maybe 10 years, whatever, left, who knows?" Notably, two-thirds of our interviewees expressed a similar sense of powerlessness in a system outgrowing the values and food systems stewardship they prize. Most assumed their family's generational legacy of farming will die with them.

Among those feeling skepticism and even despair about their future in a Utah that may leave them behind, many directly connect the problems of growth to the problem of water scarcity often attributed to agricultural use alone. Municipal water usage indeed pales compared to agriculture; however, Bob pointed out that without intercepting the growth mechanism, even the relatively water-conservative development industry will face the same constraints agriculture does in very little time. First pointing to Southern Utah's analogous water/development problem, Bob shrugged, "I think that the ag business is probably gonna die out here. Because there's just too many people that are just worried about homes. Too many developers ... We'll hang on as long as we can. And then, we'll get crowded out by houses *and* be left without water." In this way, farmers made it clear that the problem in their minds is not agriculture versus the lake, but instead, the health of both agriculture and the lake versus unmanaged, ravenous growth.

Daniel likened houses to a water-intensive crop unto themselves, casting doubt on the ability of municipal usage to remain low as houses multiply. "And I suppose a single house doesn't use as much but if you break it up that way, I feel like a crop of houses is going to use way more water than an agricultural commodity—and you're not getting any [food] out of the house." Matt similarly suggested, "We build all the houses before we build the water ... These new developers or anything that are happening now, they've got to figure out the water, and a lot of the water, the problem is, it's paper water, but it's not water." Matt acknowledged that Utah runs a risk of continued and exacerbated aridification if it relies upon the idea of water rather than its material, ecologically embedded analogue. For him, "paper water" exemplifies the disconnectedness from place that developers and legislators embrace when trying to pursue the goals of growth from afar.

As the interviewed farmers emphasized, water consumption cannot wane unless growth does as well. And while growth will surely persist, Bob suggested the state proceed with restraint as it decides how to grow responsibly. "I've just come to the conclusion to just kind of help my best to try and guide the growth. So that it's done right. It's going to come. This is a pretty productive valley right here. And it's disappearing. It's disappearing pretty fast." Charles lamented that without the right priorities, the growth threatened to abandon those whose families built the places that are now growing so dramatically. "You got to take care of the people that are here ... [this growth] is not necessarily right. I think the people that are here existing now are the ones that need to be looked after ... Growth is second." In even more elegant terms, Matt acknowledged that diffusing consumption (a core component of growth) must necessarily be the foundation for any actionable leverage point. "The solution," he said, "is the dilution."

#### 4. Discussion

It is not difficult to conclude from farmers' disproportionate water consumption that agricultural land use must necessarily change in order to prevent Great Salt Lake's collapse—and indeed, the research

frequently supports this verdict (Richter et al., 2024). The respiratory and neurological health of those converging along Great Salt Lake's borders depends upon the lake's continued survival; the production of alfalfa, with its high water demand, seems to preclude it. However, even cursory exploration into the possible land transitions a shift away from alfalfa might encompass reveals greater complexity within the issue than the graphs of water consumption depict. Accordingly, how do commodity farmers in the Great Salt Lake watershed view their role in the multi-pronged crises stemming from Great Salt Lake's desiccation? How do they perceive different land transitions toward unirrigated uses that maintain their stewardship over the land? And what leverage points do they see for productive intervention?

The farmers in our sample do not, in fact, feel constrained by the increasingly waning water resources in the basin, as they do have primary rights to it in times of scarcity. They regard their relationship with the land and water as environmentally benign—benevolent even—and trust in their own stewardship more than in regulatory institutions that might otherwise tend the local ecology. Further, they feel the popular diagnosis of the Great Salt Lake problem reflects a bias that favors urban over rural communities while ignoring the difficulties proposed solutions might levy upon farmers. Because of the perceived ignorance of ruling institutions about farmers' environmental and cultural values, food systems guardianship, and lived experiences, our interviewees do not find any of the proposed land transitions an enticing or holistically viable way to address the issue.

Farmers in this sample do not enthusiastically endorse any land transition away from irrigated agriculture to mitigate the consequences of drought because they see land and water use as a historical constant. Instead, participating farmers believe that the real issue shaping the region and threatening both the lake and their livelihood is urban growth and its attendant economic growth. In their experience, agriculture faces as much threat from this as the lake does. While drought, aridification, and overuse create a lake crisis, development and urbanization create a farming crisis—and unchecked economic growth catalyzes both. Our participants emphasized that even if they transitioned all land out of irrigated agriculture—either by using their land for some other purpose or by selling it to developers—ultimately the state's expanding population and economy would be unable to achieve a long-term decrease in water use without prioritizing watershed stability over growth. In their own words, interviewees made the point that tightly coupled growth and consumption are incompatible with steady and sustainable water use. In fact, analysis suggests it is this swelling demand that must change (Hernandez et al., 2020; Hickel and Kallis, 2020).

While the sampled farmers at no point specified that it is a "post-growth" paradigm that would reconcile the tensions intersecting on their land, they frequently indicated that they suffer under growth. Further, they understood the preeminence of growth as the ruling paradigm and expressed resignation to its ultimate priority over the survival of their livelihoods or the survival of the ecology; one farmer even articulated frustration with the imperative to seek wealth despite his contrasting values. The farmers interviewed do not see a place for sustainable food systems or a healthy Great Salt Lake system within the prevailing framework of perpetual growth; further, they do not anticipate that they will personally be able to safeguard their own well-being much longer within the prevailing paradigm.

Participant farmers understand their heritage, identity, lifestyle, and even spiritual purpose as at odds with endless profit and the subsumption of agriculture by development—and extend this understanding to the broader implications about the waning water budget. Similar to how post-growth literature has acknowledged that there can be no infinite growth on a finite planet (Higgs, 2014; Jackson, 2009; Latouche, 2009), these farmers implicitly understand that continued development on a finite (and in fact, waning) water budget in the Great Salt Lake Basin cannot last. This simple acknowledgement deviates from the way many neoliberal analyses frame the problem of economic growth with limited

water; most often neoliberal analysts regard growth and water ecology as compatible (Barbier, 2004). However, ecological economists have identified a contradiction between water scarcity and economic growth. If we take seriously the lived experiences of Great Salt Lake Basin farmers, we must also take seriously analyses that discount the supposed harmony between increased water scarcity and increased growth (Distefano and Kelly, 2017). Critical agrarian scholarship, too, has acknowledged that growth and egalitarian food systems contradict one another (Gerber, 2020). Indeed, the sampled farmers of the Great Salt Lake Basin validate with their lived experience the theoretical underpinnings to post-growth literature at large: economic growth and sustainable agroecology cannot coexist.

Notably, the farmers in our study rejected the dominant options for land transitions largely because of tensions derived from the growth paradigm. Concerns about both insolvency and the ecological consequences of land transitions derive from the myopia associated directly with economic growth. For example, participating farmers expressed a loyalty to the environmental ethics they have developed through their generations-long intimacy with the landscape. They worry about the ecological problems and the negative externalities of land transitions that have not fully accounted for the dust, weeds, and water table consequences that cannot be remedied by the subsidy offered to farmers. In fact, participating farmers frequently found the idea of a subsidy reductive because they felt it failed to acknowledge the many ways in which dollars did not embody the value of their work, whether personally, environmentally, or socially. They specifically articulated that their own motivations for farming centered much more on a fulfilling purpose, family values, the corporeal rhythms of agriculture, and what they believed was a non-negligible contribution to food supply chains. In contrast, producers in our study felt that growth imposes upon them a presumption of financial values while ignoring the true costs and benefits of their actual choices. More than one farmer expressed frustration at the idea that farmers only want to get rich when, they argue, farmers' values align more closely with the land, water, and ecology than with their personal finances or self-interest. In this way, the growth orientation of our participants' economic embeddedness fails to embody the values they would pursue without exogenous obligation.

Farmers in our study suggested that if they did not have to maintain solvency in a growth-oriented marketplace, they would be even more empowered to prioritize the health of their soil, the sustainability of their water table, and the general wellness of their landscape. More specifically, they wouldn't be pressured by the real estate marketplace to either grow or dissolve in order to remain competitive with the ballooning value of land; rather, they could maintain steady or oscillating yields that didn't rely upon continuous growth to remain economically viable.

In practice, a post-growth orientation does not exist at scale in Western agro-economic commodity markets, although emergent models like community-supported agriculture do offer mechanisms with alternative approaches to growth at local levels. Typically, as in any business, agriculture needs to decrease inputs, increase yields, or increase its consumer base to remain solvent in the modern marketplace (McArthur and McCord, 2017). This follows from price-theoretical principles of marginality and equilibrium, despite many critiques which question their veracity in the real world (Patterson, 1998; Raworth, 2017). In this way, post-growth might elegantly resolve the tensions felt by agriculturalists and real estate developers alike as it might propose a way for every agent to be successful without compromising integrity. Rather than being burdened by ecological pressures, like those affecting Great Salt Lake, or financial pressures, as from development, farmers operating outside a growth-reliant paradigm could prioritize ecological, economic, and even spiritual values.

#### 4.1. Policy recommendations

While Utah must continue its efforts to decrease water consumption

through technological improvements and land-use transition schemes, farmers' perspectives here reflect that the true antidote to Utah's water-scarcity crisis must include a growth-agnostic future. For the Great Salt Lake Basin, savvy policy might target opportunities for commodity growers to have support from state, community, and self. Namely, our research suggest that perhaps supports should dis-embed farmers from the global marketplace so that they might be price-makers instead of price-takers; this intervention would mimic the relative security of urban agriculturalists whose behavior can simultaneously prioritize ecology and economy without facing the same consequences as commodity growers (Kohn and Anderson, 2022). Great Salt Lake policies could move away from both incentives and punishments for growers, given how little autonomy they actually have to reinvent their market behavior. Where policies on agricultural water consumption are necessary, these must be made flexible so that the conservation efforts and land use transitions farmers adopt are ones that are able to be tailored to reflect what works best with each specific operation. Policymakers could also shift focus to engage in efforts to create brakes for growth that otherwise might overwhelm land politics in the region. Under such a scenario, zoning might limit large-home development on agricultural parcels and instead concentrate on high-density, small-footprint housing to alleviate real estate pressures without increasing constraints on agriculture (Schneider and Nelson, 2018). Of course, given that 38.5% of state legislative leaders work in real estate and development, the region demonstrates unique tension wherein the very people who can spearhead solutions currently profit from the problem (Stern, 2024). The political economy of Utah thus presents a challenge for a shift to post-growth ideology and action due to the self-interest of policymakers in the development industry—a fact farmers were critically aware of.

Coupled with considerations about a reorientation toward post-growth, this study suggests that the popular narrative which holds farmers primarily accountable for the lake's desiccation must also change. Pretending that farmers can single-handedly correct Utah's ecological disequilibrium not only misses the holistic, systemic truth about the effect of growth in the region but also engenders resentment and disengagement from farmers. Truer and more effective narratives must acknowledge the systemic coercion farmers' behavior reflects; only then might Utah innovate community-engaged solutions that include rather than alienate participants. For this reason, moving forward policymakers should also work with a diversity of farmers to co-develop strategies specifically designed for and supported by the heterogeneous population they aim to affect.

## 5. Conclusion

This study investigated: How do farmers view their role and the roles of others in the crises stemming from Great Salt Lake's desiccation? How do commodity farmers in the Great Salt Lake watershed perceive different land transitions toward unirrigated uses that maintain farmers' stewardship over the land? And what leverage points do farmers see for productive intervention? To address these questions, we conducted 15 qualitative interviews among alfalfa farmers in the basin to understand their lived experiences of drought and land use. The interview protocol aimed to understand what challenges and opportunities farmers might find in pursuing land transitions away from heavy irrigation, but above all, farmers' insights revealed a broader, systemic problem of growth at the heart of both their dilemmas and the lake's.

Beyond recommending Utah reorient its policy approach to growth-agnosticism instead of growth-priority, this scholarship advances existing literature on post-growth by demonstrating a practical application of the approach—further, in a region that expands previously existing case studies on the idea. This research demonstrates how a post-growth approach resonates with populations typically sidelined by the discussion about how to proceed at the intersection of ecological decline and economic proliferation.

While this study succeeded in drawing connections between the

participant farmers' experiences of drought and growth in the Great Salt Lake Basin, there remain limitations. First, the limited sample size creates an opportunity to investigate these perceptions more broadly across the basin, including in regions out-of-state like Idaho. Additionally, this research is unable to project the way agriculture will ultimately persist or crumple under the proliferating urbanization and diminishing water budget, and what that might mean for the health of Great Salt Lake and all that depend on it. Future research might explore, for example, what water would be saved or expended if all the farms in the constituent river basins are urbanized or subsumed by real estate. This broader gap in the literature urgently needs to be addressed as we try to understand the future landscape of growth and ensure the health of Great Salt Lake in this water-scarce region. These limitations notwithstanding, the salience of post-growth thinking among farmers points to a rich opportunity for expanding the conversation around solutions to this wicked problem. A post-growth approach might reconcile the traditional antagonism understood between farmers and their precious ecologies.

### Human ethics approval and consent to participate

This study was conducted in accordance with the ethical principles of the American Sociological Association and the requirements of Utah State University's Institutional Review Board (IRB). The study was approved by IRB #13937, which protocol included informed, signed consent given by all participants. Participants also gave informed, signed consent for publication of the research.

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### CRedit authorship contribution statement

**Bryn Watkins:** Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing. **Stacia Ryder:** Conceptualization, Project administration, Supervision, Validation, Writing – review & editing. **Roslynn McCann:** Writing – review & editing. **Jennifer Jo Thompson:** Writing – review & editing.

### Declaration of interests

The authors have no competing interests to declare.

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### Appendix A Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jrurstud.2026.104137>.

### Data availability

Data will be made available on request.

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