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OBM Integrative and Complementary Medicine

LIDSEN Publishing Inc.

Original Research

Farmer Stress & Coping: Qualitative Study from Hawai‘i

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Academic Editor: Morgan Valley

Special Issue: Cultivating Well-being on Farms and Ranches

OBM Integrative and Complementary Medicine
2024, volume 9, issue 4
doi:10.21926/obm.icm.2404070

Received: June 18, 2024
Accepted: December 15, 2024
Published: December 23, 2024

Abstract

This qualitative study explores the mental health challenges faced by Hawai‘i farmers and allied agricultural producers, focusing on the main stressors they encountered and the coping mechanisms they employed. Through interviews with 77 farmers across all four counties, data revealed that significant stressors for Hawai‘i farmers were legislative and policy issues, financial and economic concerns, as well as pests and diseases. Farmers employed various coping strategies to mitigate stress, primarily along the lines of behavioral, relational, and emotion-focused coping, as well as an orientation toward spirituality and engaging in philosophical perspectives. The data also revealed a communal “we” mind-state from a linguistic analysis that was important to well-being. Collectively, the findings point to the continual need for programs and services that enhance the well-being of farmers in Hawai‘i and beyond, and emphasize the need for more holistic, integrated, and culturally grounded approaches that foster social connection.

Keywords

Farmer; mental health; stress; coping; qualitative research; rural mental health; Hawaii; native Hawaiian; indigenous; spirituality

1. Introduction

Farmers play a vital role in the agricultural industry and food security, but the challenges they face can have a serious impact on their mental health and well-being. This in turn affects their productivity and ability to succeed. It is important to understand these challenges from the farmers' own perspectives in order to create effective support systems and interventions that meet their specific needs, which can vary by geography and context. This qualitative study using a phenomelogical lense explores the stressors faced by farmers in Hawai'i and the coping mechanisms they use. By amplifying the voices of Hawai'i farmers and contributing to the conversation on farmer mental health, we aim to provide insights that can inform policies, programs, and services to enhance their well-being, both in Hawai'i and in other regions facing similar challenges.

Agriculture is recognized as an occupation associated with high rates of occupational hazards including mental health issues, ranking 4th for depression and suicide among occupations [1]. Recent data continue to highlight this concern, with Sussell et al. reporting that the "Farming, Fishing, and Forestry" occupational group had one of the highest suicide rates among males at 49.9 per 100,000 in 2021, significantly higher than the overall male suicide rate in the civilian working population (32.0 per 100,000) [2]. While there are limited nationwide representative studies on mental health specific to agricultural producers, available research based on convenience samples paints a concerning picture. A needs assessment conducted by Kilanowski et al. [3] with 505 Ohio farmers revealed that 9.6% exhibited signs indicative of major depressive disorder, accompanied by risk factors such as poor dietary consumption, lack of physical activity, and obesity. In one Midwest study, which included 172 farmers from five states, 8.7% reported mild, moderate, or severe depressive symptoms [4]. In a recent study, Norrod et al. [5] analyzed farmer suicides in the U.S. from 2003 to 2017, and found elevated rates among "primary" male farmers, particularly those aged 65 and older. The COVID-19 pandemic further exacerbated stress and depression levels among the general public and agricultural producers, with younger adults indicating greater mental health challenges [6, 7]. Along similar lines, Montgomery et al. [8] in their study with 1,288 farmers in Georgia, identified that first-generation farmers faced higher levels of stress and suicidal ideation.

While most studies do not consider race to be a risk factor, some note higher relative rates of suicide among non-Hispanic white men [5, 9, 10]. Others found significanly higher rates of depression among people of color, including Black [11] and Asian farmers [12]. Hispanic migrant farmworkers also appear to experience high rates of depression, with Foo et al. [13] revealing an aggregate rate of 15.6% based on random effects models, while in a more recent study by Keeney et al. [14], 40% experienced high rates of stress, with much higher rates among women than men. In another study by Keeney et al., researchers collected data near the US-Mexico border in Imperial County, California, and found that 56% of the farmers experienced depression symptoms, with informal support networks, particularly religious community, playing a key role in coping [15]. Other recent studies that include populations beyond white Americans are suggesting that there is an increased need for mental health prevention strategies to be more culturally responsive and attend to issues of diversity as well [14, 16].

Agricultural producers face multiple risk factors that contribute to poor mental health including financial instability, physical health decline, isolation/lack of social support, climate disruptions/drought/floods, access to firearms, lack of access to health care, exposure to hazardous conditions, and overall feelings of uncertainty [3, 17-19]. Moreover, medical economic vulnerability

significantly affects farm resilience, with over 20% of U.S. farm households carrying significant medical debt and over 55% fearing incurring debt from health expenses, emphasizing the impact of health insurance arrangements on farm household resilience [20]. Access to health insurance and healthcare remains a critical issue across all ages in farm households, affecting their ability to meet health needs and sustain farm operations, highlighting the importance of social policies in supporting farmers' well-being [21]. More recent studies continue to highlight contributing factors consistent with past studies such as pesticide use [18, 22, 23] and temperature variations [10, 24]. In one qualitative study, Vayro et al. [25] conducted semi-structured interviews with 28 participants in Australia, and found that mental health literacy, stigma, partner support, and the intersectionality between being a farmer with age and gender influence farmers' mental health help-seeking behaviors, with variability in knowledge on mental health and treatments, and a tactful delivery of support with partners being pivotal. How agriculture producers manage, cope, and respond to the many types of risk factors have not been extensively explored as compared to studies that higlight risk factors for mental health challenges.

1.1 Stress & Coping Style

Pearlin's theory of stress argues that stress is not merely an individual experience but is shared by social structures, roles, and conditions that can provide or limit resource opportunities [26]. Indeed, farmers can experience significant ongoing strains and stress such as financial difficulties or family conflicts, as well as acute, life event stressors such as a flood or hurricane destroying their crop, or farm theft which is not uncommon in Hawai'i. According to Pearlin, how one copes depends on having access to social support as well as one's willingness to reach out for help; resources are critical for managing stress, which can lessen the impact of the stressors and help the individual to adapt and bounce back. Pearlin's model suggest that individuals with fewer social resources, often those in marginalized or in lower socioeconomic positions, are more likely to experience higher levels of stress and to have less effective means of coping [26].

In a survey study with 408 Hawai'i agricultural producers, researchers found that problem-focused coping (i.e., finding direct solutions to issues) was a top predictor in reducing the odds of suicidal ideation. Conversely, professional-assisted coping and media-focused coping were identified as risk factors, increasing the odds of depression and suicidal ideation by at least five-fold [27]. The negative influence of professional-assisted coping may be attributed to individuals seeking help only at a critical level of distress, potentially due to cultural stigma or the scarcity of mental health services, underscoring the complex dynamics of coping strategies in agricultural mental health. Recently, Mohammed et al. [28] analyzed 1,100 smallholder farmers in Ghana and found a significant link between alcohol misuse and food insecurity, highlighting the need for policy interventions that support better coping strategies. Maldonado et al. [16] utilized regression analysis to study the impact of acculturative stress and depression on mental healthcare utilization among Mexican-origin women from farmworker families in Southern California, and revealed how such stress can deter necessary mental health services seeking.

Calling hotlines is one coping strategy in line with help-seeking behavior. The mixed-methods analysis of Nebraska Rural Response's crisis hotline data [29] over a period of five years revealed four key findings: economic distress was the primary stressor among U.S. farmers; callers sought the hotline to share their sense of social isolation and difficulty expressing their economic distress;

adjustment disorder was the most common diagnosis, and the highest call frequency came from a region that was heavily impacted by economic restructuring and social changes.

While fewer than quantitative studies, studies that employed a qualitative methodology are providing a more nuanced picture of how coping style may buffer or exacerbate risks. For instance, Henning-Smith et al. [30] interviewed 19 key informants and identified both positive and negative coping strategies among farmers facing stress. Positive coping strategies included seeking social support and engaging in self-care, whereas negative strategies, which were more prevalent, included substance misuse and isolation. Informants underscored the necessity for enhanced mental health education, access to care, and addressing the foundational stressors affecting farmers [30]. Likewise, Perceval et al.'s [31] focus groups analyses across 63 participants across New South Wales and Queensland identified three major interrelated social factors that influence risk for farmer suicide: changing rural communities, community attitudes and stigma, and relationship issues.

The coping style of farmers can differ across geographical regions and intergenerationally, suggesting the importance of context as well as generations. Bondy and Cole [32] investigated the mental health impacts of changing farming practices in Ontario. Although they did not investigate coping per se, the study's findings highlighted several identifiable coping mechanisms with a particular emphasis on social support and community interdependence as vital for farmers' mental health and well-being. Kunde et al. [33] explored factors contributing to farmer suicides in Australia, and found health issues, relationship problems, and access to firearms to be salient factors. Their qualitative study, conducted through interviews with close relatives of 12 male farmers who had died by suicide, revealed that these farmers employed maladaptive coping strategies to deal with their distress. These strategies included increasing work hours, consuming more alcohol or cannabis, and displaying aggressive behaviors. Qualitative studies by Vayro et al. [25] with 28 participants, Freeman et al. [34] with 51 farmers from the Western region in the U.S., and Graf et al. [35] with 34 Latina migrant farmworkers in Wisconsin, further emphasized the role of familial and social support, faith, mental health literacy, and cultural sensitivity in addressing farmers' mental health needs and encouraging care-seeking behaviors [32].

1.2 Hawai'i Context

Hawai'i's agriculture is diverse and plays an important role in the state, both culturally and economically. The latest census showed the top agricultural commodities were seed crops, coffee, cattle, macadamia nuts, aquaculture (including algae), landscape plant materials, food crops grown under cover, tropical fruits such as papayas and bananas, potted and flowering plants including orchids, Chinese and head cabbage, plant rentals, and honey [36]. The state has a total of 6,569 farm operations [37], with 80% of farms having internet access, 3% farming organically, 21% selling directly to consumers, 25% hiring farm labor, and 93% being family-owned [37]. Among Hawai'i's 11,833 producers, 0.6% are American Indian/Alaska Native, 24.2% are Asian, 0.2% are Black or African American, 8.4% are Native Hawaiian/Pacific Islander, 53.2% are White, 13.5% identify as more than one race, and 5.9% are of Hispanic, Latino, or Spanish origin [38]. Approximately 1.3% of Hawai'i's state population is formally recorded as being involved in agriculture [39]. The top counties for land in farms are Hawai'i County with 604,184 acres, Maui County with 258,218 acres, Kaua'i County with 130,646 acres, and Honolulu County with 60,254 acres [38].

Hawai‘i is heavily dependent on imported food; in fact, an estimated 92% of food consumed on the islands is imported [40], and the latest 2022 USDA Census Data [41] revealed that the number of farms declined 10.4% with smaller farms experiencing the greatest decline. Between 2017 to 2022, about 300 agricultural producers exited out, and more than 700 farms stopped production [41]. Although the reasons for this decrease is not clear, the challenges of farming and attendant mental health issues cannot be discounted. In a survey with 408 Hawai‘i farmers, a third expressed depressive symptomatology, with even higher rates among certain demographics, including young and East Asian farmers [27]. Relatedly, Maunakea, Juarez, and Maunakea-Forth [42] conducted the Mauli Ola Study in partnership with MA’O Organic Farms in investigating cardiometabolic health disparities among Native Hawaiians and Pacific Islanders through a youth-led food sovereignty program with 176 participants. This study showcased the potential of community-led initiatives to address significant health challenges and enhance health outcomes [42]. Collectively, studies thus far continue to shed light on the mental health challenges faced by farmers in Hawai‘i and the wider USA. Indeed, the changing contextual factors highlight the need to explore the impact of personal, socio-cultural, and structural factors and their interconnections that contribute to mental health issues.

The aim of this study is to examine the challenges and opportunities that Hawai‘i farmers express, their coping strategies, and what they indicate as being helpful in terms of wellbeing, resiliency, and thriving. We employed a phenomenological [43] design to understand the lived experiences of Hawai‘i farmers with respect to stress and coping. A phenomenological lens allow for a direct investigation of what farmers share in terms of their personal stories and reflections in their own words, and how they interpret and make sense of their experiences [43]. By focusing on Hawai‘i farmers’ subjective experiences, this permits for a deeper and more nuanced understanding than prior surveys have captured.

2. Materials and Methods

2.1 Sample Size & Recruitment

Farmers, ranchers, and allied agricultural producers were recruited through multiple avenues by requesting their participation in a study entitled “S.O.W. Seeds of Wellbeing.” They were asked to engage in a 15-30 minute interview at their convenience to explore issues related to farming in Hawai‘i. The research opportunity was advertised on newsletters across Hawai‘i agricultural related listservs, agricultural producer groups and networks, Hawai‘i Farm Bureau and Hawai‘i Farm Union United. Interested participants were asked to note their interest by completing a short contact form that captured their name, phone, and email contact information. In addition, we also contracted with a professional, private research firm with expertise in conducting qualitative interviews with farm owners of large farms on Hawai‘i; they had their own list of farmers with whom they have conducted interviews/focus groups with, and reached their list of farmers by phone via direct dialing. While a specific aim was to achieve a balanced, representative sampling in terms of county and farm size relative to Hawai‘i agricultural statistics, this sample is a convenience sample, and only farmers who were willing to share their experiences responded.

In total, 80 farmers across Hawai‘i were interviewed. Out of the 80 interviews, 54 were conducted by the project research team members, while the remaining 26 were conducted by the contracted private research firm. Three of these contracted interviews were subsequently

disqualified due to lack of farming credentials (home gardeners etc.) resulting in a total of 77 interviews. Interviews ranged from 11 to 77 minutes, with an average duration of 38 minutes. This longer length of time (more than 60 minutes) was not initially requested, as farmers often have limited availability and may not have agreed to longer interviews upfront. Instead, we adapted to the time farmers were able to offer. Also of note is that the interviews conducted by a private research firm were shorter than those conducted by the project research team. Of the 77 completed interviews, 43 were conducted via Zoom or telephone and 34 were conducted in person, with all contracted interviews taking place over Zoom or telephone. The in-person interviews were recorded using an external recording device, and all interviews were conducted in English.

2.2 The Primary Ag Semi-Structured Interview (PASSI)

The research team developed the Primary Ag Semi-Structured Interview (PASSI), a semi-structured interview, that captured ethnicity; interview format (in-person; zoom; telephone); farm factors (agricultural industry/commodity type; position/agency; farm acreage; years of farming); and noted date, time, and length of the interview. The interview also included open-ended questions that asked about stressors, coping style, and recommendations. For stressors, questions asked about what is challenging/stressful about the farming work, and what are some common stressors or stressful experiences. Coping style questions focused on the ways in which they manage the stressors, in ways that are effective and helpful and to give examples, as well as unique circumstances, resources, and context that help them to get through challenges. The last set of questions briefly asked about resources and delivery methods for these that could be provided in the areas of health and wellbeing, and the data from this set was used internally within the project.

Audio recordings of all interviews were logged by each interviewer using a pseudo ID, with the link list that included the names and contact information stored separately in a password protected file. All interviews were recorded and transcribed verbatim, with Otter AI, and double checked and edited for clarity.

2.3 Coding & Analysis

Data coding and analysis followed cyclical and iterative coding cycles. Codes were initially established based on the PASSI and the original Hawai‘i quantitative needs assessment on farmer stress [27]; as the research team read through of all the transcribed interviews, additional codes were added to codebook. To achieve consistency during the coding process, three researchers independently analyzed a randomized subset of 15 transcribed interviews using NVivo V13 software, with two coding the entire set of interviews. Additional codes arose during this coding process that included “philosophy,” “spirituality,” and “example of stressful event,” which were also added to the codebook. Nuanced codes around stressors and coping mechanisms also emerged as participants were asked to describe the challenges they face in their work and the strategies they use to manage these difficulties. Throughout the coding process, interviews were reviewed and re-coded as needed to ensure reliability in identifying patterns, relationships, and themes [44]. Through ongoing comparison and discussion, a uniform understanding was reached, with an inter-coder reliability rate of 85% [44].

Using phenomenological thematic analysis [43], themes and subthemes were then identified that captured the primary takeaways of Hawai‘i farmer’s unique perspectives on the issues around stress,

stressors, and coping. Interestingly, within coping, we also explored participants' use of personal pronouns, "I" vs. "we", as one of the themes highlighted a communal orientation perspective that was supportive of well-being and mental health. NVivo facilitated the examination of the "I" to "we" ratio in oral expression which is consistent with literature finding an association between higher use of "I" personal pronouns with greater depressive symptoms [45]. By importing interview transcripts or textual data into NVivo, the research team was able to analyze the frequency and distribution of these pronouns, and to explore its association with maladaptive vs. adaptative coping styles. This linguistic analysis provided an interesting insight that was not originally intended, but came out from the interviews, about participants' individualistic or collective orientation with respect to stress and mental health.

In addition, in a process of data triangulation, we compared these interview findings with the quantitative needs assessment data [27]. We looked for consistency in patterns and themes, as well as unique insights, contradictions, or new dimensions of understanding.

2.4 Ethics Statement

The University of Hawai'i Institutional Review Board provided human subject approval. The data collection process ensured anonymity by recording participants' names and interview data with a pseudonym code ID, and all identifying information and the link code file were kept separate from the interview data. The protocol number for the IRB approval is 00693.

3. Results

3.1 Participant Characteristics

The interview sample consisted of 77 farmers: 16 from Kaua'i, 14 from O'ahu (Honolulu County), 21 from Hawai'i Island, and 26 from Maui. County codes were assigned as follows: Hawai'i County (coded as B), Honolulu County (Island of O'ahu, coded as O), Maui County (coded as M), and Kaua'i County (coded as K). Three of the farmers also served as key informants about the immigrant farmers community.

The participants consisted of Hawai'i farmers representing a diverse range of agricultural practices, with overlap among many holding a combination of different crops: 23 row crops/vegetables; 22 orchard/fruit trees; 8 horticulture/nursery/ornamental; 18 livestock/poultry; 11 coffee/nut/seed; 5 aquaculture; 9 apiary/ag tourism; 9 Other; 2 undisclosed. Majority operated farms between 1-9 acres (n = 32); 17 operated farms that were 10-49 acres; 10 operated farms that were 50 acres or more; and 15 did not disclose this information.

3.2 Theme 1: Stressors

The analysis revealed four primary stressors noted as subthemes impacting Hawai'i farmers: legislative and policy challenges, financial and economic pressures, environmental challenges, and variability of stressors among different farmer groups.

3.2.1 Subtheme 1: Legislative and Policy Challenges

Definition of Subtheme: Farmers identified legislative and policy issues-including access to land, water, infrastructure, and perceptions of government overreach-as significant stressors impacting their ability to farm effectively. For instance, a Hawai‘i Island apiary and agritourism farmer highlighted their frustration with bureaucracy, saying:

> "Government services... there's a whole psychology of maintain the status quo or what else can we not do, and 'how do we create a system where we can legally house farmers on the land?" (B8).

This quote illustrates the widespread sentiment that excessive bureaucratic hurdles hindered farming operations. The lack of secure access to resources, particularly land and water, weighed heavily on farmers-especially Native Hawaiians who experienced this on a spiritual and generational level. A Pacific Islander kalo (taro) farmer on O‘ahu expressed this concern:

> "You know what I cared about? Kamehameha Schools charging $7 an acre to Monsanto, and then turning around and charging $100 an acre to taro farmers..." (O6).

Furthermore, farmers criticized the lack of public investment in agricultural infrastructure compared to other sectors like tourism. A Moloka‘i farmer remarked:

> "I mean, how much money have we put into tourism?... What kind of infrastructure do we have for agriculture? Hardly anything." (B2).

3.2.2 Subtheme 2: Financial & Economic Pressures

Alongside policy challenges, financial and economic pressures significantly contributed to farmers' stress.

Definition of Subtheme: Economic pressures-including financial constraints, time limitations, and the need to manage multiple roles-were significant stressors for farmers. The following quote is from a Hispanic Maui beverage and row crop farmer, who had many concerns about government overreach interfering with their <50-acre farm:

> "They're making it harder and harder for a farmer to just farm here (Maui). So, you can't just grow carrots and wash them with your garden hose and sell them, you have to prove that you wash them in some kitchen somewhere that you're gonna have to pay for or drive to pay for in one way or another." (M3).

This quote underscores how regulatory requirements added financial strain and complexity, particularly for smaller farmers who had to juggle multiple responsibilities.

A diversified agriculture and livestock farmer, who also served as a key informant (ethnicity not specified), observed:

> "Not enough money being generated by the family to make ends meet... and this creates a lot of stress in a family-abuse, alcohol, drugs." (B2).

3.2.3 Subtheme 3: Environmental Challenges-Pests and Diseases

Environmental factors, such as pests and diseases, further heighten the stress experienced by farmers.

Definition of Subtheme: Pests and diseases, often exacerbated by changing weather, posed significant challenges to farmers. One White farmer practicing diversified agriculture including livestock on a medium sized farm explained:

> "The weather is a huge challenge where we're at and so are our environmental pressures. I'm referring specifically to pests and disease pressure. And then the changing weather patterns that we're experiencing-it seems like even in just over one year." (B5).

This statement highlights how environmental stressors added uncertainty and impacted crop yields, intensifying pressures on farmers already dealing with policy and financial issues. Some famers are adapting their farming practices to mitigate these issues. For instance, one vegetable farmer of unspecified ethnicity shared a strategy by saying,

> "Pests are a big one. There's a lot of pests on this island, but I'm currently doing crop rotations of different crops to help them go ahead." (K8).

Additionally, a Hawaiian-Chinese farmer growing row and vegetable crops noted the challenge of pests on their farm, saying:

> "The chickens are the worst. Yes. By far the chickens and the birds." (K7).

While environmental challenges impact all farmers, the types and intensities of stress they experience can vary greatly among different farmer groups based on their unique backgrounds and circumstances.

3.2.4 Subtheme 4: Variability of Stressors Among Farmer Groups

Definition of Subtheme: Stressors differed among local (from Hawai'i), transplant (from elsewhere in the United States), and immigrant farmers, each facing unique challenges. A muti-ethnic tree farmer observed:

> "I think the ones that... have the highest mental stress are the Hawaiian farmers. Because they had a system in place-a traditional system-and that got usurped and nothing was put in its place." (M15).

This quote illustrates the unique stressors faced by Native Hawaiian farmers, including generational trauma from colonization and loss of traditional practices. Additionally, a large-scale kalo (taro) grower who is Native Hawaiian highlighted internal barriers within the community, saying:

> "A lot of our people are walking around in politics, right? Because to be free, you got to release all of that anger, hate, resentment; you cannot move forward with that. We cannot move forward as a nation." (M16).

Meanwhile, transplant farmers often experienced relational stressors, such as loneliness or interpersonal conflicts, while immigrant farmers faced pronounced financial stress and challenges related to language and cultural barriers. A key informant working with immigrant farmers noted:

> "I think for immigrant groups, or even for Hawai'i, the sense of family is very important. And having a strong family is a huge foundation to be able to weather some of these uncertainties." (O3).

This quote illustrates the unique stressors faced by immigrant farmers, also echoed by transplant farmers, for whom the separation from their families and communities was an additional stressor. Relational dynamics can also introduce stressors. A White transplant farmer on Maui noted:

> "We're all spending a lot of time together, and that stress just naturally arises, and then a big part of that too is there's always going to be a difference in opinions." (M7).

These varied stressors underscore the importance of effective coping mechanisms among farmers, which are explored in the next theme.

3.3 Theme 2: Coping Mechanisms/Styles

The analysis revealed several categories of coping mechanisms among farmers: behavioral coping, emotional coping, spiritual/philosophical coping, problem-focused coping, and relational coping. Although respondents expressed that substance misuse and domestic violence were problems, they spoke about others in the community rather than themselves, reflecting the stigma around discussing these issues.

3.3.1 Subtheme 1: Behavioral Coping

Definition of Subtheme: Farmers engaged in actions and behaviors to manage stress, and noted using exercise, hobbies, substance use, as well as meditation.

One Big Island large scale coffee grower of unspecified ethnicity mentioned:

> "I know when I start painting, that's... it's almost hypnotic, meditative. Right. So I can just lose out, which is great. You know, I don't get to do it as much as I'd like to." (B1).

Meanwhile, a White diversified agriculture farmer admitted to past substance use:

> "My coping mechanism used to be a lot of really unhealthy stuff like smoking a lot of tobacco and marijuana. I am much healthier in my coping mechanisms now." (M6).

Engaging in physical and creative activities served as a therapeutic outlet, helping farmers reduce stress and maintain mental well-being. However, some farmers also resorted to potentially maladaptive behaviors like substance use to cope with stress. Many farmers said that substance misuse and aggressive behavior were problems for others in the community, but few admitted it of themselves.

3.3.2 Subtheme 2: Emotional Coping

Definition of Subtheme: Farmers employed emotional strategies such as self-reflection, maintaining a positive mindset, and emotional expression to manage stress.

A White, small scale vegetable crop farmer reflected:

> "How do I cope every day? I am a positive person; you know, I have no clear vision of what needs to happen for agriculture." (M5).

Another farmer, this one a multi-ethnic tree crop farmer, described an emotional release strategy they use to cope with stress:

> "I scream... Oh, I go to the ocean where in times and just scream and run down the beach, you know, exhaust myself and then just scream it out." (M15).

Maintaining a positive attitude, allowing emotional release, and engaging in self-reflection help farmers navigate uncertainties and challenges inherent in farming.

3.3.3 Subtheme 3: Spiritual/Philosophical Coping

Spiritual beliefs and philosophical outlooks further influence how farmers cope with stress. Spirituality and a philosophical outlook provided farmers with meaning and guiding principles, enhancing their resilience in the face of adversity. Through their spiritual beliefs, farmers were finding purpose to maintain a positive mindset despite the uncertainties of farming life.

Definition of Subtheme: Drawing strength from spiritual beliefs, faith, and a sense of purpose connected to their farming practices.

One Hawaiian kalo farmer on Maui expressed their spiritual connection to the crop, saying:

> "What makes you get up in the morning? The pursuit. (...) I love it. I love growing kalos. It was my older brother." (M16).

A White livestock and tree crop producer highlighted how spiritual awareness transformed their family dynamics:

> "Well, a few things have changed. His dad stopped drinking and started going to AA and found God, and him being more aware of the Spirit has made the family so much more loving and able to work together." (M8).

Spirituality also helped farmers maintain a non-judgmental mindset, with one White permaculturalist saying,

> "… a connection to God, source, whatever you want to call the Creator. Remind myself who I am. Helps me remember who other people are, so I don't judge them and treat them as different than divinely created beings. And that helps me to have a good mindset when I go about the world." (K2).

Lastly, as a farmer and traditional Hawaiian healer stated:

> "You can either turn and run and go in a different direction, or you can kind of be *onipa'a* and just be steadfast and look forward to opportunities and changing and go at the times." (K1).

The mindset of *onipa'a* (calm persistence, steadfastness) as described here also ties to the following subtheme, problem-focused coping.

3.3.4 Subtheme 4: Problem-Focused Coping

Definition of Subtheme: Active efforts to solve problems causing stress, including seeking information, planning, adapting practices, and taking direct action to mitigate stressors.

One Hawaiian farmer emphasized the importance of adaptability, saying:

"Instead of sitting on the problem, you want to think about solutions and reach out to others to look what's happening around you." (K1).

This quote ties to the philosophy of *onipa'a* (steadfastness), a sentiment found across interviews. Farmers who engage in problem-focused coping take proactive steps to address issues such as pests, financial constraints, or policy barriers. This approach can lead to practical solutions and a greater sense of control over their circumstances. In another example, one White row-crop farmer said:

"I'm always problem solving, right, I guess. And I did think, you know, in July like, oh, maybe we need to have row covers ready to go. Or maybe we need to have an easily set up like, tunnel." (B6).

Another multi-ethnic respondent emphasized how essential adaptability is:

"I think all farmers are... problem solvers. Every time something new happens, we go, okay, what am I going to do about this? How can I make a difference?" (M2).

This problem-solving mindset helped farmers address issues proactively, finding practical solutions to challenges like pests. Meanwhile, social support networks also play a crucial role in how farmers cope with stress.

3.3.5 Subtheme 5: Relational Coping

Definition of Subtheme: Seeking support from social networks, including family, friends, community, and fellow farmers.

One diversified agriculture farmer and key informant on the Hawai'i Island spoke specifically about human connection in the context of a modern and technologically advanced world, saying:

"In a world being more driven by data and technology, we need to be able to connect still as human beings." (B4).

Family support was a crucial aspect of social coping for many farmers. One Hawaiian Asian aquaculturist and permaculturist emphasized the importance of family, stating,

"The next generation, the *keiki* [children]... seeing the kids gain that ono back again is a big motivation for me, and then seeing the *kupuna* [elders]-confirmations and head nods or tears of happiness and stuff like that." (K10).

Community initiatives also played a significant role in providing social support. A Native Hawaiian farmer described how a simple agricultural project served multiple social purposes:

"We use that as a mechanism to voice concern about domestic violence, about food insecurity, and sustainability. And the idea was that you could see a home with a five-gallon bucket of taro growing in the front yard and know that that is a safe place." (O6).

Understanding these coping mechanisms highlighted areas where support could be enhanced. Farmers emphasized that healthy connections were key to coping well, including relationships with people, pets, nature, community engagement, and cultural practices. These connections provided support, balance, inspiration, and a sense of purpose in their lives.

Feeling stressed, depressed, and experiencing farming failures appeared to be most prevalent among those who reported feelings of isolation and competition with other farmers. They were also

more likely to express perceived stigma attached to seeking help, adhering to self-reliance values, and to engage in maladaptive coping strategies, including substance use, emotional eating, violence, and excessive screen time. On the other hand, within this relational subtheme, we noticed an interesting pattern among those who emphasized the need for greater community connection with greater feelings of well-being, of being in good relationships. This prompted us to dive a little deeper and do a simple linguistic analysis of exploring pronoun usage which revealed that farmers who predominantly used "I" statements expressed a greater occurrence of experiencing stress including depressive and anxiety symptoms, anger, and frustration, and less relational coping strategies.

Figure 1 illustrates the frequency of “I” vs. “we” linguistic utterances/words spoken in the interviews that revealed an average ratio of 3:1 for “I” vs. “we.” Interestingly, controlling for interview length, farmers who expressed higher ratio usage of the collective pronoun “we” over the personal pronoun “I” appear to note more engagement in Hawaiian culture and with community food hubs/farmers markets, as well as adherence to specific belief systems or principles around regeneration and sustainability. They were also less likely to express feeling overwhelmed, stressed, angry, and frustrated. This suggests a possible assocation between endorsing a collective mindset and strong community ties with an adapative, resilient mental well-being.

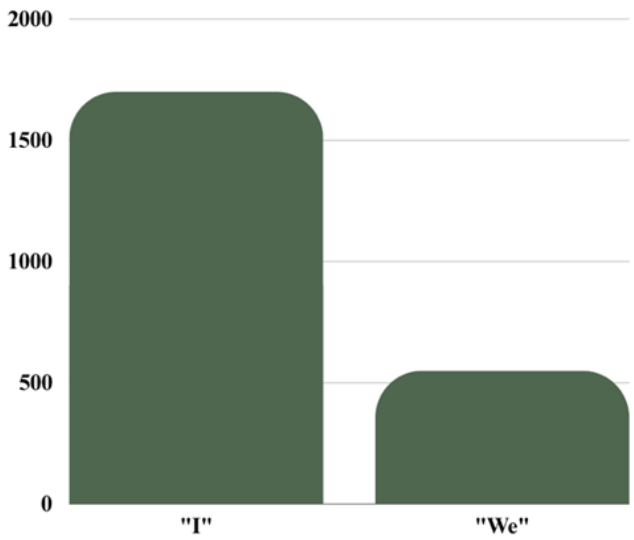

Figure 1 Frequency of Personal Pronoun:“I” vs. “We” in the Interview.

4. Discussion

This qualitative study revealed some interesting findings that mirror past research but also provided insights not reported elsewhere, and likely to be reflective of Hawai‘i’s unique culture and geographical location. Similar to other studies, legislative and policy issues emerged as primary stressors, a theme echoed in the broader literature on agricultural mental health [3]. This study’s findings are consistent with Graf et al. [35] and King et al. [46] that emphasized the compounded challenges of bureaucratic barriers and the necessity for culturally sensitive policy reforms. The stress induced by such barriers, particularly on small-scale farmers, resonates with the experiences of Latina migrant farmworkers in Wisconsin, highlighting a universal need for more accessible and equitable agricultural support systems [35]. Similarly, Hawai‘i needs to address outdated practices and invest in support services and infrastructure to strengthen Hawai‘i’s agriculture system. This

suggests that policy interventions aimed at reducing bureaucratic hurdles and providing better support to farmers could alleviate some of the stressors they face.

Financial concerns were another prominent stressor identified by the participants, consistent with previous studies that have similarly highlighted the economic pressures experienced by farmers [4, 30]. These concerns are further amplified by the structural inequities faced by Native Hawaiian and immigrant farmers, underscoring the critical role of socioeconomic status and cultural background in shaping farmer mental health, something noted beyond Hawai'i as well [16, 47]. These findings underscore the need for supportive policies, resources, and public investment in agricultural infrastructure to address the financial burdens faced by farmers.

Pests and diseases also stood out as significant stressors, corroborating findings from Onwuameze et al. [19] and Cancino et al. [22], where environmental and occupational hazards play a pivotal role in farmer mental health, highlighting the need for effective pest management strategies and support systems [19, 22, 29]. Some participants spoke of the importance to them of organic or other more natural farming methods, while others lamented the importance and challenges alike of conventional farming, including the stigma that exists against conventional farmers within the Hawai'i agricultural community. The identification of pests and diseases as a major stressor in this study reinforces the importance of developing interventions and resources that assist farmers in managing and mitigating these challenges.

The coping mechanisms identified in this study-behavioral, relational, spiritual/philosophical, problem focused, and emotion-focused coping-echo the multifaceted approaches documented in the broader literature in agricultural mental health [25, 32]. The mention of emotion-focused coping strategies, such as emotional expression and self-reflection, is in line with studies that emphasized the significance of emotional well-being among farmers [30].

Studies have also underscored the role of social support in mitigating depressive symptoms among farmers, suggesting that interventions aimed at increasing social support may be beneficial for mental health [4, 15]. The emphasis on relational coping aligns with the protective role of social support networks highlighted by Mohammed et al. [28] and Montgomery et al. [8], where community connections and coping diversity offer resilience against stress and suicidal ideation among first-generation farmers, and aligns with the importance of social support networks highlighted by previous research [32].

Similarly, studies like Bjornestad et al. [17] and Le et al. [27] continue to highlight the role of social support and specific coping strategies, as being either risk or protective factors for depression and suicide [17, 27]. Qualitative research, such as the work by Henning-Smith et al. [30], offers deep insights into the nuanced nature of coping, revealing how positive and negative strategies contribute to mental health risks, and emphasizing the significance of community connections and healthy coping mechanisms. This body of work collectively stresses the necessity for culturally sensitive and context-specific interventions, with qualitative studies playing a crucial role in capturing the complex interplay of stressors, coping mechanisms, and mental health outcomes in farming communities.

Fostering social support networks supports relational coping that facilitate the strengthening of social connections among farmers. Creating spaces for farmers to come together, share experiences, and provide emotional support can help build resilience and reduce the feelings of isolation that many farmers experience. Peer mentoring programs, farmer support groups, and community initiatives can facilitate these connections [16, 46, 48-50]. Elder farmers possess valuable knowledge

and practical skills passed down through generations, while younger farmers may have higher formal education but lack resilience and long-term coping capacities. They may often turn to online resources for problem-solving, which can limit opportunities for meaningful support from experienced farmers. Fostering working relationships and support networks within the farming community can provide crucial emotional support and facilitate knowledge exchange for improved personal and professional wellbeing.

Relatedly, the "I" vs. "we" verbal linguistic ratio finding highlight the significance of social connectedness as an intervention approach to address the mental health challenges faced by agricultural producers. A "we" mindset can serve to reduce stigma, to promote community support networks, and to foster cultural and social inclusion within the farming community. This finding corresponds with the mental health and language usage literature where greater use of "I" personal pronoun in oral dialogue or written expression has been found to be associated with depression and other negative mental health outcomes [45].

Many interviews in this study, directly or indirectly, also interestingly emphasized the need for or existence of a farming philosophy. Respondents expressed how philosophy could provide values, principles, and a purpose beyond income to support and stabilize farmers through difficult times. A farming philosophy that is rooted in nature along with a sense of interconnection can help to inspire, heal, and motivate the demanding lifestyle of farming. For example, respondents discussed feeling the pain of the death of a tree, talking to trees, and mourning over destruction caused by storms or harm from invasives and pests. They expressed a faith in nature and a spirituality tied to a sacred ecology, where the farm and nature are seen as a sanctuary, providing purpose, connection, and solace. Many respondents stated practices of "grounding themselves," starting the day and ending the day quietly with feet on the ground, watching the sun rise, watching the sunset, listening to the birds, "feeling connected." Connection, both social and spiritual, was expressed to be a key facet of coping associated with a sense of sacredness, spirituality, or religiosity.

Although there are limited studies on religion/spirituality as coping strategies for farmers, Keeney recently found religion to be one of the key coping mechanisms for struggling farmers in a small study of immigrant farmers [15]. In the broader literature on mental health and religion, higher levels of spirituality/religiosity are generally linked to reduced symptoms in depression, suicidality, substance use disorder, bipolar disorder, and post-traumatic stress disorder, while findings are mixed for anxiety, obsessive-compulsive disorder, and eating disorders [51]. Psychotic disorders show poorer outcomes with religious delusions but tend to have better prognoses with nonpsychotic religious beliefs [51]. Relatedly, Inwood et al. [52] highlighted the need for mental health training tailored to the unique needs of farm culture, emphasizing culturally sensitive counseling and support services for agricultural communities that may arguably expand to include religion/spirituality.

The findings of this qualitative study corroborated findings of the survey that was conducted with 408 farmers [27, 49], namely that financial pressures and production-related challenges are key stressors for Hawai'i farmers. In this triangulation process, comparing qualitative and quantitative data, we were able to identify both overlaps and offer additional unique insights to the survey data. The survey findings [27] underscored uncertainty, COVID-19, and production concerns as the top stressors, while this qualitative study provided more nuances and in-depth understanding of these uncertainties and production concerns that were specifically related to legislative and policy challenges, financial and economic pressures, and environmental issues such as pests and diseases.

In terms of coping mechanisms, both studies revealed problem-focused coping as a primary strategy, alongside emotion-focused coping; however, the qualitative findings offered concrete examples of these strategies, and additionally, revealed and highlighted the role of relational and spiritual/philosophical coping as adaptative strategies for Hawaiian farmers. Triangulating the interview data with the prior reported survey data offers data robustness, strengthening reliability, and provides a more comprehensive understanding of stress and coping among Hawai'i farmers.

Building on these findings, we developed a set of policy recommendations aimed at addressing the specific stressors and enhancing the coping mechanisms identified among Hawai'i farmers. Table 1 presents the themes and subthemes from our analysis alongside corresponding policy and program recommendations for each area. These recommendations are designed to inform policymakers, agricultural organizations, and community stakeholders in creating targeted interventions that alleviate the identified stressors-such as legislative barriers, financial pressures, and environmental challenges-and support adaptive coping strategies, including behavioral, emotional, spiritual/philosophical, problem-focused, and relational coping. By aligning the farmers' expressed needs with actionable policies, we aim to serve a more resilient agricultural community and improve the overall mental health and well-being of farmers in Hawai'i.

Table 1 Themes, Subthemes, and Corresponding Policy and Program Recommendations.

Theme	Subtheme	Policy and Program Recommendations
Theme 1: Stressors	*Legislative and Policy Challenges*	Simplify bureaucratic processes (e.g., scalable food safety compliance). Improve land and water access through equitable lease rates for small-scale and Native Hawaiian farmers. Increase investment in agricultural infrastructure (e.g., irrigation, fencing, and food safety facilities).
	Financial & Economic Pressures	Provide easy-to-navigate financial assistance programs tailored to small and beginning farmers, and/or a clear warmline for related questions. Expand disaster insurance subsidies to reduce financial strain from climate and pest-related losses, including for tropical crops.
	Environmental Challenges-Pests and Diseases	Continue to fund Integrated Pest Management (IPM) training and support services such as extension services. Introduce more climate-resilient farming programs (e.g., drought-resistant crops, crop rotation practices).

	Variability of Stressors Among Farmer Groups	Tailor programs to address unique challenges faced by Native Hawaiian, immigrant, and transplant farmers.
Theme 2: Coping Mechanisms/Styles	*Behavioral Coping*	Develop programs promoting healthy coping strategies such as exercise and creative outlets (e.g., ʻāina-based community days, lei making gatherings, etc. for farmers).
	Emotional Coping	Expand access to culturally sensitive and linguistically inclusive mental health services, including mobile clinics and telehealth for farmers.
	Spiritual/Philosophical Coping	Support initiatives integrating farming with cultural and spiritual practices (e.g., ʻohana-based programs, workshops inclusive to the whole family). Promote farming philosophies that emphasize environmental stewardship and connection to nature through extension, social media, and academic paradigms.
	Problem-Focused Coping	Continue to provide technical assistance to farmers for proactive problem-solving (e.g., pest control innovations) through extension. Continue to provide peer-based mentorship including knowledge sharing on adaptive practices.
	Relational Coping	Facilitate peer mentorship programs, farmer support groups, and intergenerational knowledge-sharing. Create community spaces and programs to enhance social connections and reduce isolation, including funding for food. Expand cultural programs to foster relationships tied to Hawaiian values and traditions, compensating cultural practitioners and community-based organizations for their involvement.

4.1 Limitations

Although the study provides valuable insights into the mental health challenges faced by farmers in Hawaiʻi and offers insights for support, it is important to acknowledge its limitations. First, the sample is a convenience sample, and therefore biased toward farmers who were more willing to

participate in a research study, and perhaps less likely to be currently struggling with a mental health challenge. Further, because the sample is a sample of convenience, the response rate is unknown although the private research firm shared that only 1 out of 5 from their contact list were willing to participate in the interview; the response rate is therefore arguably less than 20%. Additionally, 23 of the 77 interviews were conducted by a contracted research company rather than the research team, which may have introduced variations in interview style or approach that could influence participant responses and their willingness to share. Collectively, the response bias is toward smaller farmers which compromises 90% of farms on Hawai‘i; hence, the data did not accurately reflect larger farms and therefore not representativeness of all farms on Hawai‘i. The second limitation concerns incomplete demographic information, namely gender and age although for many interviews, we were able to infer these details when interviewees mentioned them. Third, the findings were not member-checked with participants, and only triangulated with the survey data [27], but not any additional data sources, which limits the ability to confirm the accuracy or validity of the interpretations. Finally, the unique contextual factors specific to Hawai‘i’s agricultural landscape and cultural norms may also limit the generalizability of the findings to other regions or cultural contexts. Despite these limitations, this study serves as an important starting point for a deeper and more nuanced understanding farmers’ mental health challenges in Hawai‘i, and future research should address these limitations to provide a more comprehensive understanding of the topic.

5. Conclusions

The findings from this study, enriched by comparisons and integrations with existing research suggest a need for a more holistic approach to supporting farmer mental health. This study sheds light on the stressors affecting Hawai‘i farmers, including legislative and policy challenges, financial pressures, and environmental threats like pests and diseases, and reveals the diverse coping mechanisms they employ, including behavioral, emotional, spiritual, problem-focused, and relational strategies. Fostering social support networks, recognizing the value of cultural and spiritual practices, and addressing the roots of structural violence are critical. These strategies not only aim to mitigate immediate stressors but also seek to build a resilient, inclusive, and supportive agricultural community that can navigate the complexities of modern farming with strength and dignity. By acknowledging and addressing the challenges faced by farmers, we can work towards a future where the well-being of those who feed us is placed at the forefront of agricultural and mental health support initiatives, and enhance the well-being of farmers in Hawai‘i and similar contexts, fostering a more resilient and sustainable agricultural community.

Acknowledgments

The authors are grateful to a number of people: firstly, to all the farmers, ranchers and allied agricultural producers who generously provided their time in sharing their experiences and understanding, secondly, to Jim Crum, Alex Wong and SMS Hawai‘i who assisted in conducting interviews, and thirdly, to Emilie Parry who assisted with coding and thematic analysis.

Author Contributions

The first author designed the study, interview protocol, conducted analysis and led manuscript development. The second author supported with literature review, data analysis and manuscript drafts.

Funding

This work was supported by the Hawai'i Department of Agriculture (Contract No. 69794) through the Farm Ranch Stress Assistance Network-State Departments of Agriculture (FRSAN-SDA, 2021), National Institute of Food and Agriculture (NIFA), U.S. Department of Agriculture Grant No. 2021-70035-35371, and USDA-NIFA Hatch Integrated Project #3523-H. Any opinions, findings, conclusions or recommendations expressed in this publication are those of the authors and should not be construed to represent any official HDOA or USDA Government determination or policy.

Competing Interests

The authors have declared that no competing interests exist.

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