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Queer Farmers in the 2017 US Census of Agriculture

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ABSTRACT

Research suggests queer farmers are both more prevalent than expected and different from other farmers in significant ways. Using 2017 USDA Census of Agriculture data, we investigate this premise using an innovative coding scheme to identify two-producer farms run by men married to men and women married to women. Our findings suggest a good deal of farms are run by queer farmers and are they significantly different in several ways from non-queer farms. We encourage further investigation of queer farmers using USDA Census of Agriculture data and provide the coding scheme needed to do so. We further call for a refinement of the USDA Census of Agriculture question regarding marital status making it easier to identify producers married to each other, and subsequently same-sex married producers.

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Introduction

Agriculture in the US has been built on and guided toward heterosexual familial relationships—both in practice and ideology (Leslie 2017; Leslie, Wypler, and Bell 2019). However queer[1] farmers exist and become involved in farming for many of the same reasons as straight farmers (Movement Advancement Project (MAP) 2019). Additionally, the farming profession has unique characteristics such as autonomy that may attract queer people to it (Edward 2018). However, there is no published quantitative research on this population, limiting the ability to draw conclusions about the characteristics of queer farmers. This invisibility renders support for queer farmers difficult, especially at a time when the USDA is increasingly emphasizing the need for nondiscrimination based on sexual orientation as well as specific programing for LGBT individuals (MAP 2019).

There are numerous reasons to study queer farmers, including multiple calls for quantitative data collection and research (Hoffelmeyer and Sexsmith 2019; MAP 2019; Leslie, Wypler, and Bell 2019). Additional reasons include (1) challenging current discriminatory farming models and increasing the power of queer farmers, (2) increasing the visibility of queer farmers and combating the stereotype that queer

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people only exist in urban spaces, and (3) exploring whether quantitative data supports qualitative findings that queer farmers are involved in transformative agricultural practices, such as sustainable and alternative farming methods. We briefly review each.

The traditional heterosexual family farm model has been encouraged by those in power through avenues such as 4-H education (Rosenberg, 2016). Even the sustainable agriculture movement, which is reimagining how we farm, promotes heterosexual relationships and marriage as fundamental to farming (Leslie 2017). This farm structure is one way in which the state governs families and promotes heterosexual relations within rural areas (Rosenburg 2016). Without data on queer farmers, this system remains unchallenged and will continue to marginalize queer people. In order to combat marginalization, it is vital to recognize the existence and unique needs of queer farmers (Hoffelmeyer and Sexsmith 2019).

In the popular conscience, queer Americans eschew rural life due to discrimination, preferring more tolerant urban communities (Annes and Redlin 2012a; MAP 2019). This may be one reason for the lack of attention to queer farmers; it is assumed that most farms are rural and that most queer people are urban. However, the stereotype of queer people as metronormative has been increasingly challenged. MAP published a study in 2019 showing that national surveys of rural LGBT adults are consistent with the estimated 4.5% of all US adults who identify as LGBT. Additionally, LGBT people report similar levels of well-being in urban and rural areas and may identify as 'rural' just as strongly as they identify as 'LGBT' (MAP 2019). Problematizing the notion that gay men migrate from rural areas to urban centers, Annes and Redlin (2012a) found that multi-directional migration, in which young men move to urban centers to explore themselves before returning to their rural roots, is a vital component of rural gay men's identity development. Whether these trends for rural queer people extend to queer farmers is as yet unknown; and it will be important for debunking any notions of the lack of queer farmers, just as previous research has done for rural queer people more generally.

Finally, queer farmers' contributions to the agri-food system are both intrinsically valuable and potentially transformative. In particular, qualitative research suggests that queer farmers' unique experiences and worldviews make them more drawn to the disruption of conventional agriculture and the promotion of sustainable alternatives (Edward 2018; Leslie 2017; 2019; Leslie, Wypler, and Bell 2019, Wypler 2019; and MAP 2019).

Alternatively, studies of sexuality in rural contexts offer evidence that complicates the association of queerness with pro-environmental attitudes and actions (Barrington 2011; Bell 2009; Brewer 2018; Peter et al. 2009; Turesky 2011; Kazyak 2012). In particular, gay men living in rural areas may feel pressure to perform overt masculinity, especially related to the domination and control of nature, which is at odds with sustainable farming (Annes and Redlin 2012b; Bell 2009; Brewer 2018; Kazyak 2012). Furthermore, queer farmers may practice sustainable agriculture, not for its alternative ethics, but because they are structurally excluded from mainstream agriculture, similar to what has been documented for women farmers (Trauger 2004; Pilgeram and Amos 2015; Sachs et al. 2016). Thus, data is needed to investigate qualitative claims of the transformative

potential of queer farmers, and whether they are indeed farming in ways that are significantly different from their straight counterparts.

In short, there are reasons to hypothesize both the existence of a large and vibrant queer farming community with a predilection toward sustainability, and a small scattering of queer farmers who shy away from sustainable practices. Existing research on queer farmers provides detailed understandings of the motivations and practices of a subset of queer farmers (Edward 2018; Leslie 2017; 2019; and Leslie, Wypler, and Bell 2019; Wypler 2019). These studies' strengths lay in their micro-level focus, however, their methodologies do not allow conclusions to be drawn about the number and characteristics of queer farmers in the US. Additionally, the quantitative data to accomplish this is not readily available. While Leslie, Wypler, and Bell 2019 call for the inclusion of sexuality and gender identity questions on future US Censuses of Agriculture, these questions were not on the 2017 Census of Agriculture. Our view is that they are not likely to be added anytime soon, due in part to the USDA National Agriculture Statistics Service's interest in mitigating dropping response rates (Johansson, Effland, and Coble 2017).

Despite this, we discovered that it is possible to identify a subset of queer farmers in the 2017 USDA Census of Agriculture. Specifically, we were able to distinguish those farms with two married producers who were of the same sex, as suggested by Hoffelmeyer and Sexsmith (2019). This echoes the US Census Bureau's workaround following the removal of a direct sexuality question – they are now focusing on LGBT married and cohabitating partnerships, which can be identified by looking at the gender and relationship status of respondents (United States Department of Commerce 2020). In the USDA Census of Agriculture, this process enables us to identify, count, and describe farms run by men married to men (MMM) and women married to women (WMW)[2].

Our coding scheme limits our sample to a comparison of farms with two producers, eliminating farms that list one, three, or four. It also presents other significant limitations and biases, discussed in more detail in the methods. Further, there are certain ethical quandaries involved in identifying a relatively small and potentially vulnerable population. However, the USDA takes significant steps in ensuring the anonymity of every respondent to the Census of Agriculture. These steps include a rigorous application process to access microdata, and the review of outputs by the Washington D.C. National Agricultural Statistics Service to ensure that any potentially damaging or identifying information is suppressed. Additionally, there are significant potential benefits in terms of building awareness and support for queer farmers and strengthening our agrifood system through diversification. This study represents the first attempt to investigate queer farmers quantitatively—and with a large data source to begin investigating the true status of queer farmers in US agriculture. In this paper we explore the following questions and attention for difference between MWM and WMW.

Q1: What percentage of two-producer farms are run by a queer farming couple?
Q2: Are queer farmers more likely to be people of color or Hispanic compared to other farmer pairs?
Q3: Are queer farmers more likely to farm in urban areas compared to other farmer pairs?

Q3.1: Do queer farmers live on their farms in similar rates to other farmer pairs?
Q4: Are queer farmers are more likely to be involved in alternative farming practices (intensive grazing, organic, value added) compared to other farmer pairs?
Q4.1: Are queer farmers who practice any organic farming less likely to be certified organic compared to other farmer pairs?

Methods

The Census of Agriculture is conducted once every five years to gain information on land use and ownership, operator characteristics, production practices, income, and expenditures (United States Department of Agriculture (USDA) 2019). It is intended to be a complete count of US farms and ranches, defined as operations on which $1,000 of agricultural products were raised and sold during the Census of Agriculture year (United States Department of Agriculture (USDA) 2019).

The 2017 Census of Agriculture allowed respondents to list up to four producers for their farm. Demographic questions were asked about each producer, including producers' gender and marital status. Specifically, the questionnaire asks if each producer is married to one of the other listed producers. Unfortunately, respondents are not asked to indicate which producer they are married to. Therefore, to correctly identify our sample, we limit the data to include only two-producer farms.

To identifying MMM and WMW, we first dropped farms with one, three, or four producers, leaving us with two producers farms. We then generated six variables indicating producer types; two married men, two married women, two unmarried men, two unmarried women, a married man and woman, and an unmarried man and woman. Taking 'Men Married to Men' as an example, we created the variable 'Married Men' equal to zero. We then replaced 'Men Married to Men' equal to one when the case satisfied two conditions, as follows.

First, producer one and producer two must both be male. Second, the producers must be married. We accepted the second condition to be true in any of three cases: 1) producer one indicated they were married to producer two, 2) producer two indicated that they were married to producer one, or 3) both producers one and two indicated that they were married to the other producer. Since we limited our sample to farms with only two producers, one producer indicating they were married to the other was deemed sufficient. Respondents may not have felt it necessary to list both producers as married to each other since this was self-evident.

Following this coding, we were able to compare MMM and WMW to the non-same-sex married reference groups using cross-tabulations and chi-square tests. This analysis was chosen for simplicity of interpretation and direct comparison of demographic characteristics among the various groups. Specifically, we compared MMM to all other two-producer farms, WMW to all other two-producer farms, MMM to two unmarried men, WMW to two unmarried women, and MMM to WMW. In our analysis, we used frequency weights provided by the USDA to adjust the 2017 Census of Agriculture data. It is standard practice to use this weight, and all statistics provided on the USDA website represent these weighted results. We follow the USDA convention in reporting our weighted findings.

For each of these groups, we compared data on Rural-Urban Continuum Codes, race, ethnicity, hired manager status, having farming as the main occupation, living on-farm, being retired, 11 production categories, intensive grazing (livestock grazing on small, rotating areas), value-added (products that have been physically changed to increase value such as making strawberries into jam), human consumption (i.e. crops that will be eaten by humans as opposed to going to animal feed or manufacturing purposes), and using organic practices. Organic farming was broken into four non-exclusive types. *Certified i*ndicates they are certified organic through the USDA Organic Program. *Exempt* means that they would be certified but are small enough to merit an exemption. *Transitioning* expresses that they are working toward becoming certified. *Other* indicates that they use organic practices and principals but are not certified, exempt, or transitioning.

Due to the way the Census of Agriculture collects demographic data, the limitations of our coding scheme are significant. Both partners must be farmers (eliminating partnerships in which one partner works off-farm). Also, they must have listed themselves as married (excluding queer partnerships not involving marriage, and those who do not wish to report their marriage). Further, queer people engaging in collective farming (Anahita 2009; Leslie 2019; Sbicca 2012; Wypler 2019) are dropped from our sample. Beyond these issues, we must consider that people who indicated their same-sex marriage in the questionnaire may be more likely to be publicly 'out' than those who did not, further biasing our sample. These are significant limitations and reinforce Leslie, Wypler, and Bell's (2019) call for the inclusion of sexuality and gender identity questions in future US Censuses of Agriculture.

Our coding process eliminates a substantial number of non-identifiable queer farmers from our sample. Thus, we are identifying the bare minimum number of queer farmers in the United States and are more than likely missing certain groups of queer farmers that could be significantly different from our two-producer, self-reported married sample.

Results

Starting with a total of 2,042,220 US farms, we dropped farms run by one, three, or four producers. This left us with 930,782 farms run by two producers, accounting for 45.5% of all farms. Of these two producer farms, 8,302 were run by MMM and 3,550 were run by WMW, indicating 0.89% of two producer farms were run by MMM and 0.38% by WMW, for a total of 11,852 farms or 1.2% (Table 1). For comparison, farms run by a

Table 1. All combinations of gender and marital status for farms in the 2017 USDA census of agriculture.

	Frequency	Percent
Man married to man	8,302	0.89
Woman married to woman	3,550	0.38
Married man and woman	751,422	80.73
Two unmarried men	91,102	9.79
Two unmarried women	10,094	1.08
Unmarried man and woman	66,312	7.12
Total	930,782	100.0

married man and woman account for about 81% of all two producer farms. Because each farm represents two farmers, we identified 16,604 queer men farmers and 7,100 queer women farmers.

Given the limitations of our coding scheme, the actual number of queer producers is likely far higher if we extrapolate our data to all farms. However, we simply cannot identify all of them given the limitations of the Census of Agriculture data. Thus, for our analysis we concentrate on the 11,852 farms and 23,701 queer farmers identified directly via our coding scheme.

Looking at the distribution of all two-producer farms across US states (Supplemental Figure 1), the states with the highest shares are Texas, Missouri, Oklahoma, and Iowa with a substantial percentage also in California and clustered in the Midwest. For MMM, the states with the highest shares are Texas, Missouri, Kentucky, and California with some clustering in the Midwest (Supplemental Figure 1). WMW, in contrast, are more concentrated in the West with high proportions in California, Oregon, Washington, and Colorado (Supplemental Figure 2). There are also high shares of WMW in Texas, Oklahoma, Missouri, Kentucky, Ohio, and Florida.

Descriptive statistics for all variables included in the analyses are presented in Table 2. We distinguish between MMM (0.89% of the sample), WMW (0.38%), and Non-Same-Sex-Married (NSSM) farmers (98.73%). The NSSM group includes married men and women, two unmarried men, two unmarried women, and unmarried men and women.

Table 2 shows that, independent from their sexual orientation, most farmers are white and non-Hispanic, live on the farm, are not retired, do not have military experience, and have a main occupation other than farming. For example, only 4% of MMM and 5% of WMW are nonwhite, and 4% of MMM and 4% of WMW are Hispanic. Table 2 also shows that most farms, independent from the sexual orientation of their operators, are in metropolitan counties or in nonmetro counties with an urban population of 2,500 to 19,999, adjacent to a metro area. Further, most farmers produce hay, cattle, horses, poultry, and sheep. For example, nearly half of all MMM farms raised hay and/or cattle, while 42% of WMW raised horses/equines.

Most farmers in the three groups do not deliver value-added products. Only 2% of MMM and 6% of WMW do so. However, most farmers grew products intended for human consumption, i.e. not for animal or industrial use. For MMM, this figure is 61%, and for WMW, it is 55%. Also, few farmers practice intensive grazing or organic agriculture. For example, 17% of MMM and 20% of WMW report intensive grazing practices and only 2% of MMM and 3% of WMW practice any organic agriculture. Of those who did have any organic agriculture, 74% of MMM and 59% of WMW were certified organic.

The demographic descriptions presented in Table 2 show some small differences between MMM, WMW, and NSSM in their demographics and farm characteristics. Therefore, to determine whether MMM and WMW distributions were due to chance, we conducted Pearson's chi-squared tests on cross-tabulations. As is common for this test, our null hypothesis is that the variables are independent, i.e., there are no relationships between the categorical variables.

Table 2. Descriptive statistics for MMM, WMW, and NSSM farmers.

	MMM (number of farms = 8,302)			WMW (number of farms = 3,550)			NSSM (number of farms = 918,930)		
	Freq	*n*	Percent	Freq	*n*	Percent	Freq	*n*	Percent
Farmer 1									
Nonwhite	308	8,302	3.71	167	3,550	4.70	28,232	918,930	0.03
Hispanic	295	8,302	3.55	142	3,550	4.00	27,420	918,930	0.03
Military	1,915	8,302	23.07	406	3,550	11.44	185,254	918,930	0.2
Hired manager	509	8,302	6.13	80	3,550	2.25	25,766	918,930	0.03
Main occupation	4,326	8,302	52.11	1,367	3,550	38.51	391,967	918,930	0.43
Lives on farm	6,140	8,302	73.96	2,935	3,550	82.68	751,632	918,930	0.82
Retired	925	8,302	11.14	405	3,550	11.41	89,547	918,930	0.1
Farmer 2									
Nonwhite	346	8,302	4.17	196	3,550	5.52	30,284	918,930	0.03
Hispanic	357	8,302	4.30	169	3,550	4.76	29,826	918,930	0.03
Military	909	8,302	10.95	244	3,550	6.87	43,378	918,930	0.05
Hired manager	622	8,302	7.49	89	3,550	2.51	30,513	918,930	0.03
Main occupation	3,751	8,302	45.18	1,111	3,550	31.30	308,238	918,930	0.34
Lives on farm	5,536	8,302	66.68	2,935	3,550	82.68	760,667	918,930	0.83
Retired	786	8,302	9.47	413	3,550	11.63	94,123	918,930	0.1
Farm Characteristics									
Rural urban codes		8,301			3,550			918,916	
1	1,215		14.64	713		20.08	146,186		15.91
2	1,391		16.76	690		19.44	149,786		16.30
3	1020		12.29	539		15.18	118,236		12.87
4	777		9.36	355		10.00	81,788		8.90
5	274		3.30	159		4.48	29,508		3.21
6	1,677		20.20	535		15.07	187,759		20.43
7	895		10.78	274		7.72	100,960		10.99
8	428		5.16	94		2.65	40,997		4.46
9	615		0.07	191		5.38	63,626		6.92
Products									
Vegetables	387	6,516	5.94	271	3,181	8.52	36,440	767,402	4.75
Sheep	864	6,532	13.23	784	3,175	24.69	117,604	769,032	15.29
Bees	313	6,396	4.89	248	3,080	8.05	36,424	757,238	4.81
Hay	3,600	7,711	46.69	1,056	3,372	31.32	364,530	872,198	41.79
Wood	117	6,340	1.85	62	3,107	2.00	12,585	756,899	1.66
Aquaculture	29	5,922	0.49	6	2,967	0.20	1,887	721,681	0.26
Cattle	3,910	8,302	47.10	1,142	3,550	32.17	419,410	918,930	45.64
Pigs	388	6,495	5.97	208	3,147	6.61	44,579	765,223	5.83
Poultry	1,209	6,521	18.54	1,000	3,106	32.20	163,227	764,660	21.35

(*continued*)

Table 2. Continued.

	MMM (number of farms = 8,302)			WMW (number of farms = 3,550)			NSSM (number of farms = 918,930)		
	Freq	*n*	Percent	Freq	*n*	Percent	Freq	*n*	Percent
Other Livestock	180	5,455	3.30	190	2,909	6.53	20,689	680,334	3.04
Horses/Equines	1,898	6,765	28.06	1,327	3,130	42.40	271,053	800,487	33.86
Any organic	162	7,320	2.21	97	3,265	2.97	13,935	848,762	1.64
Certified organic	120	162	74.07	37	97	38.14	8,233	13,935	59.08
Exempt organic	6	162	3.70	18	97	18.56	1,637	13,935	11.75
Transitioning Organic	18	162	11.11	D	97	D	1,862	13,935	13.36
Other organic	34	162	20.99	42	97	43.30	3,370	13,935	24.18
Intensive Grazing	1144	6,686	17.11	610	3,096	19.70	139,913	802,717	17.43
Value added	161	6,784	2.37	187	3,161	5.92	18,919	810,244	2.33
Human consumption	4,752	7,828	60.71	1,864	3,405	54.74	509,949	877,569	58.11

To control for gender and focus on sexuality, we compared MMM to two unmarried men (MUM) and men married to women (MMW). Similarly, we compare WMW to two unmarried women (WUW) and to MMW. Also, to focus on gender within same-sex marriages, we compared MMM and WMW directly to each other.

Men Married to Men (MMM)

Table 3 presents the chi-square test results comparing characteristics of MMM farmers to MUM and MMW farmers. We compare farmers 1 and 2 together and then separately. We make the comparison of farmers 1 and 2 independent for two reasons. First, the chi-square tests indicate that the characteristics of MMM farmers 1 versus MMM farmers 2 are statistically different, except for the variable nonwhite. Second, it makes theoretical sense that the order in which farmers are listed is nonrandom, with the main farmer listed first and the supporting farmer listed second.

Our chi-square test results suggest that the characteristics of MMM compare to MUM and MMW are statistically different. The results show that MMM farmers are primarily white and non-Hispanic, but they are more frequently nonwhite and Hispanic than farmers in the other two groups. Also, MMM more often have military experience than MUM and MMW. However, when we compare farmer 1 and farmer 2, the previous result only holds for farmer 1 since MMM farmer 2 is actually *less* likely to have military experience than MUM farmer 2.

MMM farmers are more likely than MMW farmers to be hired managers and have farming as their primary occupation, but less likely than MUM. This result also holds when we separate farmers 1 and 2 for the analysis. Also, MMM are more likely to live on their farms compared to MUM, but they are less likely to live on their farm than MMW. Finally, MMM are more likely to be retired than MUM and MMW. However, when we split the analysis for farmers 1 and 2, the previous result only holds for farmer 1. MMM farmer 2, on the other hand, is less likely to be retired than MMW farmer 2 but more likely than MUM farmer 2.

Turning from farmer to farm characteristics, Table 4 presents the chi-square test results of comparing MMM farms to MUM and MMW farms. Our results indicate there are differences in the location of farms run by MMM with respect to MMW and MUM. Compared with MMW, MMM are less likely to farm in counties that are in metro areas of 1 million or more (RUCC 1) and more likely to farm in rural counties with less than 2,500 urban population, adjacent or not adjacent to a metro area (RUCC 8 and 9). However, compared with MUM, MMM are more likely to farm in counties that are in metro areas of 250,000 to 1 million or greater than 1 million (RUCC 1 and 2) and less likely to farm in rural counties with less than 2,500 urban population, adjacent or not adjacent to a metro area (RUCC 8 and 9).

In terms of production, MMM-run farms are more likely than MMW-run farms to produce vegetables, hay, aquaculture, and/or cattle. They are also significantly less likely to have sheep, poultry, or equines. However, MMM-run farms are more likely than MUM-run farms to produce vegetables, sheep, bees, wood, pigs, poultry, horses/equines, and other livestock and less likely to produce hay.

Looking at organic production, MMM farms were more likely MMW farms to have organic land, as well as USDA-certified organic land specifically. Comparing MMM

Table 3. Chi-square test for farmer characteristics MMM vs. MUM and MMM vs. MMW.

	MMM farmers 1 and 2 (number of farmers = 16,604)		MUM farmers 1 and 2 (number of farmers = 182,204)			MMW farmers 1 and 2 (number of farmers = 1,502,844)		
Variable	Freq	Percent	Freq	Percent	Pr.	Freq	Percent	Pr.
Nonwhite	654	3.94	5,341	2.93	0.000	44,509	2.96	0.000
Hispanic	652	3.93	5,110	2.80	0.000	47,130	3.14	0.000
Military	2824	17.01	28,695	15.75	0.000	185,821	12.36	0.000
Hired manager	1131	6.81	21,064	11.56	0.000	27,650	1.84	0.000
Farming is main occupation	8077	48.64	99,745	54.74	0.000	542,732	36.11	0.000
Lives on farm	11676	70.32	97,009	53.24	0.000	1,287,777	85.69	0.000
Retired	1711	10.30	15,176	8.33	0.000	145,744	9.70	0.009
	MMM farmer 1 (number of farmers = 8,302)		MUM farmer 1 (number of farmers = 91,102)			MMW farmer 1 (number of farmers = 751,422)		
Variable	Freq	Percent	Freq	Percent	Pr.	Freq	Percent	Pr.
Nonwhite	308	3.71	2,671	2.93	0.000	21,309	2.84	0.000
Hispanic	295	3.55	2,272	2.49	0.000	22,803	3.03	0.006
Military	1915	23.07	17,283	18.97	0.000	158,199	21.05	0.000
Hired Manager	509	6.13	8,896	9.76	0.000	13,710	1.82	0.000
Farming is Main Occupation	4326	52.11	50,542	55.48	0.000	309,939	41.25	0.000
Lives on Farm	6140	73.96	53,981	59.25	0.000	644,658	85.79	0.000
Retired	925	11.14	8,659	9.50	0.000	69,322	9.23	0.000
	MMM farmer 2 (number of farmers = 8,302)		MUM farmer 2 (number of farmers = 91,102)			MMW farmer 2 (number of farmers = 751,422)		
Variable	Freq	Percent	Freq	Percent	Pr.	Freq	Percent	Pr.
Nonwhite	346	4.17	2,670	2.93	0.000	21,309	2.84	0.000
Hispanic	357	4.30	2,838	3.12	0.000	22,803	3.03	0.000
Military	909	10.95	11,412	12.53	0.000	158,199	21.05	0.000
Hired manager	622	7.49	12,168	13.36	0.000	13,710	1.82	0.000
Farming is main occupation	3751	45.18	49,203	54.01	0.000	309,939	41.25	0.000
Lives on farm	5536	66.68	43,028	47.23	0.000	644,658	85.79	0.000
Retired	786	9.47	6,517	7.15	0.000	69,322	9.23	0.020

Table 4. Chi-square test for farm characteristics MMM vs MUM and MMM vs MMW.

	MMM farms (number of farms = 8,302)			MUM farms (number of farms = 91,102)				MMW farms (number of farms = 751,422)			
Variable	Freq	*n*	Percent	Freq	*n*	Percent	Pr.	Freq	*n*	Percent	Pr.
Rural urban codes		8,301			91,101		0.000		751,411		0.000
(Most urban) 1	1,215		14.64	11,436		12.55		121,781		16.21	
2	1,391		16.75	14,268		15.66		122,991		16.37	
3	1020		12.29	11,594		12.73		96,852		12.89	
4	777		9.36	8,351		9.17		66,728		8.88	
5	274		3.3	2,759		3.03		24,261		3.23	
6	1,677		20.2	19,201		21.08		153,362		20.41	
7	895		10.78	11,017		12.09		81,990		10.91	
8	428		5.16	4,634		5.09		32,925		4.38	
(Most rural) 9	615		7.41	7,826		8.59		50,479		6.72	
Products											
Vegetables	387	6,516	4.66	3,288	72,896	3.61	0.000	29,845	630,482	3.97	0.000
Sheep	864	6,532	10.41	4,081	72,255	4.48	0.000	103,585	632,663	13.79	0.000
Bees	313	6,396	3.77	1,643	71,595	1.8	0.000	32,253	623,963	4.29	0.322
Hay	3,600	7,711	43.36	40,595	83,759	44.56	0.003	297,684	716,296	39.62	0.000
Wood	117	6,340	1.41	961	71,388	1.05	0.001	10,817	622,319	1.44	0.516
Aquaculture	29	5,922	0.35	436	67,102	0.48	0.138	1,262	594,217	0.17	0.000
Cattle	3,910	8,302	47.1	43,333	91,102	47.57	0.413	345,853	751,422	46.03	0.052
Pigs	388	6,495	4.67	3,505	72,341	3.85	0.000	38,154	629,139	5.08	0.761
Poultry	1,209	6,521	14.56	5,636	71,944	6.19	0.000	146,290	630,396	19.47	0.000
Other livestock	180	5,455	2.17	784	62,623	0.86	0.000	18,112	562,104	2.41	0.747
Horses/Equines	1,898	6,765	22.86	12,625	73,319	13.86	0.000	236,404	660,476	31.46	0.000
Any organic	162	7,320	1.95	1,305	79,702	1.43	0.000	11,217	699,253	1.49	0.000
Certified organic	120	162	74.07	1,126	1,305	86.28	0.101	6,367	11,217	56.76	0.000
Exempt organic	6	162	3.7	33	1,305	2.53	0.112	1,407	11,217	12.54	0.016
Transitioning organic	18	162	11.11	210	1,305	16.09	0.803	1,452	11,217	12.94	0.627
Other organic	34	162	20.99	89	1,305	6.82	0.000	2,868	11,217	25.57	0.682
Intensive grazing	1144	6,686	13.78	11,185	74,010	12.28	0.000	118,530	662,848	15.77	0.101
Value added	161	6,784	1.94	1,031	75,026	1.13	0.000	16,218	668,706	2.16	0.782
Human consumption	4,752	7,828	57.24	50,950	85,507	55.93	0.053	421,422	720,183	56.08	0.000

farm with MUM farms, the former are also slightly more inclined to have organic land, but are more likely land be categorized as "other" as opposed to certified or transitioning. MMM are more likely than other farms to grow products intended for human consumption. Also, they are more prone than MUM to practice intensive grazing and produce value-added products.

Women Married to Women

Table 5 presents the chi-square test results comparing characteristics of WMW farmers to WUW and MMW farmers. As in the previous section, we compare farmers 1 and 2 together and then separately. The chi-square tests indicate there are not many differences between the characteristics of WMW farmer 1 and WMW farmer 2. The only variables that have a significant difference are military experience and farming as the main occupation. However, it still makes theoretical sense that the order in which farmers are listed is nonrandom, with the main farmer listed first and the supporting farmer listed second.

WMW are primarily white and non-Hispanic, but also more likely than WUW and MMW to be nonwhite and Hispanic. Compared with WUW, WMW are more likely to have military experience and live on their farm. Also, they are less likely than WUW to be hired managers and be retired. There are not statistical differences between WMW and WUW on the probability of having farming as their main occupation.

WMW farmers are less likely to have military experience than MMW. However, when we compare farmers 1 and farmers 2, the previous result only holds for farmer 1 since WMW farmer 2 is more likely to have military experience than MMW farmer 2. Also, WMW are more prone than MMW to be hired managers and be retired. Further, WMW are less likely than MMW to live on the farm and have farming as their main occupation (Table 6).

Turning to farm characteristics, Table 7 presents the chi-square test results of comparing WMW farms to WUW and MMW farms. Compared to WUW, WMW are less likely to farm in the top four most rural county codes (RUCC 6, 7, 8, and 9) and more likely than WUW to farm in two of the most urban county codes (RUCC 2 and 3). The same trend holds when comparing WMW to MMW – WMW are less likely to farm in highly rural counties and more likely to farm in highly urban counties.

Looking at production, WMW are more likely than WUW to produce vegetables, bees, hay, wood, cattle, pigs, and poultry, and less likely to produce horses/equines. WMW and WUW are equally likely to have any organic land and to be certified, exempt, or other. WMW are more likely to practice intensive grazing, produce value-added products, and grow crops for human consumption.

WMW-run farms are more likely than MMW-run farms to produce vegetables, sheep, bees, poultry, equines, and other livestock, and less likely to produce hay and cattle. Also, WMW farms have a greater chance than MMW farms of having any type of organic production, and especially organic production deemed exempt, or 'other'. WMW are also more likely to practice intensive grazing and sell value-added products while being less likely to grow products intended for human consumption.

Table 5. Chi-square test for farmer characteristics WMW vs. WUW and WMW vs. MMW.

	WMW farmers 1 and 2 (number of farmers = 7,100)		WUW farmers 1 and 2 (number of farmers = 20,188)			MMW farmers 1 and 2 (number of farmers = 1,502,844)		
Variable	Freq	Percent	Freq	Percent	Pr	Freq	Percent	Pr
Nonwhite	363	5.11	1,798	8.91	0.000	44,509	2.96	0.000
Hispanic	311	4.38	616	3.05	0.000	47,130	3.14	0.000
Military	650	9.15	569	2.82	0.000	185,821	12.36	0.000
Hired manager	169	2.38	913	4.52	0.000	27,650	1.84	0.001
Farming is main occupation	2478	34.9	7,183	35.58	0.303	542,732	36.11	0.034
Lives on farm	5870	82.68	12,248	60.67	0.000	1,287,777	85.69	0.000
Retired	818	11.52	3,435	17.02	0.000	145,744	9.70	0.000
	WMW farmer 1 (number of farmers = 3,550)		WUW farmer 1 (number of farmers = 10,094)			MMW farmer 1 (number of farmers = 751,422)		
Variable	Freq	Percent	Freq	Percent	Pr	Freq	Percent	Pr
Nonwhite	167	4.70	900	8.92	0.000	21,309	2.84	0.000
Hispanic	142	4.00	283	2.80	0.000	22,803	3.03	0.001
Military	406	11.44	360	3.57	0.000	158,199	21.05	0.000
Hired manager	80	2.25	330	3.27	0.002	13,710	1.82	0.057
Farming is main occupation	1367	38.51	4,026	39.89	0.149	309,939	41.25	0.001
Lives on farm	2935	82.68	6,594	65.33	0.000	644,658	85.79	0.000
Retired	405	11.41	1,948	19.30	0.000	69,322	9.23	0.000
	WMW Farmer 2 (number of farmers = 3,550)		\WUW Farmer 2 (number of farmers = 10,094)			MMW Farmer 2 (number of farmers = 751,422)		
Variable	Freq	Percent	Freq	Percent	Pr	Freq	Percent	Pr
Nonwhite	196	5.52	898	8.90	0.000	23,200	3.09	0.000
Hispanic	169	4.76	333	3.30	0.000	24,327	3.24	0.000
Military	244	6.87	209	2.07	0.000	27,622	3.68	0.000
Hired manager	89	2.51	583	5.78	0.000	13,940	1.86	0.004
Farming is main occupation	1111	31.3	3,157	31.28	0.983	232,793	30.98	0.685
Lives on farm	2935	82.68	5,654	56.01	0.000	643,119	85.59	0.000
Retired	413	11.63	1,487	14.73	0.000	76,422	10.17	0.006

Table 6. Chi-square test for farm characteristics WMW vs. WUW and WMW vs. MMW.

	WMW Farms (number of farms = 3,550)			WUW farms (number of farms = 10,094)				MMW farms (number of farms = 751,422)			
Variable	Freq	*n*	Percent	Freq	*n*	Percent	Pr	Freq	*n*	Percent	Pr
Rural urban codes		3,550			10,094		0.000		751,411		0.000
(Most urban) 1	713		20.08	2,105		20.85		121,781		16.21	
2	690		19.44	1,706		16.90		122,991		16.37	
3	539		15.18	1,261		12.49		96,852		12.89	
4	355		10.00	924		9.15		66,728		8.88	
5	159		4.48	312		3.09		24,261		3.23	
6	535		15.07	1,759		17.43		153,362		20.41	
7	274		7.72	1,017		10.08		81,990		10.91	
8	94		2.65	391		3.87		32,925		4.38	
(Most rural) 9	191		5.38	619		6.13		50,479		6.72	
Products											
Vegetables	271	3,181	8.52	463	8,602	5.38	0.000	29,845	630,482	4.73	0.000
Sheep	784	3,175	24.69	2,019	8,666	23.30	0.114	103,585	632,663	16.37	0.000
Bees	248	3,080	8.05	340	7,983	4.26	0.000	32,253	623,963	5.17	0.000
Hay	1,056	3,372	31.32	2,322	9,355	24.82	0.000	297,684	716,296	41.56	0.000
Wood	62	3,107	2.00	69	8,504	0.81	0.000	10,817	622,319	1.74	0.274
Aquaculture	6	2,967	0.20	23	8,272	0.28	0.485	1,262	594,217	0.21	0.905
Cattle	1,142	3,550	32.17	2,835	10,094	28.09	0.000	345,853	751,422	46.03	0.000
Pigs	208	3,147	6.61	341	8,590	3.97	0.000	38,154	629,139	6.06	0.201
Poultry	1,000	3,106	32.20	1,885	8,185	23.03	0.000	146,290	630,396	23.21	0.000
Other livestock	190	2,909	6.53	417	7,383	5.65	0.087	18,112	562,104	3.22	0.000
Horses/Equines	1,327	3,130	42.40	4,079	4,079	100.00	0.001	236,404	660,476	35.79	0.000
Any organic	97	3,265	2.97	227	9,077	2.50	0.150	11,217	699,253	1.60	0.000
Certified organic	37	97	38.14	73	227	32.16	0.067	6,367	11,217	56.76	0.206
Exempt organic	18	97	18.56	51	227	22.47	0.990	1,407	11,217	12.54	0.000
Transitioning organic	D	97	D	D	227	D	D	1,452	11,217	12.94	0.063
Other organic	42	97	43.30	98	227	43.17	0.280	2,868	11,217	25.57	0.000
Intensive grazing	610	3,096	19.70	1,412	8,641	16.34	0.000	118,530	662,848	17.88	0.008
Value added	187	3,161	5.92	320	8,783	3.64	0.000	16,218	668,706	2.43	0.000
Human consumption	1,864	3,405	54.74	4,161	9,312	44.68	0	421,422	720,183	58.52	0.000

Table 7. Chi-square test for farmer characteristics MMM vs. WMW.

	MMM farmers 1 and 2 (number of farmers = 16,604)		WMW farmers 1 and 2 (number of farmers 7,100)		
Variable	Freq	Percent	Freq	Percent	Pr.
Nonwhite	654	3.94	363	5.11	0.000
Hispanic	652	3.93	311	4.38	0.105
Military	2,824	17.01	650	9.15	0.000
Hired manager	1,131	6.81	169	2.38	0.000
Farming is main occupation	8,077	48.64	2,478	34.90	0.000
Lives on farm	11,676	70.32	5,870	82.68	0.000
Retired	1,711	10.3	818	11.52	0.005
	MMM Farmer 1 (number of farmers = 8,302)		WMW Farmer 1 (number of farmers = 3,550)		
Variable	Freq	Percent	Freq	Percent	Pr.
Nonwhite	308	3.71	167	4.70	0.011
Hispanic	295	3.55	142	4.00	0.237
Military	1,915	23.07	406	11.44	0.000
Hired manager	509	6.13	80	2.25	0.000
Farming is main occupation	4,326	52.11	1,367	38.51	0.000
Lives on farm	6,140	73.96	2,935	82.68	0.000
Retired	925	11.14	405	11.41	0.674
	MMM farmer 2 (number of farmers = 8,302)		WMW farmer 2 (number of farmers = 3,550)		
Variable	Freq	Percent	Freq	Percent	Pr.
Nonwhite	346	4.17	196	5.52	0.001
Hispanic	357	4.30	169	4.76	0.265
Military	909	10.95	244	6.87	0.000
Hired manager	622	7.49	89	2.51	0.000
Farming is main occupation	3,751	45.18	1.111	31.30	0.000
Lives on farm	5,536	66.68	2935	82.68	0.000
Retired	786	9.47	413	11.63	0.000

Men Married to Men and Women Married to Women

We directly compared MMM and WMW to test for differences between queer men and queer women farmers (Table 7). MMM are less likely than WMW to be nonwhite, live on their farms, and be retired. However, MMM are more likely to have military experience, be a hired manager, and have farming as their main occupation.

MMM farm more frequently in the top four most rural areas, and WMW farm more frequently in three of the most urban areas. Looking at production, MMM are more likely than WMW to produce hay, aquaculture, and cattle, and less likely to produce vegetables, sheep, bees, poultry, horses/equines, and other livestock. MMM are also less likely to have any organic production. Of those MMM who did have organic production, they are less likely to be exempt or 'other' compared to WMW. Finally, MMM are less likely to practice intensive grazing and have value-added products, and more likely to grow products intended for human consumption (Table 8).

Discussion

Out of all two-producer farms, 0.9 percent are run by MMM and about 0.4% are run by WMW. Given that this is a severe underestimation, it is evidence of a substantial number of queer farmers in the US, and particularly queer men. However, we must also consider that, given the documented trend of lesbians farming collectively (Anahita

Table 8. Chi-square test for farm characteristics MMM vs. WMW.

	MMM farms (number of farms = 8,302)			WMW farms (number of farms = 3,550)			
Variable	Freq	n	Percent	Freq	n	Percent	Pr.
Rural urban codes		8,301			3,550		0.000
(Most urban) 1	1,215		14.64	713		20.08	
2	1,391		16.75	690		19.44	
3	1020		12.29	539		15.18	
4	777		9.36	355		10.00	
5	274		3.30	159		4.48	
6	1,677		20.20	535		15.07	
7	895		10.78	274		7.72	
8	428		5.16	94		2.65	
(Most rural) 9	615		7.41	191		5.38	
Products							
Vegetables	387	6,516	4.66	271	3,181	8.52	0.000
Sheep	864	6,532	10.41	784	3,175	24.69	0.000
Bees	313	6,396	3.77	248	3,080	8.05	0.000
Hay	3,600	7,711	43.36	1,056	3,372	31.32	0.000
Wood	117	6,340	1.41	62	3,107	2.00	0.615
Aquaculture	29	5,922	0.35	6	2,967	0.20	0.041
Cattle	3,910	8,302	47.1	1,142	3,550	32.17	0.000
Pigs	388	6,495	4.67	208	3,147	6.61	0.224
Poultry	1,209	6,521	14.56	1,000	3,106	32.20	0.000
Other livestock	180	5,455	2.17	190	2,909	6.53	0.000
Horses/Equines	1,898	6,765	22.86	1,327	3,130	42.40	0.000
Any organic	162	7,320	1.95	97	3,265	2.97	0.020
Certified organic	120	162	74.07	37	97	38.14	0.079
Exempt organic	6	162	3.7	18	97	18.56	0.000
Transitioning organic	18	162	11.11	D	97	D	NA
Other organic	34	162	20.99	42	97	43.30	0.000
Intensive grazing	1,144	6,686	13.78	610	3,096	19.70	0.002
Value added	161	6,784	1.94	187	3,161	5.92	0.000
Human consumption	4,752	7,828	57.24	1,864	3,405	54.74	0.000

2009; Leslie 2019; Sbicca 2012; Wypler 2019), our coding process likely excluded a greater proportion of WMW than it did MMM. Nonetheless, our data allows us to identify some significant trends showing differences between MMM, WMW, MUM, WUW, and MMW. In general, although most of the producers in our sample were white and non-Hispanic, queer farmers were more likely to be a racial or ethnic minority than other farmers. This is an especially important finding as it demonstrates the intersectional identities of queer farmers in multiple marginalized groups—specifically sexual, ethnic, and racial minorities (see Leslie, Wypler, and Bell 2019; Smith 2019).

MMM had some advantages over MMW and WMW. They were more likely than these groups to be a hired manager, have farming as their main occupation, and practice types of organic farming that are more difficult to obtain bureaucratically. One of the most distinct differences between MMM and other groups was that MMM lived off-farm at a much higher rate. While a greater raw percentage of MMM farmed in urban counties, they were also more likely to farm in highly rural areas than MMW and WMW. This supports research finding that gay men, despite stereotypes, do value and live in rural areas (Annes and Redlin 2012a; Annes and Redlin 2012b; MAP 2019). However it is also possible, as Leslie (2019) found in New England, that gay men farmers lived in urban areas and commuted to their rural farm in order to avoid the

perceived homophobia of rural areas; this is especially possible as MMM were less likely to live on their farm than other groups.

MMM farms tended to be less diverse in their production than MMW and WMW, with fewer producing vegetables, sheep, poultry, and equines. They were, however, more likely to have any organic production and especially certified organic production. These trends may indicate that MMM have more power than MMW and WMW, as they hold high power roles on farm, show little evidence of being driven to urban areas by discrimination, are able to concentrate on one or two main products, and can obtain the bureaucracy-heavy organic certification.

However, many of the trends identified above are reversed when comparing MMM to MUM. In particular, MMM are less likely to be a hired manager or having farming as their main occupation, and more likely to live on farm or be retired. They are more likely to live in the top two urban coded counties, and less likely to live in the most rural coded counties. MMM are also more diverse in their production compared to MUM—they are more likely to produce vegetables, sheep, bees, wood, pigs, poultry, equines, and other livestock. They are more likely to have organic production, but less likely to be certified. In short, comparisons between MMM and MUM look surprisingly similar to comparisons between WMW and other two-producer groups. While WMW may have access to fewer resources and less support due to their gender, as Hoffelmeyer and Sexsmith (2019) found, it appears MMM have some advantages due to their gender but some disadvantages due to their sexuality.

Turning to WMW, they had certain indicators of disadvantages compared to MMW and MMM. They were less likely to be hired managers and have farming as their main occupation, and more likely to produce a variety of crops and livestock and opposed to relying on monocultures as many large profitable farms do. In contrast to research showing that lesbian women have an easier time being perceived as masculine and accepted in rural areas than gay men (Kazyak 2012), WMW were far more likely to farm in urban areas than all other groups. Although they were more likely to have any organic agriculture, they were less likely to have the bureaucratically difficult organic certification and more likely to have 'other' organic agriculture that involves no USDA oversight. WMW were more likely to practice intensive grazing and produce value-added products. While some of these trends seem to indicate that WMW farm more sustainably than other groups (more diversity of products, value-added sales, organic agriculture, and intensive grazing), it is equally possible that WMW farm in these ways due to a lack of power and access to the resources and support needed to farm conventionally.

When comparing WMW to WUW, differences in main occupation and organic agriculture are no longer present. WMW are still less likely to be a hired manager, and more likely to live on their farm and farm in highly urban areas. They produce a greater variety of crops and animals and are more likely to practice intensive grazing. This suggests that WMW are different from WUW—particularly in regard to farming location—but also that these two groups are more similar than MMM and MUM. Gender, then, may play a more important role than sexuality for many women involved in farming. This reinforces one of the main findings of Hoffelmeyer and Sexsmith (2019)—that queer women's gender, rather than their sexuality, resulted in their exclusion from agricultural resources.

Conclusions

While our identification of queer farmers in the US has limitations, our identification of at least 1.2% of two-producer farms as queer-run challenges the heterosexual familial basis of US farms, demonstrating that queer farmers do exist, and likely in large numbers. These queer farmers are also more likely than straight farmers to be Hispanic and/or nonwhite. Additionally, and despite stereotypes, some queer farmers do farm in very rural locations.

In particular, we find that MMM farmers are just as likely—and often more likely—than other groups to farm in rural areas. This supports studies showing that gay men do in fact feel connected to, and live in, rural places (Annes and Redlin 2012a, 2012b; MAP 2019). However, we also find that MMM tend to farm in more urban areas when compared *specifically* with MUM, supporting studies that demonstrate the difficulties gay men face in rural places (Bell 2009; Brewer 2018; Kazyak 2012; Leslie 2019; Wienke and Hill 2013). This reflects the overall trend in our data showing that gay men's sexuality does not eliminate the advantages of their gender but does cause significant differences between them and straight men.

WMW, in contrast, appear to be doubly impacted by their gender and sexuality. They are far more likely to farm in highly urban areas, indicating they may experience discrimination and/or discomfort farming in rural areas (though of course some still do). WMW were also more likely to have characteristics that are associated with both alternative agriculture and a lack of access to farming resources and support. While they differed in some ways from WUW, these differences were less pronounced than those between gay and straight men. This suggests, in line with Hoffelmeyer and Sexsmith's findings (2019), that WMW's gender is highly impactful, while their sexuality may be slightly less important (except in determining farm location).

While our data shows that both MMM and WMW farm in significantly different—and sometimes more alternative—ways than non-same-sex-married farmers, it is difficult to say whether this reflects the transformatory and sustainable potential of queer farmers. Many of our indicators of sustainability, such as crop diversity, product differentiation, and organic production, may be equally indicative of a lack of the resources that would enable farmers to farm conventionally. Therefore, while our data can support other research linking queer farmers to sustainable farming practices (ex. Leslie 2019, Edward 2018), further research is necessary to determine the reasons queer farmers engage in these practices.

While our exploration demonstrates support for various theories and studies related to queer farmers, the most definitive result is the need for more research on this population. The data we analyzed establishes that queer farmers exist in relatively substantial numbers, and furthermore differ from non-queer farmers in statistically significant ways. Beyond the obvious call for more and better data, these findings back the need for programing and support specifically tailored and targeted to queer farmers and queer *women* farmers in particular. This is further emphasized by queer farmers' greater likelihood of being nonwhite and Hispanic—research and outreach at the intersection of sexuality, ethnicity, and race will be key for exploring the multiplicative effects of these identities (Leslie 2019).

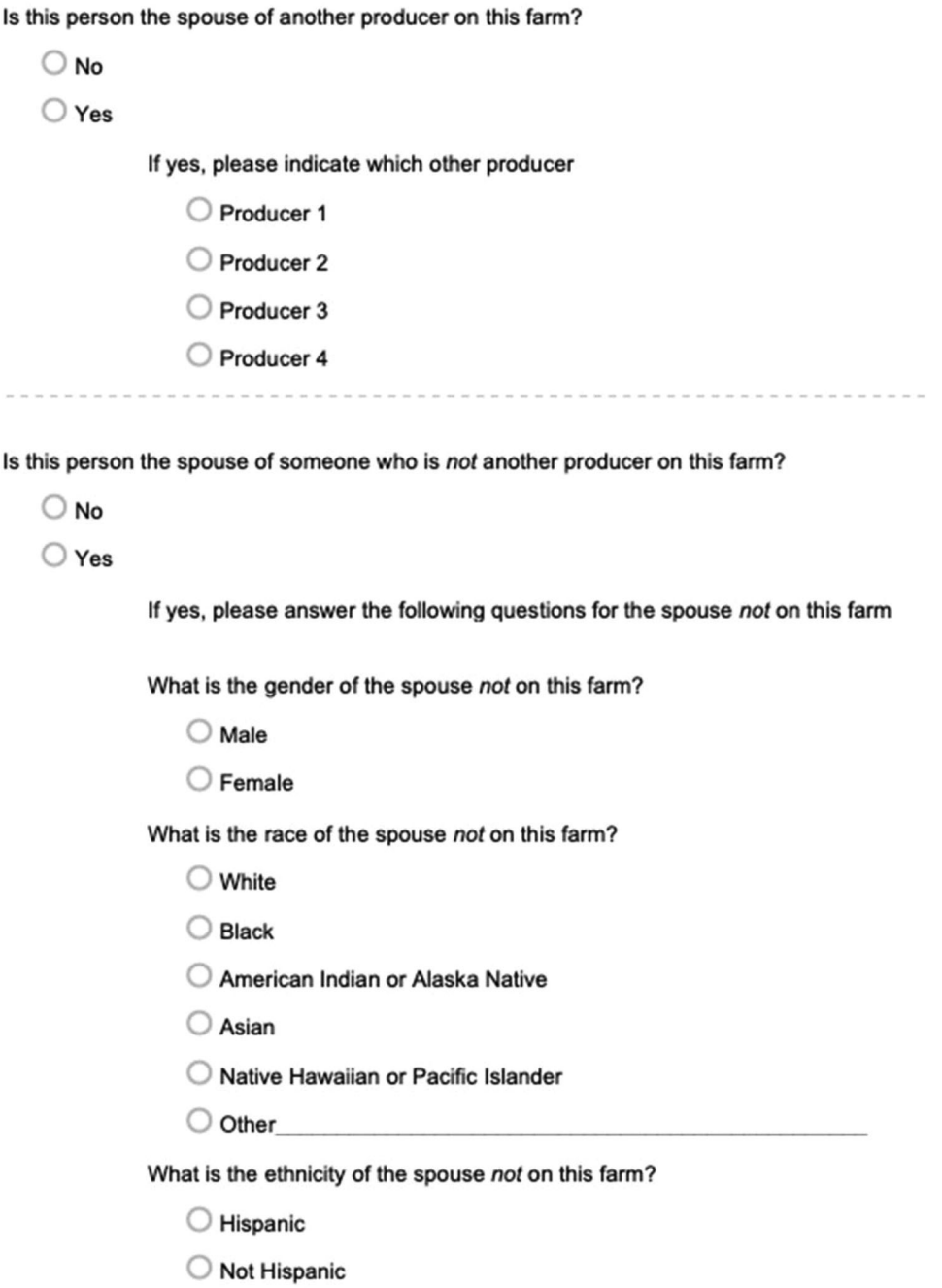

Figure 1. Suggested changes to USDA census of agriculture marriage question.

Quantitative data on queer farmers is out there and needs to be accessed by researchers. We have provided a detailed description of our coding process for the 2017 Census of Agriculture and encourage interested parties to contact the corresponding author with questions. Unfortunately, as same-sex marriage only became nationally legal in 2015, the 2012 and earlier USDA Censuses of Agriculture are poor candidates for this

kind of coding. The 2015–2019 Agricultural Resource Management Surveys, however, have a similar marriage questions and may be good contenders for future research.

Furthermore, we echo Leslie, Wypler, and Bell's (2019) call for the USDA Census of Agriculture to include questions on sexuality and gender identity. The Census of Agriculture has changed before, adding a question on gender in 1978, the ability to list multiple producers in 2002, and the question on marital status in 2012 (Pilgeram et al. 2020). We suggest that the Census expand their question on marriage that indicate (1) which producers are specifically married to each other and (2) if the producer is married to someone who is *not* a producer on their same farm, as well as collecting data on this person's gender, race, and ethnicity.

We suggest specific question wording in Figure 1. This would be a small, easy-to-implement change that would fix several current issues, including the need to limit analysis to two-producer farms and the inability to determine if a farmer is married to someone off-farm. Beyond increasing the ability to identify same-sex marriages, the addition of these questions would greatly benefit anyone looking to study the importance of other kinds of partnerships such as opposite-sex marriages, farmer/non-farmer marriages, and more. The importance of marriage to farming has been established (Pilgeram and Amos 2015; Sachs et al. 2016)—expanding the ability to analyze such relationships in USDA Census of Agriculture data could greatly increase our understanding of the changing landscape of social relationships in agriculture.

Notes

1. We use 'queer' here and throughout to be consistent with the prevailing literature.
2. We cannot know how these individuals identify and therefore avoid using the labels 'gay' and 'lesbian'.

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