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The Smarterfarmer Project

Farms and the Digital Frontier:
Mapping the Digital Landscape of Farming in Denmark

The SmarterFarmer sample

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The SmarterFarmer Sample

In the following section, we describe the sample based on key characteristics and compare it to the overall population of Danish arable and livestock farms to contextualize our findings.

1. Farm Type

Of the surveyed farms, 45,3% are primarily crop farms, 27,3% are primarily livestock farms, and the remaining 27,3 % are mixed operations with about equal crop- and livestock production (see Figure 1). This means that nearly half of the sample focuses mainly on arable farming, while the other half includes farms where livestock play a more prominent role.

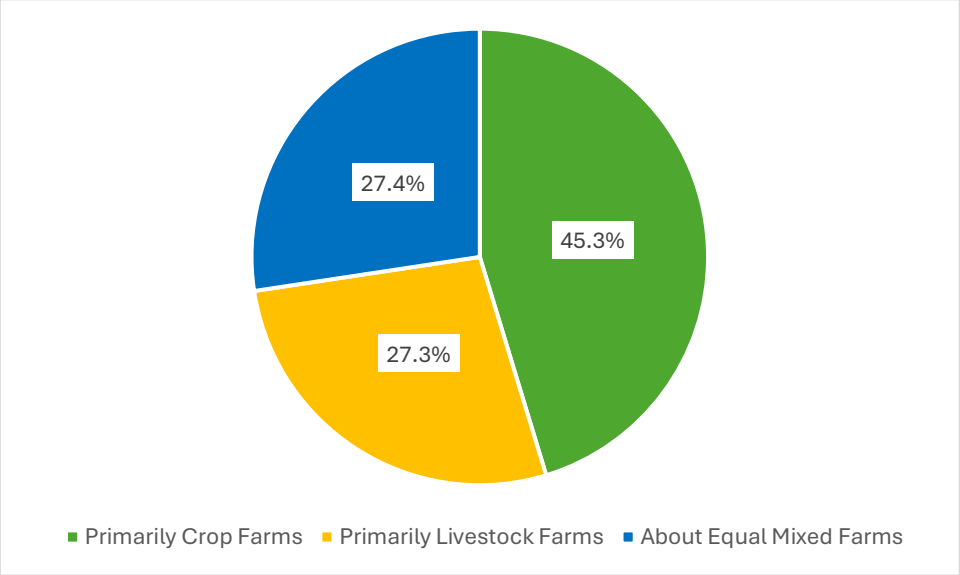


Figure 1: Farm Type Distribution among surveyed Farms (self-identified)

Among the primarily livestock and about equal mixed farms, almost half of the surveyed farms are cattle farms and close to one-third are pig farms (see Figure 2). The smallest group among the livestock-holding farms are poultry farms, with only about 4%. The remaining farms have a mix of animals.

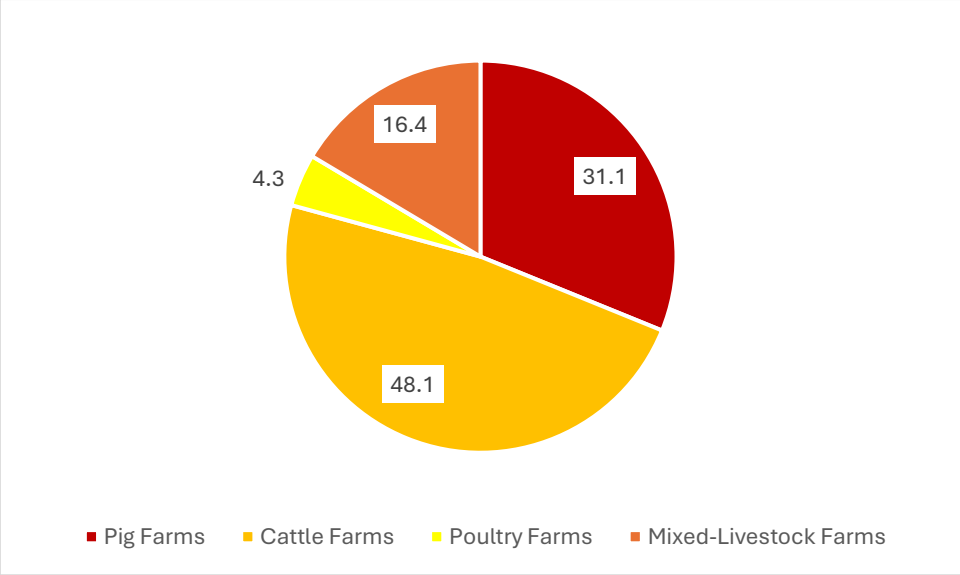


Figure 2: Animal Distribution among Livestock-holding Farms

When comparing our sample to the overall population in terms of farm type and livestock composition, we find that arable farms are underrepresented by approximately 10 percentage points, while livestock-oriented farms are overrepresented by a similar margin (see Table 1). However, while the proportions of cattle, poultry, and mixed farms in the sample, as categorized by Danmark Statistik, closely reflect those in the population, pig farms are notably overrepresented in our sample by 7.2 percentage points.

Since arable farms generally have lower incomes, and pig farms are more common in the high-income segment (with only about a quarter of arable farms in the sample falling into the top 25% income group, compared to nearly 90% of pig farms), the emphasis on higher-income farms during the sampling process likely contributed to this skew in farm type representation. To address this, we control for farm type in our statistical analyses. Still, it is our assessment that our SmarterFarmer sample works as a reasonably useful proxy for the general Danish population of farms.

	Sample Distribution	Population Distribution	% Difference
Arable Farms	41,1%	51,2%	-10,1%
Pig Farms	18,4%	11,2%	7,2%
Cattle Farms	28,3%	27,9%	0,4%
Poultry Farms	2,5%	1,6%	1,0%
Mixed Farms	9,7%	8,1%	1,6%

Table 1: Comparison of Farm Type Distribution between Population and SmarterFarmer Sample (Danmark Statistik categorization)

2. Farm Location

In terms of location, more than half of the surveyed farms are situated in Southern Denmark and Central Jutland (see Figure 3). The smallest group of respondents comes from the Capital Region (Hovedstaden), while the remaining farms are almost evenly split between North Jutland and Zealand.

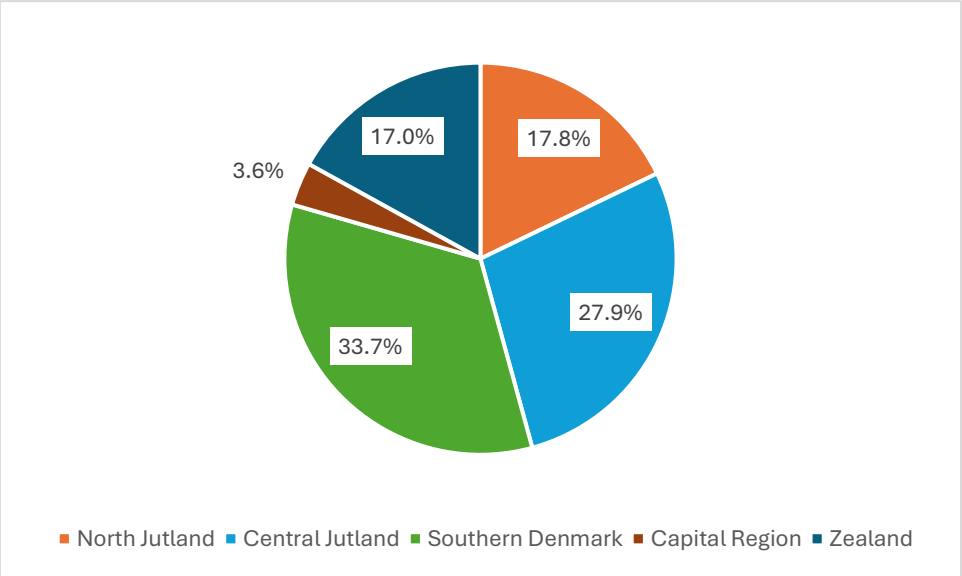


Figure 3: Farm Location Distribution among surveyed Farms

When comparing the sample to the overall population, the regional distribution is largely consistent, with only minor deviations (see Table 2). The most notable differences include a slight underrepresentation of farms from Central Jutland and the Capital Region, and a slight overrepresentation of farms from Southern Denmark.

	Sample Distribution	Population Distribution	% Difference
North Jutland	17,8%	18,3%	-0,5%
Central Jutland	27,9%	29,9%	-2,0%
Southern Denmark	33,7%	29,9%	3,8%
Capital Region	3,6%	5,0%	-1,4%
Zealand	17,0%	17,0%	0,0%

Table 2: Comparison of Farm Location Distribution between Population and SmarterFarmer Sample

In terms of farm type distribution across the regions, most primarily arable farms in the sample are located in Southern Denmark (~30%), followed closely by Zealand (~27%) and Central Jutland (~25%). Among primarily livestock farms, the largest share is also found in Southern Denmark

(~40%), while about half are located across North and Central Jutland. The smallest share of livestock farms is found on Zealand (~10%). The distribution of mixed farms follows a similar regional pattern, with concentrations in Southern Denmark and Jutland, and fewer located in the eastern regions.

For the purpose of our analysis, we combined farms from around the Capital Region with farms from Zealand.

3. Cultivated Land

About 63% of the farms in the sample cultivate at least 100 hectares, with one in four cultivating 300 hectares or more (see Figure 4). In contrast, smaller farms (those with less than 50 hectares) make up around 16% of the sample, and 4% of farms have no cultivated land at all. This distribution reflects the study's sampling and exclusion criteria, which focused on commercially active farms and placed greater emphasis on operations with higher turnover. The average farm size in Denmark is approximately 80 hectares[1].

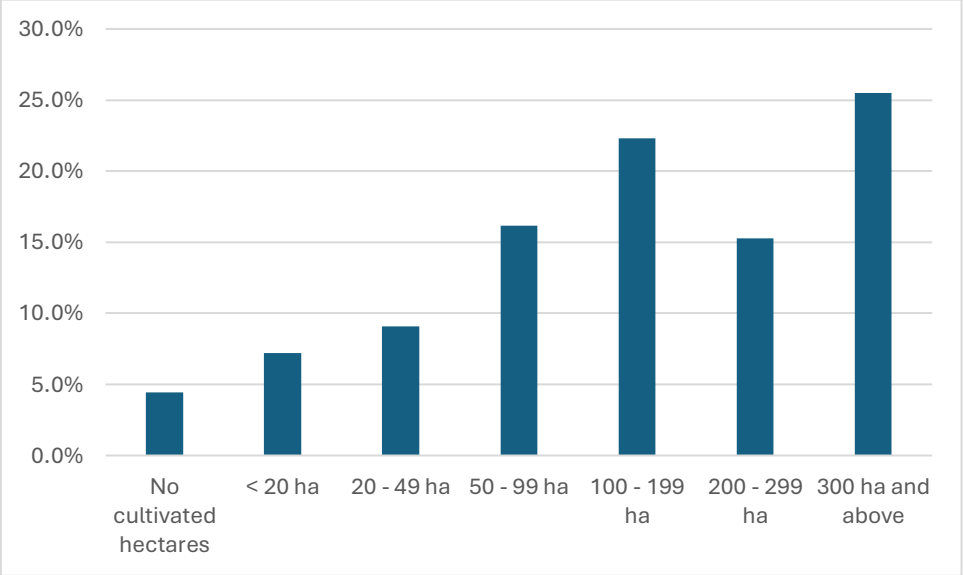


Figure 4: Size Distribution in terms of Cultivated Hectares among the surveyed Farms

This emphasis on larger operations becomes evident when comparing the sample distribution to that of the overall population (see Table 3). The share of farms that are about average-sized or smaller is 19 percentage points lower in the sample than in the population. Farms in the 100–199 hectares range are equally represented in both. Meanwhile, farms with 200 hectares or more are more prominent in the sample, with a 17 percentage point increase compared to their share in

[1] Danish Agriculture & Food Council, 2023

the population (12% more for farms with 300 hectares or more). The proportion of farms without cultivated land remains largely consistent between the sample and the population.

	Sample Distribution	Population Distribution	% Difference
No cultivated hectares	4,4%	3,3%	1,2%
< 20 ha	7,2%	17,0%	-9,7%
20 - 49 ha	9,1%	14,0%	-4,9%
50 - 99 ha	16,2%	20,7%	-4,6%
100 - 199 ha	22,3%	21,6%	0,7%
200 - 299 ha	15,3%	10,2%	5,1%
300 ha and above	25,5%	13,2%	12,2%

Table 3: Comparison of Hectare Distribution between Population and SmarterFarmer Sample

4. Number of Animals

Regarding the number of animals, specifically pigs and/or cattle, the sample reveals the following distribution (Figure 5): Among cattle farms, nearly half have between 100 and 500 animals. Approximately 12% have fewer than 100, while a similar share has more than 1,000 animals.

In contrast, having around 1,000 animals marks the lower end of the scale for pig farms. The majority of pig farms (57%) operate with 5,000 or more animals, reflecting the typically larger scale of pig production.

Mixed-animal farms tend to fall into two groups: either relatively small operations, with 30% having fewer than 100 animals, or larger ones, with 48% having more than 1,000 animals.

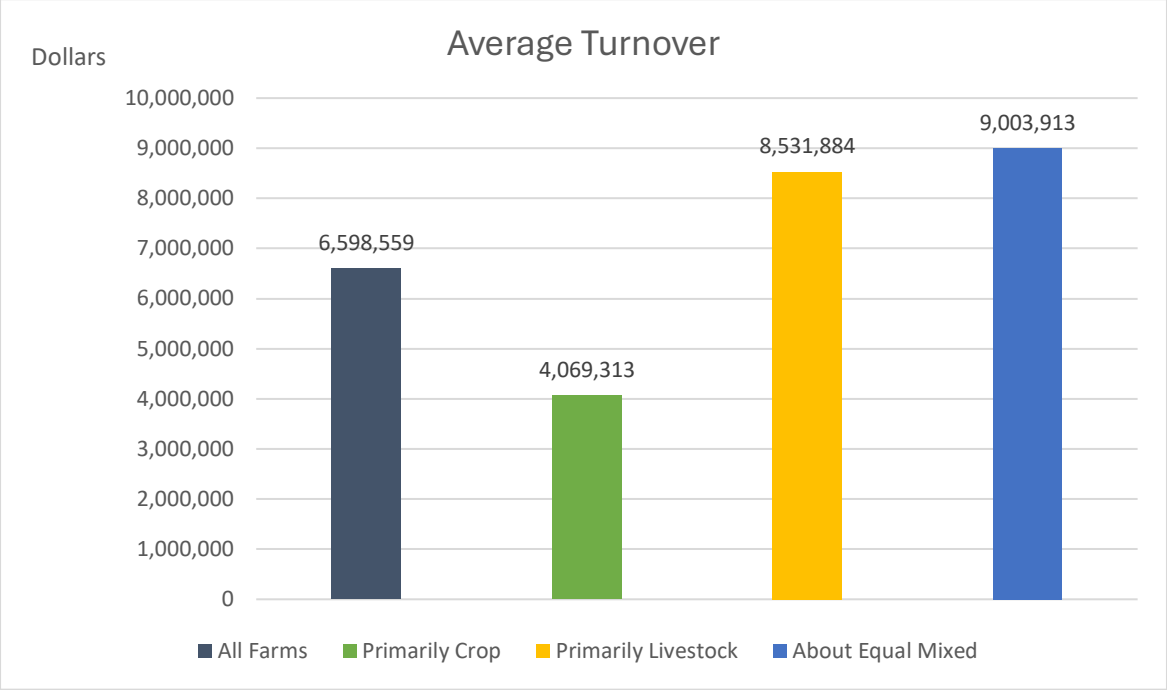
A small share of primarily arable farms is also keeping pigs or cattle (about 12%). Among these, 83% have fewer than 100 animals, while the remaining farms have more.

Type	Under 1000		1000 - 4999	5000 or more
Pig farms	4%		39%	57%
	Under 100	100-499	500 - 999	1000 or more
Cattle farms	12%	48%	29%	12%
Mixed-animal farms	30%	13%	8%	48%
	Under 100	Over 100		
Arable farms	83%	17%		

Figure 5: Number of Animals by Farm Type Among Livestock-Holding Farms

5. Economic Size

The average annual turnover across all farms (based on the 2015–2022 average) was approximately 6.5 million DKK[2]. Livestock farms and mixed farms showed similar average turnover levels of around 9 million DKK, while primarily arable farms reported a lower average turnover of about 4 million DKK.



To compare economic size across the different production types, we primarily relied on the average total standard output (SO)[3] using data from 2020 and 2023 to account for year-to-year fluctuations. The standard output of an agricultural product is defined as the average monetary value of that product at farm-gate prices in Euros. It excludes direct payments, value-added tax (VAT), and product-specific taxes. A farm's overall economic size is determined by the total value of its standard output. The average standard output across the sample was about 835,000 euros (Figure 6). Primarily arable farms averaged about 428,000 euros, while both livestock and mixed farms showed considerably higher outputs of approximately 1.2 million euros.

[2] Extreme outliers removed. Turnover values are tax-based estimates.
[3] Jensen & Larsen, 2016

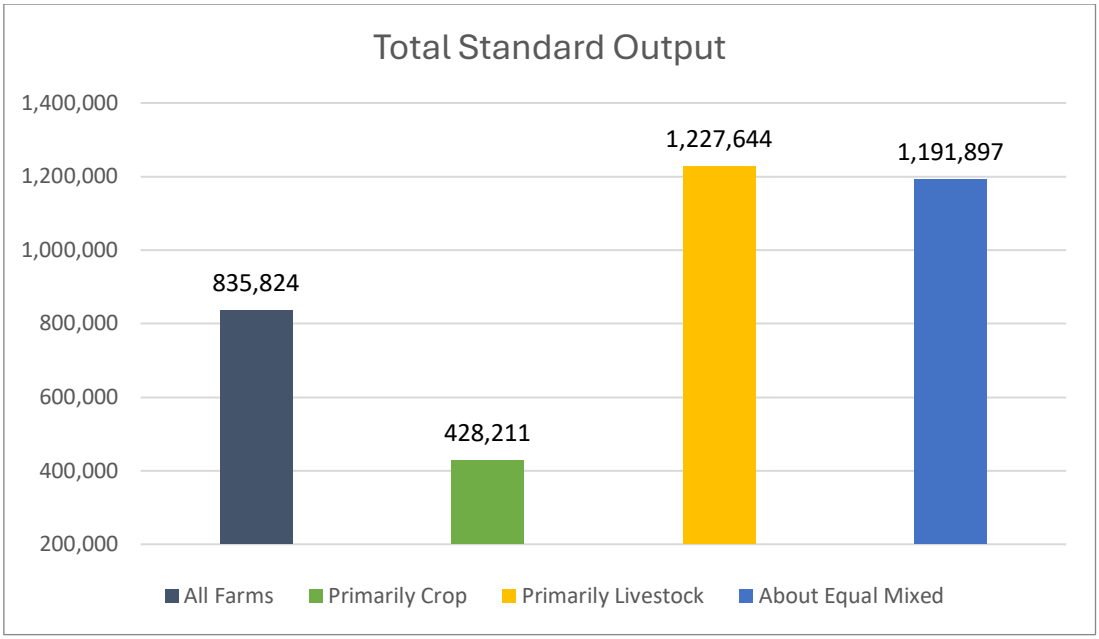


Figure 6: Average Total Standard Output per Farm Type

6. Other Farm-level Characteristics

In terms of workforce, the surveyed farms employed an average of 3.2 full-time workers (based on the average between 2015 and 2022), including the farmer or farm manager[4]. Most farms operated with between 1 and 5.8 individuals. When broken down by farm type, primarily arable farms employed an average of 2.2 people, while livestock farms had a significantly higher average of 4.4. Farms with a roughly equal mix of arable and livestock production averaged 3.9 full-time workers.

[4] Extreme outliers removed.

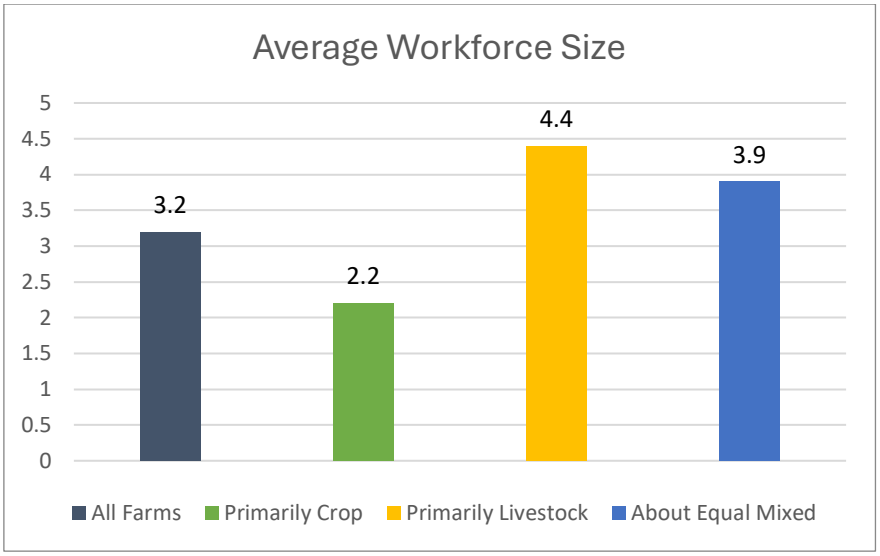


Figure 7: Average Workforce Size per Farm Type

Two thirds (66%) of farms are operated on a full-time basis in terms of registered work hours and one third is part-time (Figure 8).

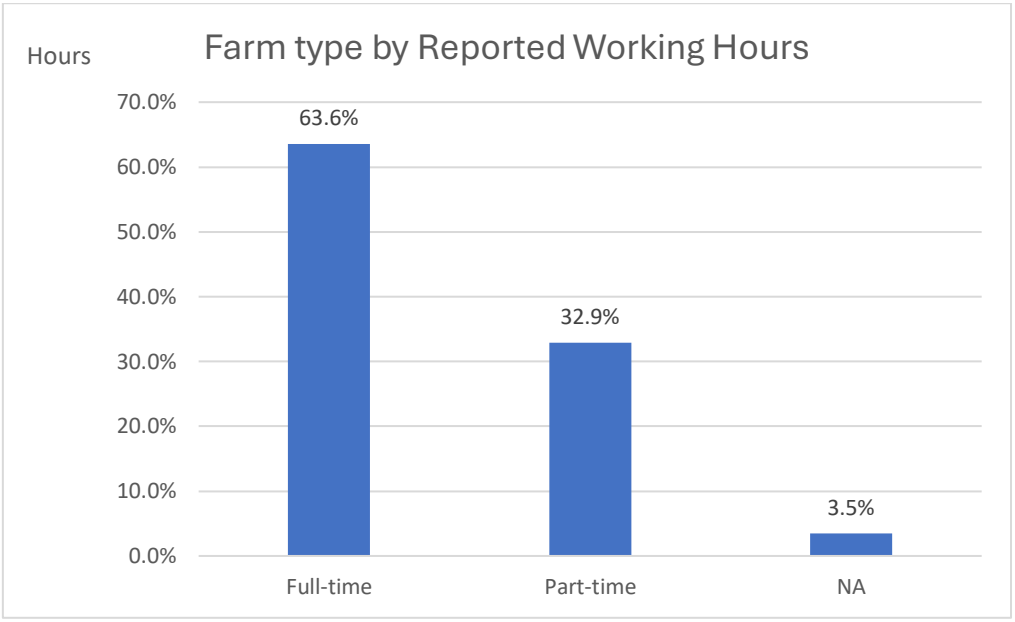


Figure 8: Proportion of Full- vs. Part-Time Farms based on reported Working Hours

7.7% of the surveyed farms are organic farms or farms transitioning to being organic. Of those, 27% are arable farms, 40% are primarily livestock farms, and 33% are about equal mixed productions (Figure 9).

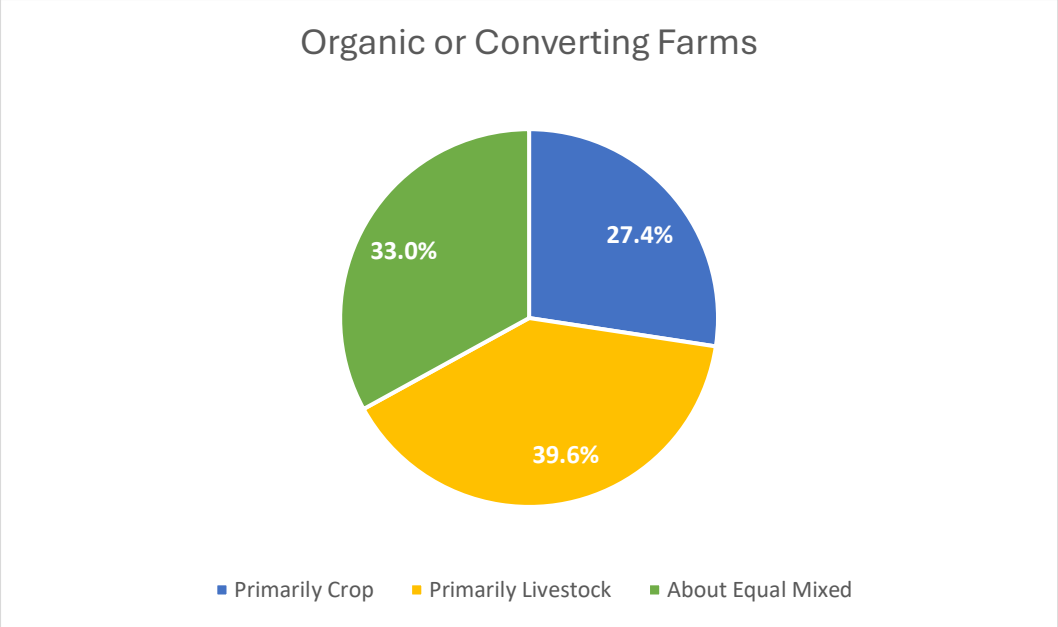


Figure 9: Farm Type Distribution among Organic or Converting Farms

Regarding the legal structure, 89% of farms are sole proprietorship or partnerships, with the rest being limited liability firms or other forms.

7. Farmer and Farm Manager Characteristics

Regarding the characteristics of the farmers and farm managers associated with the surveyed farms, 92% are male (Figure 10).

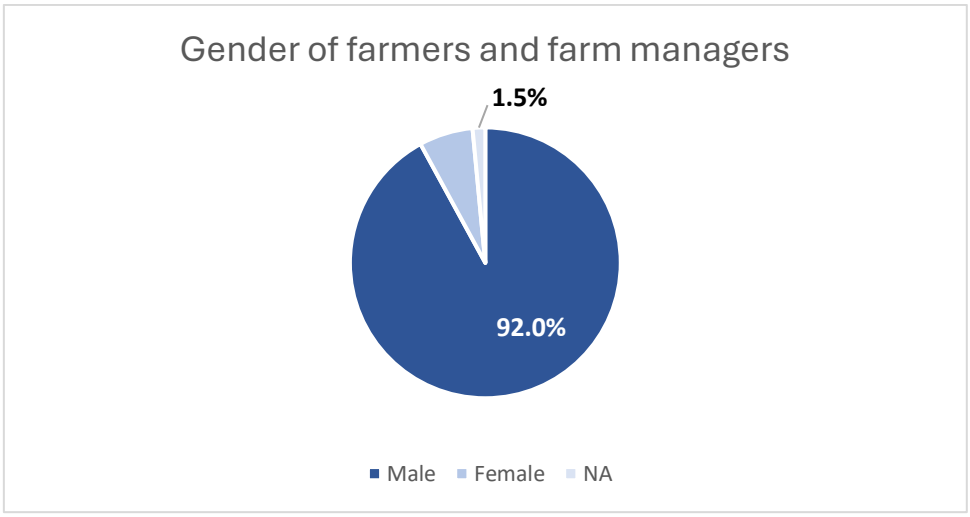


Figure 10: Gender Distribution among matched Farmers and Farm Managers (n = 1522)

The surveyed farms are run by farm managers with an average age of 54 years (Figure 11), with most farmers and farm managers being between 41 and 67 years. Farm managers of primarily arable farms are on average with about 57 years the oldest, followed by farm managers of about equal mixed farms (53 years) and primarily livestock farms (50,5 years).

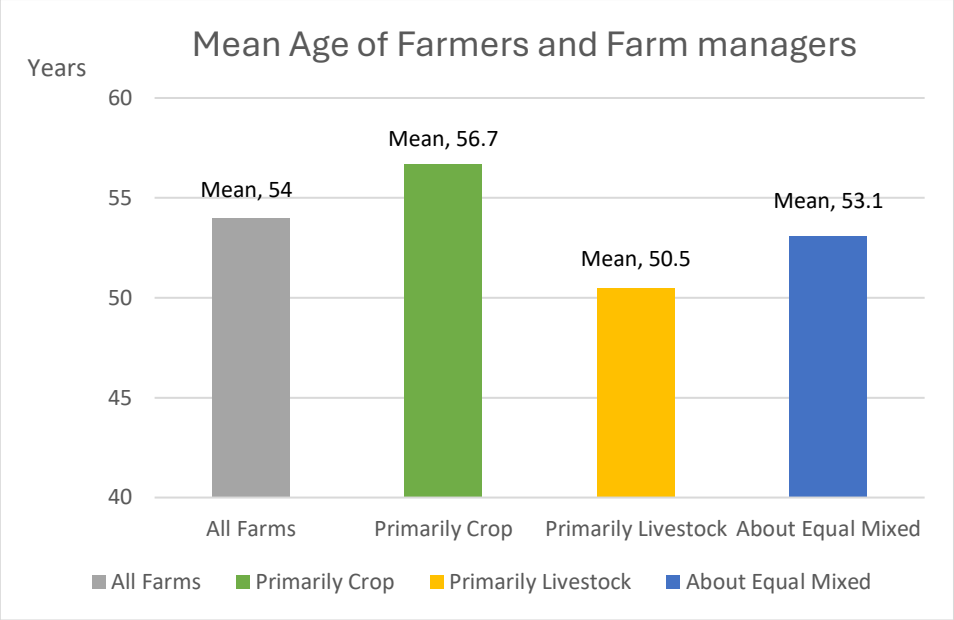


Figure 11: Mean Farmer and Farm Manager Age per Farm Type

Regarding family status, 70% of farmers and farm managers are registered as married, 21% as single, the remaining as divorced or widowed. Over 90% of farmers and farm managers have children.

In terms of education level (Figure 12), the majority of farmers and farm managers had vocational education (*erhvervsfaglige uddannelser*), followed by short-cycle higher education (*korte videregående uddannelser*). Just over 10% reported primary and lower secondary education (*grundskolen*) as their highest completed level. The remaining education categories—upper secondary, medium-cycle, and long-cycle higher education—each accounted for less than 5% of the sample.

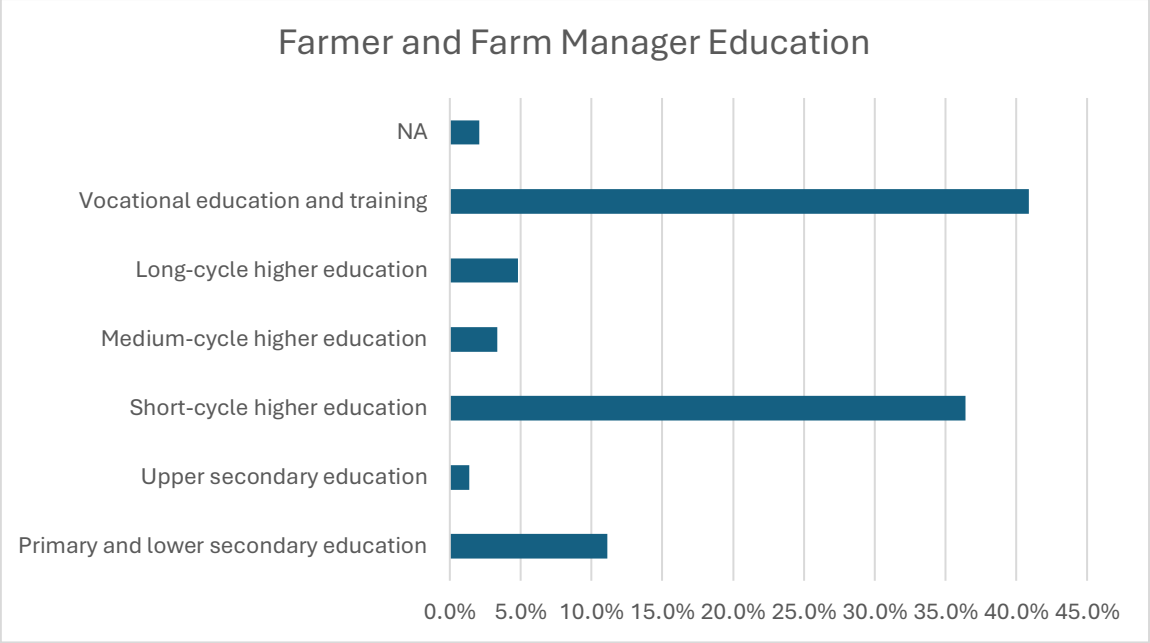


Figure 12: Distribution of highest Education Level among Farmers and Farm Managers