WILD BLUEBERRY COMMISSION OF MAINE

TESTIMONY OF THE WILD BLUEBERRY COMMISSION OF MAINE

January 20, 2026

Re: Support for LD 2094, An Act to Authorize a General Fund Bond Issue to Support Maine's Agricultural and Forestry Sectors

Senator Rotundo, Representative Gattine, and esteemed members of the Committee on Appropriations and Financial Affairs, my name is Eric Venturini, and I am the Executive Director of the Wild Blueberry Commission of Maine. I am also the President of the Agricultural Council of Maine, and an engaged member of an agriculture and forestry stakeholder group that has been meeting regularly for several months to discuss and advocate for a path forward for LD 2094.

Maine's Wild Blueberry Industry

The Wild Blueberry Commission (WBCM) works on behalf of Maine's 512[1] farms who currently grow wild blueberries on approximately 40,000 acres across the state, contributing $361 million dollars to the state's economy annually.[2] Maine is the only state with significant commercial production of wild blueberries, producing nearly 100% of all ***wild blueberries*** in the US.

Three years ago, for the first time, I told the legislature that the wild blueberry industry's economic position, its financial health, had never been worse. That was true, again, last year. It is true again now. Producer field prices have declined by more than 45% in the last 20+ years.[3] Nationally, the cost of

[1] USDA National Agricultural Statistics Service. 2022. Berries: 2022. United States Census of Agriculture.
[2] Camoine Associates. Unpublished Data. Economic and Fiscal Impacts of the Maine Wild Blueberry Industry. Wild Blueberry Association of North America – US, October 2023.
[3] USDA National Agricultural Statistics Service (NASS) average published (processed and fresh) prices, as adjusted by the Producer Price Index commodity data for farm products, to account for inflation. Illustrates commodity price cycle and decline from 2002 to 2022. Analysis by Dr. Aaron Hoshide, University of Maine.
[4] Hoshide, A. K. Unpublished Data. 2025 Estimate of Loss in Maine's Wild Blueberry Industry due to Weather. Wild Blueberry Commission of Maine.

agricultural production has increased more than 25% in just the last 5 years even as prices decline.[4] Wild blueberry farm and business profit margins have been starkly negative for most of our industry for at least the last 3 years. Our own economic analysis found that last year Maine wild blueberry producers' cost of production doubled and we lost an estimated $28M industry wide.[4] Maine's wild blueberry acreage under active management has declined by more than 20% in the last 5 years. These losses are a travesty. As the only State in the country with a tradition of wild blueberry production—a tradition that first started with Wabanaki stewardship thousands of years ago—this is not a trend that we can sit back and watch. To survive, our industry needs emergency relief. We are seeking that federally, and our organization is standing up its own small program to help deliver that short-term relief. Those band-aids, while needed, are not *strategic* investments and will not reverse our long-term trends.

Need for Strategic Investment

How *do* we reverse this trend? With *strategic* investments. In 2022, the Governor's Agricultural Infrastructure Investment Program (AIIP) used a one-time allocation of federal dollars to make 64 awards in agricultural infrastructure totaling $19.3 million. That investment has created examples of profitability and viability, bright spots in ours and in other agricultural sectors. You have already heard from some of those recipients today. These few businesses have diversified their income streams, explored and invested in new product lines, expanded the scale of their business, built and maintained more profitable businesses.

In the bill before you, the $4M allocated to the Farmer's Drought Relief Fund (FDRF), and the $8M open to all agricultural entities under the Agriculture and Forest Products Investment Fund (AFPIF) represent strategic investments to develop sustainable water sources and irrigation (i.e., FDRF), and critical cost-saving and capacity building infrastructure (i.e., AFPIF). Our industry is in dire need of strategic investments like this that will build viability and help to capitalize our grossly undercapitalized industry.[5] These investments will create more shining examples of profitability, which we need to build agricultural viability one business at a time.

Amendment Considerations

We have some suggestions that we believe would make these investments even more strategic and are hoping to work alongside the Department of Agricultural, Conservation and Forestry (DACF), and key stakeholders, to develop an amendment for the committee to consider. Key provisions that we would like to see included are:

Guardrails on eligibility. To ensure that allocations are made responsibly and result in a clear return on investment to Maine, we suggest that, notwithstanding existing statutory language guiding these programs, funding target established businesses with significant agricultural production. We provide the following language to aid in committee deliberations and request that this language be applied to agricultural allocations made within AFPIF and the FDRP:

> Operational Longevity. An applicant for these specific funds must demonstrate active engagement in commercial agricultural or forest product production for at least 3 consecutive years immediately preceding the date of application.
>
> Revenue Threshold. An applicant for these specific funds must demonstrate a minimum average of

[5] A 2021 study found that based on Maine's fruit and vegetable production, the State could support an estimated 657M in processing/preserving sales, but only supports $492M, a deficit of $164M. Bailey, M., K.P. Bell, A. Crawley, T. Gabe, J. Malacarne, and J. Rubin. 2021. Economic Impacts of Investments in Food and Agricultural Processing Infrastructure in Maine. UMaine School of Economics and Margaret Chase Smith Center, EDA Center at University of Maine. EDA UMaine Staff Paper 2021-103: Technical Report.

$10,000 in annual gross sales derived from agricultural products in at least one of the last 4 years, as evidenced by federal IRS Schedule F filings or equivalent.

Open and competitive. In the current bill, only $8M out of out a total $24M allocation to AFPIF is openly competitive within agriculture. We request that either, at least 50% of the AFPIF allocation be open and competitive to all of agriculture, or that the committee add an additional $4M that would target only the state's iconic wild blueberry industry.

A Path Forward

If it is the pleasure of the committee, we are very interested in working with other stakeholders, members of the legislature, the DACF, and the committee to draft a bipartisan amendment to incorporate the input that we have heard today.

Thank you for your time and consideration. I would be happy to answer any questions that you may have.

WILD BLUEBERRY MAINE

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EDA UMaine Staff Paper: 2021-103—Economic Impacts of Investments in Food and Agricultural Processing Infrastructure in Maine (November 2021)

ECONOMIC IMPACTS OF INVESTMENTS IN FOOD AND AGRICULTURAL PROCESSING INFRASTRUCTURE IN MAINE

Version: 2.0: November 2021[1]

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Executive Summary

The information and analysis presented in this report show the following.

- ⇨ A 2021 survey (about infrastructure investment opportunities in forestry, fisheries and agriculture) conducted by the Maine Department of Agriculture, Conservation and Forestry (DACF); Maine Department of Economic and Community Development; and Maine Department of Marine Resources indicates broad stakeholder support for investments in food and agricultural processing infrastructure in Maine, with a priority in the four areas of dairy processing, meat processing, grain storage and drying, and fruit and vegetable co-packing and custom processing.
- ⇨ The presence of processing facilities can provide opportunities for food and agricultural value-added in a region, and these businesses support local jobs and are stable outlets for agricultural products.
- ⇨ The amounts of agricultural products grown and raised on Maine farms in the four priority areas have the potential to support expansions in statewide food and agricultural processing infrastructure.
- ⇨ Four food and agricultural processing infrastructure expansion scenarios developed by DACF could amount to an additional $181 million in annual food processing sales.
- ⇨ Investments in additional processing infrastructure could support, including multiplier effects, an estimated 1,367 Maine jobs, $321 million in annual statewide sales revenue, and $62 million in labor income per year.
- ⇨ Given current labor market constraints, expansion of Maine's food processing industry will likely require development of parallel workforce strategies.

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1 This report may be updated in the future to incorporate new data, or to clarify errors or omissions.

2 This project was funded by the Maine Department of Agriculture, Conservation and Forestry.

3 EDA UMaine Staff Papers disseminate research and analysis conducted by members of the EDA Center at University of Maine. The authors acknowledge the helpful comments and suggestions provided by the Maine Department of Agriculture, Conservation and Forestry.

ECONOMIC IMPACTS OF INVESTMENTS IN FOOD AND AGRICULTURAL PROCESSING INFRASTRUCTURE IN MAINE

1. Introduction

The food and agricultural processing sector (also referred to as *Food Manufacturing*) provides a good source of employment and economic activity in many parts of the United States and worldwide.[4] Given the strong connection between economic activity (e.g., employment, sales) in a region's *Food Manufacturing* sector and purchases from local farms, the industry also supports a region's supply chain in food and related products and is an important part of the value-added to local agricultural production. Between 1998 and 2019, U.S. employment in the *Food Manufacturing* sector grew by 7.9 percent, compared with a 25.1 percent decline in overall U.S. *Manufacturing* employment.[5] By contrast, Maine saw an 8.6 percent reduction in *Food Manufacturing* employment between 1998 and 2019, along with a 31.6 percent reduction in overall statewide *Manufacturing* employment.

This report examines Maine's food and agricultural processing sector, with an emphasis on the economic impacts of new investments in food processing infrastructure. The new processing infrastructure scenarios are informed by a 2021 survey about infrastructure investment opportunities in forestry, fisheries and agriculture conducted by the Maine Department of Agriculture, Conservation and Forestry (DACF); Maine Department of Economic and Community Development (DECD); and Maine Department of Marine Resources (DMR). The

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4 Throughout the report, official sector titles (used by data reporting agencies when releasing employment and other industry data) are shown in italics.

5 Employment figures, which are from the U.S. Bureau of Labor Statistics, measure total full-time and part-time employment (Series SAEMP25N).

scenarios are backed by analysis of existing processing capacity in Maine (and all other states) relative to farm production. Results of the DACF/DECD/DMR survey show broad stakeholder support for investments in food and agricultural processing infrastructure, with a priority in the areas of dairy processing, meat processing, grain storage and drying, and fruit and vegetable co-packing and custom processing. Our analysis of the economic impacts of new processing capacity amounts to an additional $181 million in annual food manufacturing sales across the four priority areas. These investments in additional processing infrastructure could support, including multiplier effects, an estimated 1,367 Maine jobs, $321 million in annual statewide sales revenue, and $62 million in labor income per year.

2. Maine's Food and Agricultural Processing Sector

Table 1 provides an overview of the *Food Manufacturing* sector in Maine.[6] This sector is part of the broader *Manufacturing* industry and it is made up of several narrowly defined sectors. Although the *Food Manufacturing* sector has additional subindustries such as *Bakeries and Tortilla Manufacturing* and *Animal Food Manufacturing*, this report primarily focuses on the four subsectors of *Grain and Oilseed Milling, Fruit and Vegetable Preserving and Specialty Food Manufacturing* (i.e., Fruit and Vegetable Processing), *Dairy Product Manufacturing*, and *Animal Slaughtering and Processing*. Respondents to the 2021 DACF/DECD/DMR survey indicated support for investments in processing infrastructure in these four areas.

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[6] Unless otherwise noted, the figures shown in table 1 are from the 2019 Annual Survey of Manufacturers, U.S. Census Bureau. Data on total Maine and U.S. employment, used to calculate the location quotients, are from the U.S. Bureau of Labor Statistics.

Among the four selected subsectors, Fruit and Vegetable Processing has the largest employment size in Maine, with 1,259 employees as of 2019. Following Fruit and Vegetable Processing, the other three sectors in order of employment size are *Dairy Product Manufacturing* (379 employees), *Animal Slaughtering and Processing* (86 employees) and *Grain and Oilseed Milling* (60 employees).[7] An industry location quotient (LQ) measures the extent to which a region has a specialization in a given sector of the economy. It is calculated as the ratio of the sector's share of employment in the region of study (e.g., employment in the Fruit and Vegetable Processing sector is 0.23 percent of Maine employment) relative to the sector's share of employment in a benchmark region (e.g., the Fruit and Vegetable Processing sector makes up 0.12 percent of U.S. employment).

Location quotients greater than 1.0 (e.g., the Fruit and Vegetable Processing sector has a location quotient of 1.94 in Maine) indicate that the region specializes in the sector, whereas values of less than 1.0 indicate that the region has a "deficit" of employment in the sector. Having a deficit means that, in the region of interest (i.e., Maine), the sector's percentage of total employment is less than the sector's share of overall U.S. employment. Among the four sectors considered, Maine has a specialization in the Fruit and Vegetable Processing industry, which is due in part to its large production (and processing) of potatoes and blueberries. The other three food processing industries, however, have location quotients of about 0.6 or lower in Maine. This suggests that, generally speaking, the state has employment deficits in the *Dairy Product Manufacturing*, *Animal Slaughtering and Processing*, and *Grain and Oilseed Milling* sectors. In

[7] The data in table 1 for the *Animal Slaughtering and Processing* sector are from 2018, because 2019 figures were not disclosed for Maine. The *Grain and Oilseed Milling* employment figure of 51 workers is from 2018, because 2019 employment in the sector was not disclosed for Maine.

other words, these industries make up a smaller percentage of overall Maine employment relative to the shares of total U.S. employment that are accounted for by these sectors.[8]

Table 1 also presents information on annual sales per worker and annual payroll per worker in the overall *Food Manufacturing* industry and the four subsectors of interest. Sales per worker, which is an indicator of labor productivity, range from about $200,000 to $650,000 in Maine, and payroll per worker varies across the four sectors from about $35,000 to over $55,000. With the exception of the annual payroll per worker in Maine's Fruit and Vegetable Processing sector (which is $49,787, compared with an average U.S. payroll per worker of $48,820 in the sector), sales and payroll per worker are lower in Maine compared with the corresponding national averages.

3. Expanding Food Processing Capacity in Maine

The food and agricultural product supply chain is characterized by processing companies combining their equipment, machinery and workers along with inputs grown on (and purchased from) farms and other agricultural producers to make "manufactured" food products (e.g., potato chips). Therefore, there's a strong connection between a region's sales and employment in *Food Manufacturing* businesses and its agricultural production (on farms). In addition, the presence of processing facilities can provide opportunities for food and agricultural value-added

[8] The concepts of industry specialization and employment deficits, which are based on the industry location quotients, are a little different than the analysis presented in section 3 of the report that examines the amount of industry processing activity (e.g., employment) that could be supported based on the amounts of agricultural products grown and raised on farms.

in a region, and these businesses support local jobs and are stable outlets for agricultural products.

To gauge the processing infrastructure needs of the state's forestry, fisheries and agricultural sectors, the Maine Department of Agriculture, Conservation and Forestry; Maine Department of Economic and Community Development; and Maine Department of Marine Resources conducted a survey of sector businesses (e.g., farms) and other industry stakeholders during the spring of 2021. Results of the survey were reviewed by members of DACF, who developed the following four scenarios for expanded agricultural processing infrastructure in Maine:

- ⇨ Increased dairy processing, e.g., pasteurization and fluid bottling,
- ⇨ Increased capacity for custom and inspected meat operations,
- ⇨ Increased grain storage and drying equipment, and
- ⇨ Increased fruit, vegetable and value-added processing, e.g., co-packing and custom products.

As a way to provide context to the scale of new processing infrastructure investments that could be supported in Maine in the product categories identified by the DACF/DECD/DMR survey, we examined the relationship between the amount of activity in the food manufacturing sectors and on-farm agricultural production. Although there are certainly a wide range of factors that might affect the level of food and agricultural processing activity that can be supported in a state (e.g., demand for products, processing activities of surrounding regions, labor costs and availability) the amount of agricultural production taking place on farms is among the most important considerations. By comparing the amount of actual processing capacity in Maine to

the amount that would be predicted based on the state's agricultural production on farms, we can estimate the amount of additional processing capacity that the state could support in the four product categories described above. That is, if Maine has sufficiently lower processing sales (or employment) than what is predicted based on its agricultural production—informed by data and trends from other states—then it's perhaps feasible that Maine could expand its processing of the agricultural product.

Dairy Product Manufacturing

The DACF/DECD/DMR survey shows support for additional dairy processing capacity. Our analysis of *Dairy Product Manufacturing*, both industry sales and employment, relative to milk production on Maine farms suggests that the state could support expanded processing activities in this area.

Figure 1 shows the relationship between *Dairy Product Manufacturing* sales and the amount of milk produced on farms located in a state, both measured in natural logs.[9] Places such as California, Wisconsin, Idaho and New York are among the leaders for milk production (on farms) and *Dairy Product Manufacturing* industry sales, whereas Alaska, Rhode Island and Hawaii are among the lowest in these areas. The figure shows a positive relationship between *Dairy Product Manufacturing* sales and milk production on farms, and this effect is highly statistically significant. The trendline in figure 1 shows the estimated amount of *Dairy Product Manufacturing*

[9] Data on the amount (i.e., pounds in 2019) of milk produced on farms in each state is from the United States Department of Agriculture, National Agricultural Statistics Service. *Dairy Product Manufacturing* sales figures are from the 2019 Annual Survey of Manufacturers, U.S. Census Bureau. The data are transformed into natural logs due to the wide range of values.

sales that could be supported in a state based on the amount of milk produced on farms. Points "above" the line indicate states with, perhaps, excess processing capacity, whereas points "below" the trendline represent states that could feasibly expand their dairy processing infrastructure.

Figure 2 also shows a positive and highly statistically significant relationship between *Dairy Product Manufacturing* and the amount of milk produced on farms in a state, but this time the focus is on dairy processing employment.[10] For both indicators of activity in the *Dairy Product Manufacturing* sector—i.e., sales in figure 1 and employment in figure 2—Maine is situated below the trendline indicating the estimated amount of dairy processing that could be supported based on the state's milk production on farms. Specifically, the 621 million pounds of milk produced on Maine farms in 2019 could support an estimated $714 million in *Dairy Product Manufacturing* sales in 2019. Compared to Maine's actual *Dairy Product Manufacturing* sales of $246 million, the state has a deficit of about $468 million in dairy processing sales. In terms of employment, the level of milk production on Maine farms could support an estimated 1,069 jobs in *Dairy Product Manufacturing*. Compared to Maine's actual *Dairy Product Manufacturing* employment of 379 workers in 2019, the state has a deficit of about 690 dairy processing jobs.

Overall, the analysis shows that the amount of milk produced on Maine farms could support an additional $468 million in sales and 690 workers employed in *Dairy Product Manufacturing*, which is equivalent to a more than doubling of Maine's existing dairy processing capacity. These results are consistent with feedback provided by respondents to the Maine

[10] *Dairy Product Manufacturing* employment figures are from the 2019 Annual Survey of Manufacturers, U.S. Census Bureau.

DACF/DECD/DMR survey, who indicated support for processing infrastructure investments in the dairy sector (e.g., additional capacity in pasteurization and fluid bottling). The specific scenario proposed by DACF is a 50 percent increase in statewide dairy processing, which falls well within the additional processing capacity that could be supported based on the amount of milk produced on Maine farms. In other words, even with a 50 percent expansion, Maine's employment and sales in *Dairy Product Manufacturing* would be considerably lower than the estimated amounts of processing activity—sales and employment—that could be supported in Maine. The statewide economic impact of a 50 percent expansion of Maine's *Dairy Product Manufacturing* sector is presented later in this report.

Animal Slaughtering and Processing

We use the same general approach that we applied to *Dairy Product Manufacturing* to estimate the amount of meat processing economic activity that could be supported based on the amount of production on Maine farms. Whereas dairy processing examined the relationship between manufacturing activity and the amount of milk produced on Maine farms, the analysis of *Animal Slaughtering and Processing* considers the contributions of the numbers of cattle and hogs on farms.[11] Since the analysis of meat processing is analyzed using information on two types of farm activity—that is, cattle and hogs—the numbers cannot be shown on a simple scatterplot. Instead, the amount of activity in *Animal Slaughtering and Processing* that could be supported in Maine is estimated using a regression model that accounts for the effects of the numbers of cattle

11 Data on the number of cattle and hogs on farms in each state in 2018 is from the United States Department of Agriculture, National Agricultural Statistics Service.

and hogs.[12] The counts of these two types of livestock are indicators of the amounts of animals that are "raised" on farms in a state.

The regression results, estimated using data from all 50 states, show that both the numbers of cattle and hogs on farms in a state have positive and statistically significant effects on employment in the *Animal Slaughtering and Processing* sector.[13] Given the 81,000 cattle and 4,400 hogs on Maine farms in 2018, the state could support an estimated 259 jobs in the *Animal Slaughtering and Processing* industry. Compared to the actual 2018 employment of 86 workers in these businesses, Maine could expand this food processing sector by more than 170 workers (see figure 3). Although this increase amounts to a more than doubling of the state's employment in animal slaughtering facilities, the sector's size in Maine would still be modest by U.S. standards.

Table 2 shows the bottom ten states in terms of employment in the *Animal Slaughtering and Processing* industry as of 2018 and Maine ranks 49th out of 50 states, only behind Alaska. Even if the state were to grow this sector to the estimated 259 workers that could be supported based on the numbers of cattle and hogs on Maine farms, the state would still rank in the bottom ten nationally in terms of animal slaughtering employment. Our finding that Maine is underserved in animal slaughtering processing capacity is consistent with the results of the DACF/DECD/DMR survey, which found that businesses (e.g., farms) and industry stakeholders

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12 The variables used to measure the amount of activity in *Animal Slaughtering and Processing* (i.e., employment and sales) account for all types of meat, including beef, pork and poultry. The two variables used in the regression model to analyze the amount of production activity that could be supported in a state, however, are the numbers of cattle and hogs raised on farms. Using data on different types of animals raised on farms (e.g., chickens) could alter the analysis, but it's unlikely that the changes would be very large.

13 *Animal Slaughtering and Processing* employment figures are from the 2018 Annual Survey of Manufacturers, U.S. Census Bureau. Regression results also show that the numbers of cattle and hogs on farms in a state have positive and statistically significant effects on *Animal Slaughtering and Processing* industry sales in 2018.

support the expansion of additional capacity for animal slaughtering. The specific scenario proposed by DACF is a 50 percent increase in statewide processing capacity for custom and inspected meat operations, which falls well within the additional processing capacity that is feasible in Maine given the amount of cattle and hogs raised on the state's farms. The statewide economic impact of a 50 percent expansion of Maine's *Animal Slaughtering and Processing* sector is presented later in this report.

Fruit, Vegetable and Berry Processing

With $273 million in farm sales in 2017, Maine ranks 18th nationally in terms of on-farm production of fruit, vegetables and berries. Of the 100,000 acres of farmland in Maine devoted to the production of fruit, vegetable and berries, about 50 percent of this acreage is used to grow potatoes and 40 percent is used to grow blueberries.[14] Aroostook County is, by far, the largest producer of vegetables in Maine, particularly potatoes (Gabe 2017), and most of Maine's blueberries are grown in Washington County. When it comes to the *Fruit and Vegetable Preserving* sector, Maine ranks 27th nationally both in terms of sales and employment.

Figure 4 shows the relationship between (the natural log of) *Fruit and Vegetable Preserving* sales and the (natural log of the) dollar value of fruit, vegetables and berries produced on farms located in a state.[15] Places such as California, Washington, Florida and Idaho are among the leaders for the on-farm production of fruit, vegetables and berries, as well as *Fruit and*

14 Agricultural sales and acreage figures are from the 2017 U.S. Census of Agriculture.

15 Data on the value of Fruit, Vegetables and Berries produced on farms in each state is from the 2017 United States Census of Agriculture, U.S. Census Bureau. *Fruit and Vegetable Preserving* industry sales figures are from the 2018 Annual Survey of Manufacturers, U.S. Census Bureau.

Vegetable Preserving industry sales, whereas Wyoming, South Dakota, Alaska and Rhode Island are among the lowest in these areas. The figure shows a positive and highly statistically significant relationship between *Fruit and Vegetable Preserving* industry sales and the on-farm production of fruit, vegetables and berries. The trendline in Figure 4 shows the (natural log of the) estimated dollar value of sales in the industry that could be supported based on the amount of on-farm production.

Figure 5 shows a positive and statistically significant relationship between *Fruit and Vegetable Preserving* industry employment and the value of fruit, vegetables and berries produced on farms in a state.[16] For both indicators of activity in the *Fruit and Vegetable Preserving* industry—i.e., sales in figure 4 and employment in figure 5—Maine is situated below the trendline indicating the estimated amount of food processing that could be supported based on a state's on-farm production. For example, the $273 million in fruit, vegetables and berries produced on Maine farms in 2017 could support an estimated $657 million in *Fruit and Vegetable Preserving* sales in 2018. Compared to Maine's actual *Fruit and Vegetable Preserving* sales of $492 million in 2019, the state has a deficit of about $164 million. In terms of employment, the value of fruit, vegetables and berries grown on Maine farms could support an estimated 1,511 jobs in *Fruit and Vegetable Preserving*. Compared to Maine's actual *Fruit and Vegetable Preserving* employment of 1,259 workers in 2019, the state has a deficit of about 250 food processing jobs.

[16] *Fruit and Vegetable Preserving* industry employment figures are from the 2018 Annual Survey of Manufacturers, U.S. Census Bureau.

Overall, the analysis shows that the amount of fruit, vegetables and berries grown on Maine farms could support an additional $164 million in sales and 250 workers employed in *Fruit and Vegetable Preserving*, which is equivalent to a 33 percent (sales) and 20 percent (employment) increase in processing capacity. These results are consistent with feedback provided by the respondents of the Maine DACF/DECD/DMR survey, who indicated support for processing infrastructure investments in the fruit and vegetable sector. The specific scenario proposed by DACF is the development of a new co-packing and custom processing facility that is flexible across scale of production and product categories. The statewide economic impact of a new *Fruit and Vegetable Preserving* facility is presented later in this report.

Grain and Oilseed Milling

The DACF/DECD/DMR survey suggests the need for expanded capacity in grain processing infrastructure, particularly additional grain storing and drying equipment. To determine the amount of additional grain processing capacity that Maine could support, we analyze the relationship between two measures of *Grain and Oilseed Milling* activity—sales and employment—and the value of grain grown on farms in a state. In terms of on-farm grain production, Maine ranks 44th out of 47 states (with data) as of the 2017 U.S. Census of Agriculture, with $14 million in sales. In terms of processing capacity, Maine ranks 44th (out of 47 states with data) for *Grain and Oilseed Milling* sales and 43rd for employment.[17]

[17] *Grain and Oilseed Milling* industry sales and employment figures are from the 2018 Annual Survey of Manufacturers, U.S. Census Bureau.

Figure 6 shows a positive and statistically significant relationship between *Grain and Oilseed Milling* sales and the value of farm-level grain production in a state. Likewise, there's a positive and statistically significant relationship between grain processing employment and the value of grain grown by farms (figure 7). In both figures, the markers that represent Maine are below the trendline, which suggests that Maine has a deficit in grain processing capacity. In terms of *Grain and Oilseed Milling* sales, the $14 million of grain sold by Maine farms would support an estimated $72 million in processing sales. Likewise, the value of grain grown on Maine farms could support an estimated 68 jobs in grain processing employment.

This analysis shows that the value of grain grown on Maine farms could support an additional $37 million in sales and 17 workers employed in *Grain and Oilseed Milling*, which is equivalent to a 50 percent increase in grain processing sales and a 25 percent increase in processing employment. These results are generally consistent with feedback provided by the respondents of the Maine DACF/DECD/DMR survey, who indicated support for processing infrastructure investments for grain farming. The specific scenario proposed by DACF is a 50 percent increase in storage and drying equipment. The statewide economic impact of expanded grain processing capacity is presented in the next section of the report.

4. Economic Impacts of Expanded Food and Agricultural Processing in Maine

Expanding the amount of food and agricultural processing infrastructure in Maine could generate a substantial economic impact across the state. Economic impact is defined as the additional annual employment, sales revenue and labor income associated with the expanded processing capacity, as well as the multiplier effects supported by the purchases of the food and

agricultural processing operations, and their suppliers and employees. This report does not, however, consider the temporary economic impacts of the construction and purchases of equipment to "build" the new agricultural processing infrastructure.

Table 3 (panels "a" to "e") shows the economic impacts related to the expansion scenarios described earlier in the report, with separate results for each scenario and an overall combined impact. For the scenarios related to *Grain and Oilseed Milling*, *Dairy Product Manufacturing*, and *Animal Slaughtering and Processing*, the direct impacts involve expanding processing sales by 50 percent, relative to existing levels in 2019 (table 1).[18] For the scenario related to Fruit, Vegetable and Berry processing, the direct impact involves an additional business establishment in the industry sector. According to 2019 County Business Patterns data (U.S. Census Bureau) for the State of Maine, the average size of a *Fruit and Vegetable Preserving* establishment is 66 workers. This average size of 66 workers is used as the direct employment in the economic impact analysis of *Fruit and Vegetable Preserving*.[19]

In the *Fruit and Vegetable Preserving* sector (table 3b), the direct sales ($32 million) and labor income ($3.4 million) figures are the amounts of sales and labor income in the processing facilities that correspond with an additional 66 workers.[20] The multiplier effects are the jobs, sales and labor income in other businesses and Maine farms that are supported by the additional economic activity in the processing businesses. For example, an expansion of 66 jobs in the *Fruit*

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18 These expansions—i.e., increase sales by 50 percent—are within the sectors' excess processing capacity, based on the amounts of agricultural products grown or raised on Maine farms.

19 This expansion of an additional 66 workers in the Fruit and Vegetable Preserving sector is within the industry's excess processing capacity, based on the amount of fruit, vegetables and berries grown on Maine farms.

20 The direct sales and labor income figures are estimated by the IMPLAN model, based on the direct employment of 66 workers.

and Vegetable Preserving sector would require the purchases of additional inputs used by the establishment and the increase to employment (and labor income) support an expansion of economic activity as well. In the other three economic impact scenarios (i.e., *Grain and Oilseed Milling, Dairy Product Manufacturing* and *Animal Slaughtering and Processing*), the direct employment and labor income figures are estimated by the IMPLAN model, based on the amounts of additional sales required for a 50 percent expansion. For example, an additional $8.9 million in *Animal Slaughtering and Processing* sales, relative to the $17.9 million in sales as of 2019, would require an additional 24 workers and $1.1 million in direct labor income (table 3d).

The multiplier effects are estimated using an input-output model (IMPLAN) of the Maine economy. The IMPLAN model is an input-output framework that traces the flows of expenditures and income through the Maine economy with a complex system of accounts that are uniquely tailored to the region. Underlying these accounts is information regarding transactions occurring among businesses located in Maine, the spending patterns of households, and transactions occurring between Maine businesses and households and the rest of the world. Some of the data sources used to develop the IMPLAN model include County Business Patterns of the U.S. Census Bureau, Regional Economic Information System (REIS) data and input-output accounts from the U.S. Bureau of Economic Analysis, and ES-202 statistics from the U.S. Bureau of Labor Statistics.

The economic impacts associated with the expanded processing capacity in Maine ranges from an estimated 71 jobs, including multiplier effects, in the *Grain and Oilseed Milling* sector, to an estimated 1,017 jobs in the *Dairy Product Manufacturing* sector. The total economic impact, including multiplier effects, of the four scenarios combined is an estimated $321 million in sales, 1,367 jobs and $62 million in labor income. The economic impact results shown in table 3e

suggest an employment multiplier of 2.55 for the combined four scenarios. This multiplier is calculated as the total employment impact of 1,367 divided by the direct employment of 535. This means that each additional processing worker is associated with a total of 2.55 jobs across the state. That is, the processing job itself plus an additional 1.55 workers. This is a relatively large employment multiplier, which is typical of a manufacturing sector that is characterized by high labor productivity (i.e., sales per worker). The sales multiplier of 1.77 (calculated as the total sales impact of $321 million divided by the direct sales of $181 million) suggests that each additional dollar of processing sales has a total impact of 1.77 across the entire statewide economy. This multiplier of 1.77 includes the "original" dollar of processing sales plus an additional $0.77 in other sectors of the Maine economy.

In the current economic climate (as of fall 2021), it might be difficult for Maine businesses to hire enough employees in order to expand the four food processing sectors by a combined 535 workers (as well as find workers to fill the jobs counted in the multiplier effects). In recent years, Maine has experienced challenges in terms of labor supply, with job postings regularly outpacing unemployment. Location and skill mismatch are some of the reasons why positions are left unfilled. Table 4 shows that the four food processing sectors have averaged a combined 168 job vacancies over the past five years. Over the past 18 months, which is the period immediately before and during the pandemic, the number of statewide job postings declined in the *Grain and Oilseed Milling* and *Dairy Product Manufacturing* sectors; and increased in the *Fruit and Vegetable Preserving and Specialty Food Manufacturing* and *Animal Slaughtering and Processing* industries.

Table 5 lists the top ten occupations required by the four food processing sectors, along with trends in labor demand (i.e., growing, declining or constant) in Maine over the past five years and whether the jobs are "hard to fill." Occupations are characterized as "hard to fill" if jobs are vacant in Maine for more than an average of 85 days. Of the ten most important occupations for food processing businesses, five have growing demand over the past five years and eight are "hard to fill" in Maine. These labor market issues suggest that expansion of Maine's food processing industry will likely require development of parallel workforce strategies.

5. Summary

The food and agricultural manufacturing sector provides an important source of employment and economic activity nationally and around the world, with the sector having a U.S. employment growth rate of 7.9 percent between 1998 and 2019. Given that this sector applies value added to food and agricultural products grown and raised on a region's farms, there's a strong connection between processing activity—both sales and employment—and the amounts of agricultural products grown and raised on farms in a state. Maine farms and other agricultural stakeholders support the expansion of food and agricultural processing infrastructure in the state. A survey conducted by the Maine Department of Agriculture, Conservation and Forestry; Maine Department of Economic and Community Development; and Maine Department of Marine Resources during the spring of 2021 found support for expanded processing infrastructure in dairy processing, meat processing, grain storage and drying; and a new fruit and vegetable co-packing and custom processing facility.

Empirical analysis of processing industry sales and employment in the *Grain and Oilseed Milling, Fruit and Vegetable Preserving and Specialty Food Manufacturing* (i.e., Fruit and Vegetable Processing), *Dairy Product Manufacturing*, and *Animal Slaughtering and Processing* sectors suggests that the amount of goods grown and raised on Maine farms can support substantially higher levels of food processing in the state. Expanded processing scenarios of 50 percent increases in dairy processing, meat processing, and grain storage and drying; and the additional of a new (average-size) fruit and vegetable co-packing and custom processing facility could generate a statewide economic impact, including multiplier effects, of an estimated 1,367 jobs, $320 million in sales and $62 million in labor income. The employment multiplier of 2.55 suggests that 535 in expanded processing jobs would support an additional 831 jobs in sectors across the state, including agricultural production. The expanded processing capacity, which may be subject to labor supply challenges of finding workers to fill new positions, can also generate value-added opportunities for Maine's agricultural sector as well as opportunities for the branding of "Made in Maine" food and agricultural products.

References

Gabe, Todd. 2017. "Estimating County-Level Capacities for Supplying Local Vegetables and Melons." School of Economics Staff Paper #634, University of Maine.

Table 1. Food and Agricultural Processing in Maine

Sector Title	Maine Employment	Maine Sales ($1,000)	Maine Payroll ($1,000)	Maine LQ	Maine Sales Per Worker	Maine Payroll Per Worker
Food Manufacturing	4,661	$1,823,274	$219,556	0.75	$391,177	$47,105
Grain and Oilseed Milling	51	$35,136	$3,324	0.24	$688.941	$65,176
Fruit and Vegetable Preserving and Specialty Food Manufacturing	1,259	$492,624	$62,682	1.94	$391,282	$49,787
Dairy Product Manufacturing	379	$246,432	$19,501	0.61	$650,216	$51,454
Animal Slaughtering and Processing	86	$17,878	$2,979	0.04	$207,884	$34,640

Notes: The Maine employment, sales and payroll figures are from the 2019 Annual Survey of Manufacturers, U.S. Census Bureau. Data on total Maine and U.S. employment, used to calculate the location quotients, are from the U.S. Bureau of Labor Statistics. Figures for the *Animal Slaughtering and Processing* sector are from 2018, because 2019 figures were not disclosed for Maine. The *Grain and Oilseed Milling* employment figure is from 2018, because 2019 employment in the sector was not disclosed for Maine.

Table 2. Maine Ranks Low Nationwide for 2018 Employment in the *Animal Slaughtering and Processing* Industry

State	2018 *Animal Slaughtering and Processing* Employment	National Rank
Alaska	52	50
Maine	86	49
Wyoming	102	48
New Hampshire	118	47
New Mexico	130	46
Nevada	160	45
Hawaii	239	44
Vermont	359	43
Connecticut	362	42
Montana	437	41

Note: Employment figures are from the 2018 Annual Survey of Manufacturers, U.S. Census Bureau.

Table 3a. Statewide Economic Impact of a 50 Percent Increase in Maine's *Grain and Oilseed Milling* Sector

	Direct	Multiplier Effects	Total
Sales	$17,568,000	$9,453,859	$27,021,859
Employment	14	58	71
Labor Income	$746,406	$2,810,038	$3,556,444

Table 3b. Statewide Economic Impact of a New Average-Sized Establishment in *Fruit and Vegetable Preserving and Specialty Food Manufacturing* in Maine

	Direct	Multiplier Effects	Total
Sales	$31,520,341	$20,227,312	$51,747,653
Employment	66	138	204
Labor Income	$3,377,271	$6,537,890	$9,915,161

Table 3c. Statewide Economic Impact of a 50 Percent Increase in Maine's *Dairy Product Manufacturing* Sector

	Direct	Multiplier Effects	Total
Sales	$123,216,000	$103,416,990	$226,632,990
Employment	431	586	1,017
Labor Income	$18,607,311	$27,356,581	$45,963,892

Table 3d. Statewide Economic Impact of a 50 Percent Increase in Maine's *Animal Slaughtering and Processing* Sector

	Direct	Multiplier Effects	Total
Sales	$8,939,000	$6,407,512	$15,346,512
Employment	24	50	74
Labor Income	$1,142,607	$1,717,547	$2,860,154

Table 3e. Statewide Economic Impact of Additional Capacity in *Grain and Oilseed Milling, Fruit and Vegetable Preserving and Specialty Food Manufacturing, Dairy Product Manufacturing,* and *Animal Slaughtering and Processing* in Maine

	Direct	Multiplier Effects	Total
Sales	$181,243,341	$139,505,673	$320,749,014
Employment	535	831	1,367
Labor Income	$23,873,595	$38,422,056	$62,295,651

Notes: The direct impacts of $17.6 million in *Grain and Oilseed Milling* sales, 66 workers in *Fruit and Vegetable Preserving*, $123.2 million in *Diary Product Manufacturing* sales, and $8.9 million in *Animal Slaughtering and Processing* sales are based on the new food processing infrastructure scenarios provided by DACF. The other direct impacts and multiplier effects are estimated by the Maine IMPLAN model.

Table 4. Job Vacancies in Maine's Food Processing Sectors

Industry	Average Annual Job Vacancies Over Past 5 Years	Last 18 Months
Grain and Oilseed Milling	23	Declining
Fruit and Vegetable Preserving and Specialty Food Manufacturing	69	Growing
Dairy Product Manufacturing	18	Declining
Animal Slaughtering and Processing	58	Growing
Total:	168	

Note. Information is from the Burning Glass Labor Insights Portal.

Table 5. Key Occupations in Maine's Food Processing Sectors

Occupation	Change in Demand	Hard to Fill
Laborers and Freight, Stock, and Material Movers	Growing	Yes
Heavy and Tractor-Trailer Truck Drivers	Growing	Yes
Maintenance and Repair Workers	Constant	Yes
Industrial Truck and Tractor Operators	Growing	Yes
Production Workers	Constant	Yes
Refrigeration Mechanics and Installers	Growing	Yes
Industrial Engineering Technicians	Growing	Yes
First-Line Supervisors of Production and Operating Workers	Constant	No
Food Cooking Machine Operators and Tenders	Constant	Yes
Wholesale and Manufacturing Sales Representatives	Constant	No

Note. Information is from the Burning Glass Labor Insights Portal.

Figure 1. Maine Could Support an Estimated $468 Million in Additional Dairy Processing Sales, Based on the Amount of Milk Produced on the State's Farms

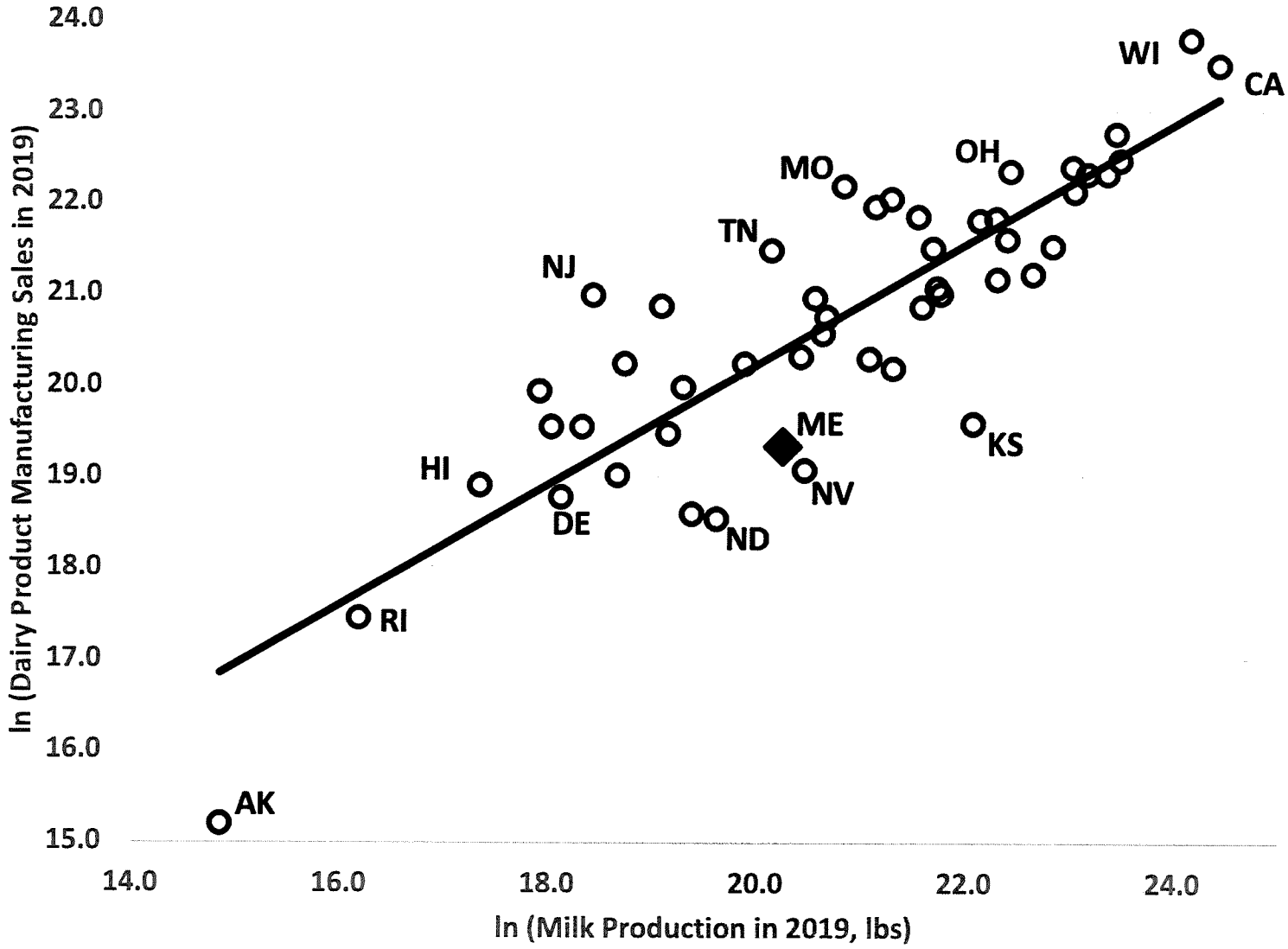

Figure 2. Maine Could Support an Estimated 690 Additional Workers in Dairy Processing Employment, Based on the Amount of Milk Produced on the State's Farms

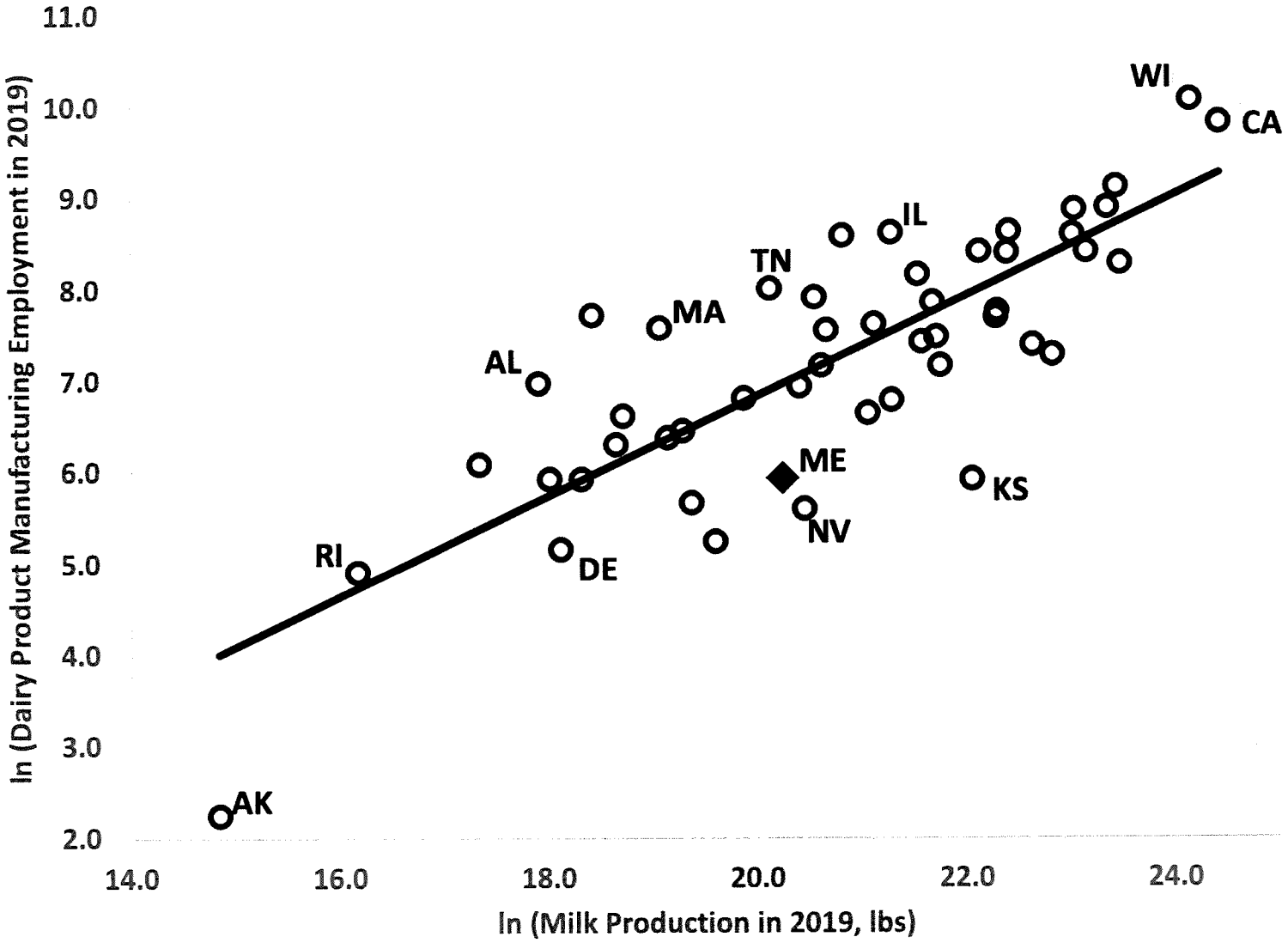

Figure 3. Maine Could Support an Estimated 172 Additional Workers in Animal Slaughtering Employment, Based on the Number of Cattle and Hogs Raised on the State's Farms

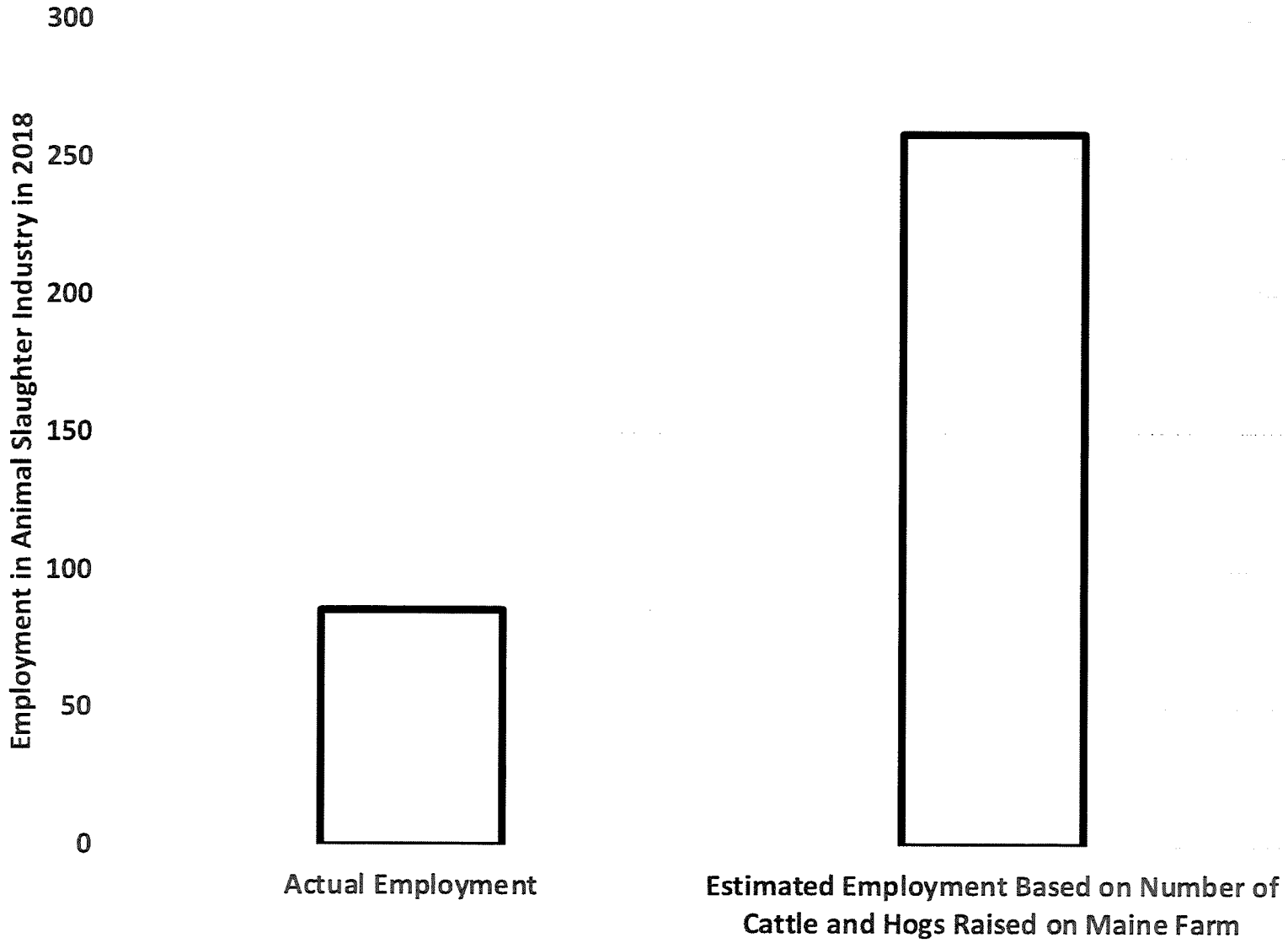

Figure 4. Maine Could Support an Estimated $164 Million in Additional Fruit, Vegetable and Berry Processing Sales, Based on the Value of Fruit, Vegetables and Berries Produced on the State's Farms

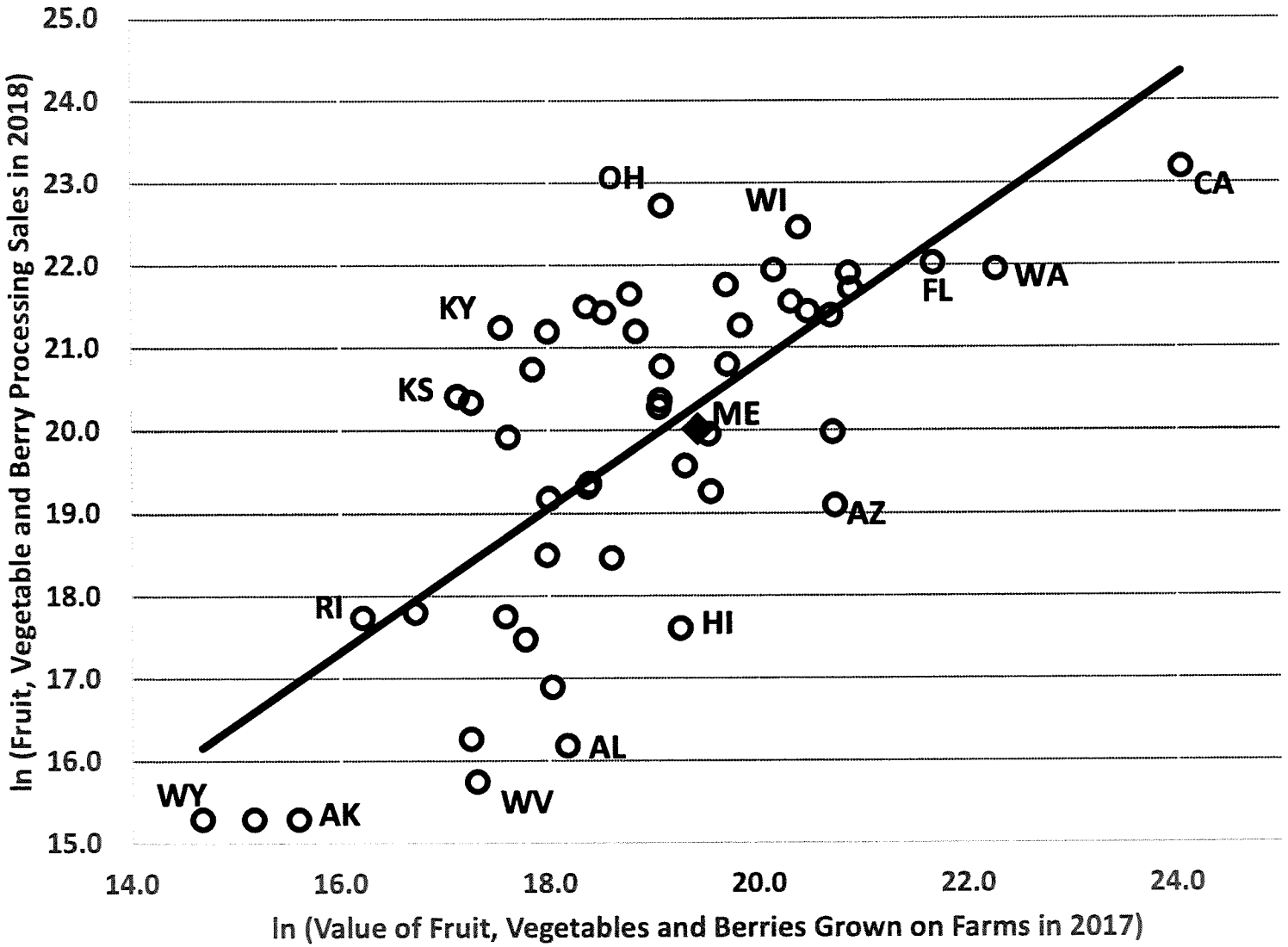

Figure 5. Maine Could Support an Estimated 250 Additional Workers in Fruit, Vegetable and Berry Processing Employment, Based on the Value of Fruit, Vegetables and Berries Produced on the State's Farms

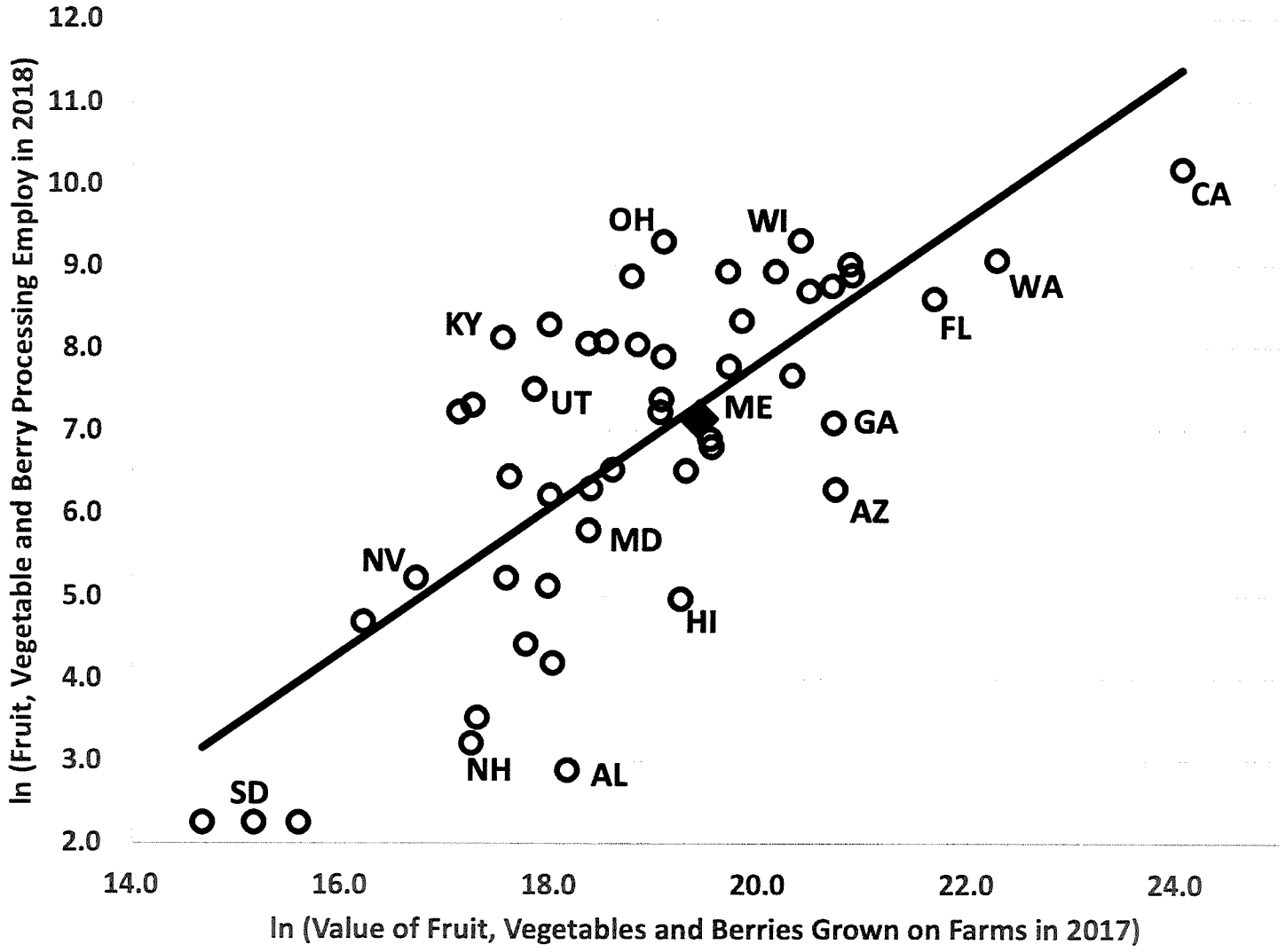

Figure 6. Maine Could Support an Estimated $37 Million in Additional Grain and Oilseed Milling Sales, Based on the Value of Grain Produced on the State's Farms

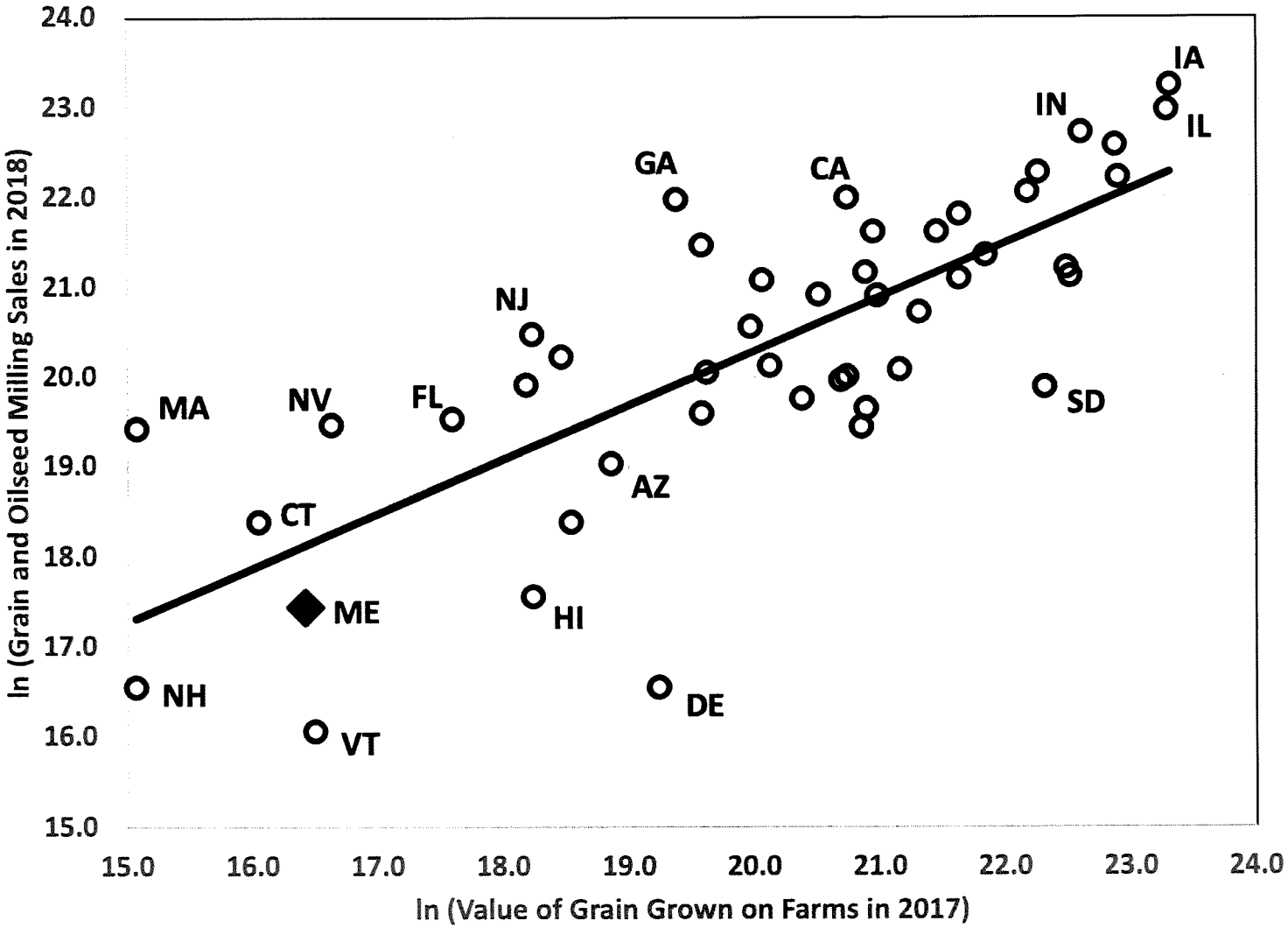

Figure 7. Maine Could Support an Estimated 17 Additional Workers in Grain and Oilseed Milling Employment, Based on the Value of Grain Produced on the State's Farms