Harvesting Hope: Addressing Food Insecurity and Agricultural Waste Through Gleaning in Massachusetts

Michael Hannigan[1], Mateo Rull-Garza[2], Jaime C. Piñero[2]
[1]Farm and Food Systems Program, Greenfield Community College
[2]Stockbridge School of Agriculture, University of Massachusetts Amherst

About 30% of crops in the U.S. are never harvested, leading to significant food waste. This results in financial losses for farmers, higher consumer prices, and wasted resources like water and energy. Food loss happens at multiple levels, including on farms due to labor shortages or imperfections, during transportation due to damage, and at the consumer level due to over-purchasing or rejecting imperfect produce. The unrealistic standards for fruit and vegetable appearance mean that many blemished but edible crops go to waste, even though people with limited access to healthy food may be more willing to accept them. Addressing waste at all stages is crucial for improving resource use and food security.

Food insecurity is linked to economic instability and systemic inequalities, affecting marginalized communities disproportionately. Many families facing food insecurity buy cheap, processed foods, which can lead to health problems like obesity. The high cost of fresh produce, often driven by inefficiencies and waste in the supply chain, limits access to healthier options. Reducing food waste could help make nutritious food more affordable and improve public health.

Gleaning as a Solution to Food Waste and Insecurity. Gleaning, where volunteers collect leftover crops after commercial harvests, is an effective but underutilized strategy to reduce food waste and combat food insecurity. The practice has a long history and remains a valuable way to redirect surplus food to those in need. However, in the U.S., large-scale farming, logistical challenges, and liability concerns limit its use. Massachusetts-based organizations like the Boston Area Gleaners have made significant progress, salvaging hundreds of thousands of pounds of food, but more needs to be done to promote and expand gleaning efforts.

The Role of Tax Incentives and Liability Protections. Farmers can benefit from federal tax deductions for donating food, but many don't use these incentives due to low awareness or the complexity of the process. Simplifying tax policies and educating farmers could encourage more participation. Liability concerns also deter some farmers, despite existing legal protections for food donors. Additional state-level protections, such as those proposed in Massachusetts, could further ease concerns and increase participation in gleaning programs.

To address these issues effectively, this research surveyed a large group of Massachusetts fruit growers, mostly apple growers, Apples are one of the most widely grown fruits in the state, and their production presents unique opportunities and challenges for gleaning. Apple orchards often need help with labor shortages, market fluctuations, and strict aesthetic standards, leading to significant portions of the harvest being left unpicked. With our research, we sought to determine (1) the number of apple growers participating in gleaning programs, (2) the number of apple growers using or aware of federal tax and liability protection policies, and (3) whether a tax credit in Massachusetts would encourage apple growers to participate in gleaning programs.

Materials and Methods

To explore the barriers farmers face in participating in

gleaning programs and evaluate the effectiveness of proposed tax incentives and liability protections for food donations, we employed a mixed-methods approach that included quantitative data collection through a survey, qualitative research through interviews, and experiential learning through participation in gleaning activities.

We distributed an eleven-question survey at the Massachusetts Fruit Growers' Association 2024 annual meeting held on July 10th, 2024, at the UMass Cold Spring Orchard (Belchertown, MA). The survey was designed to assess farmers' attitudes, concerns, and potential barriers and motivators regarding participation in gleaning programs using a combination of multiple-choice and quantitative scale questions. The survey consisted of 10 multiple-choice and quantitative scale questions.

The survey was distributed at the 2024 Massachusetts Fruit Growers Association meeting at Cold Spring Orchard, with over 100 fruit growers represented. Of the 25 apple growers who completed the survey, 91% were male, and 54.5% were in their 60s and 70s. Most growers had farms between 30 and 96 acres.

Results

Participation in gleaning programs was notable, with 64% having participated at least once (Figure 1).

Figure 1. Percentage of Massachusetts fruit growers who have participated in gleaning at least once. Data indicates that the majority (64%) of growers surveyed have participated in gleaning.

However, awareness and use of federal tax incentives were low, as 76.5% of respondents were either unaware of or had not used the incentive (Figure 2A). Regarding state tax incentives, 64% indicated these would motivate them to participate in gleaning, while 28% wanted more information (Figure 2B).

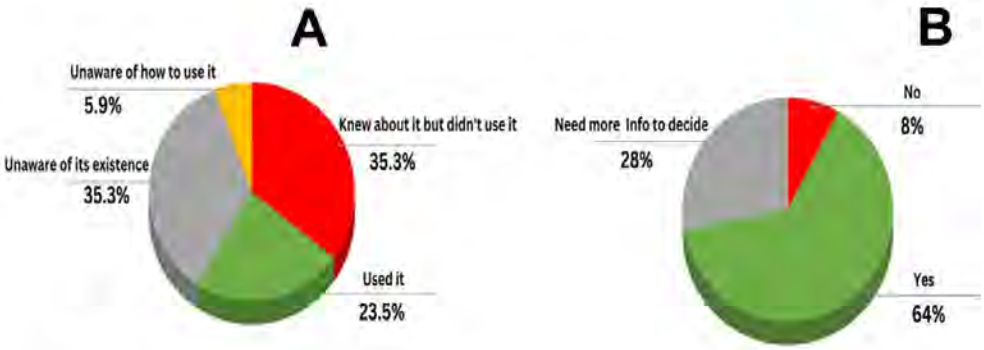

Figure 2. (A) Awareness and use of the gleaning federal tax incentive by Massachusetts Fruit Growers. **(B)** Would additional state tax incentives motivate Massachusetts fruit growers to participate in gleaning? The proposed incentives would allow a non-refundable credit from net taxable income for the year of the donation, equal to the fair market value of donated food crops, not exceeding $5,000 per year.

We ran a statistical test to discern whether the finding that only 17% of farmers ($n = 23$) in a study conducted by Duke World Food Policy Center (2022) considered tax incentives as an important motivator was different to our finding that 64% of farmers ($n = 24$) are encouraged by tax incentives to participate in gleaning. We found that this difference was statistically significant. Regarding liability protections, 45.8% said state-specific protections would encourage participation, 25% wanted more information, and 29.2% were not motivated by these protections (Figure 3A). Awareness of federal liability protections was low, with 80% unaware of the Good Samaritan Act (Figure 3B).

The main barriers to gleaning were a lack of time or labor (70%), lack of information about gleaning programs (40%), insufficient surplus to donate (40%), and liability concerns (20%). Tax incentives and public recognition were rated as the most important motivators, with tax incentives significantly more motivating than liability protections (Figure 4).

Conclusion

Our research shows that enhancing protections and offering incentives, as proposed in "An Act Encour-

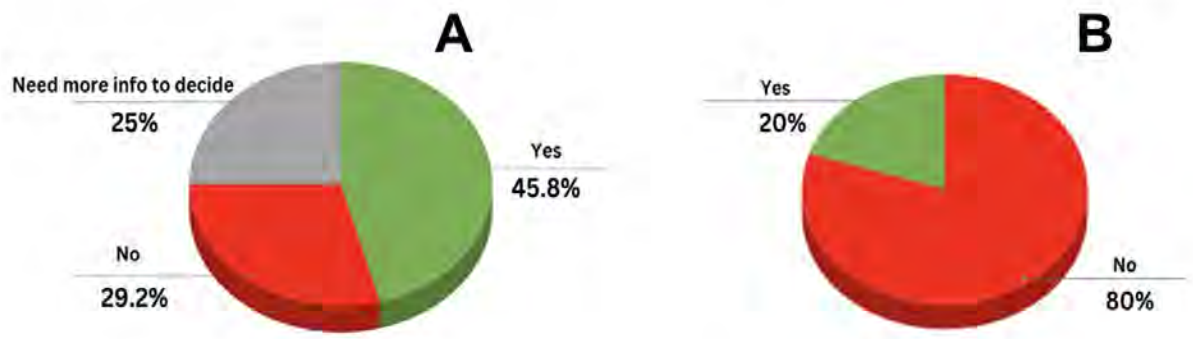

Figure 3. (A) Awareness of federal liability protections for farmers participating in gleaning, **(B)** Assessing the impact of additional State liability protections as incentives to increase participation in gleaning programs

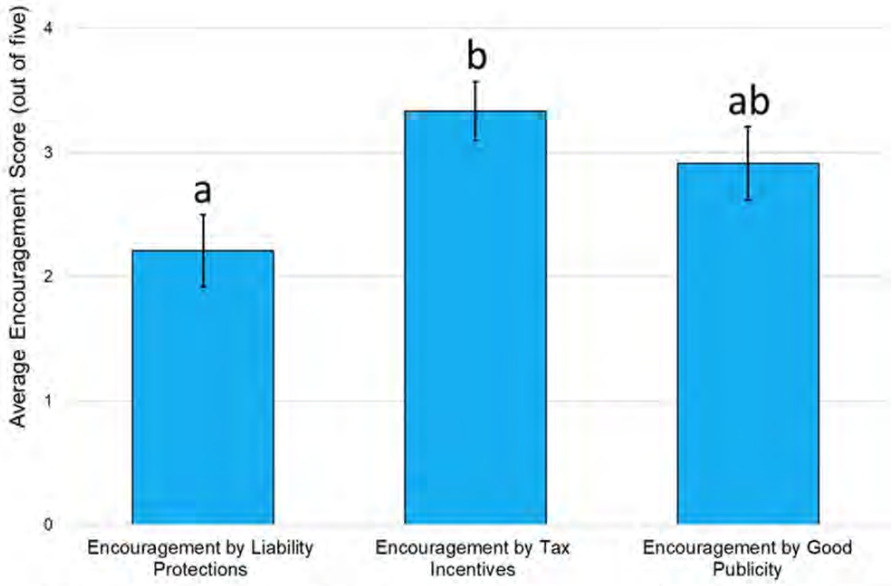

Figure 4. Encouragement provided by liability protections, tax incentives, and public relations on a scale of 1 (not likely) to 5 (very likely). Tax incentives and public recognition are rated as the two most important motivators whereas tax incentives are significantly more encouraging than liability protections. Good publicity is not significantly more motivating than liability protections.

aging Donation of Food to Persons in Need" (MA S.920/H.1594), can significantly increase gleaning participation among Massachusetts apple growers. Liability protections would encourage 45.8% of growers, while 64% support state tax credits. Expanding these incentives, along with direct payments for donated produce, would make participation more attractive. Though liability is not the top concern, it plays a crucial role in reducing legal risks. Clear communication, streamlined tax processes, and strong outreach are essential to maximize engagement. Further research across other agricultural sectors is needed to develop broader programs, helping reduce food waste and strengthen food security statewide.

Acknowledgements

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Mike Hannigan is an undergraduate student at Greenfield Community College and a summer 2024 intern in the Research and Extension Experience for Undergraduates (REEU) program. Mateo Rull-Garza is a graduate student at the University of Massachusetts, Stockbridge School of Agriculture.

Editor's note: Gleaning ensures food safety by adhering to strict harvesting practices, with no produce collected from the ground. All gleaned produce is harvested in the same way as the farm's market-bound crops, using volunteer labor. For example, apples are picked directly from the trees, and no fruit that has fallen to the ground is collected, maintaining the same safety standards as commercial harvests.

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