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“We need a better system”: Maryland crop growers’ perspectives on reducing food loss through donation

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Abstract

The donation of unharvested or unsold crops to rescue organizations has been promoted as a strat-

egy to improve healthy food access for food insecure households while reducing production-level food loss and waste (FLW). In this study, we aimed to assess the motivations, barriers, and facilitators

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for crop donation as a FLW reduction strategy among Maryland farmers. We interviewed 18 Maryland-based food producers (nine frequent crop donors and nine infrequent, by self-report) in 2016 – 2017, soliciting their perspectives on crop donation motivators, process feasibility, and interventions aimed at increasing crop donation. The interviews were thematically coded. All respondents were aware of crop donation as an option, and most expressed interest in reducing FLW by diverting crop surpluses for human consumption. While financial barriers represented one aspect influencing donation decisions, respondents also cited convenience, process knowledge, and liability as key considerations. In contrast to frequent donors, many of whom considered donation a moral imperative, some infrequent donors questioned the expectation that they would donate crops without compensation. Both frequent and infrequent donors were aware of pro-donation tax incentives, and infrequent donors reported being unlikely to use them. This research demonstrates that crop donation motivations, barriers, and facilitators can be diverse. Given the existence of crop surpluses and their potential benefits as emergency food, our results suggest that multiple interventions and policies may contribute to incentivizing and facilitating crop donation (or enabling the purchase of surplus crops) rather than one-size-fits-all approaches. Our findings also highlight a need to prioritize crop recovery methods that enhance growers' financial stability.

Keywords

Food Waste, Food Loss, Food Rescue, Emergency Food, Crop Donation, Food Production, Farming, Worker Health, Food Insecurity, Gleaning, Donation Tax Incentive

Introduction

Increasing evidence of widespread food loss and waste (FLW) throughout the United States (U.S.) food supply chain, coupled with supply chain challenges during the COVID-19 pandemic, has highlighted the benefits of recovering surplus food at all supply chain levels, including farms (C. Campbell & McAvoy, 2020; Hall et al., 2009; Mansoor, 2020; ReFED, 2018). In Maryland in

2017, approximately 12,400 farms on roughly 1.4 million acres grew crops that included vegetables, fruits, nuts, and berries (U.S. Department of Agriculture National Agriculture Statistics Service [USDA NASS] 2019). The quantity of these crops that were surplus (i.e., went unharvested or unsold) is unknown (USDA NASS, 2019), but estimates suggest up to 17 million tons of crops planted for human consumption are lost annually at the farm level (ReFED, n.d.-a). In response to this, donating surplus crops to rescue organizations has been promoted as a way to improve healthy food access for food insecure households while reducing production-level crop losses (Feeding America, 2020).

Background on Farm-Level FLW

Farm-level FLW represents an under-researched area in the U.S. Key research gaps include the extent and character of farm-level FLW, evaluations of rescue program, and how best to reduce FLW by supporting farmers to donate surplus crops (Baker et al., 2019; D. Campbell & Munden-Dixon, 2018; Gillman et al., 2019; Harvey et al., 2022; Hecht & Neff, 2019; Johnson et al., 2019; Kinach et al., 2020; Soma et al., 2021; Spang et al., 2019).

Governmental U.S. FLW estimates currently exclude farm-level losses (Buzby et al., 2014), meaning that these estimates may be systematically undervalued (Johnson, Dunning, Gunter et al., 2018). Several peer-reviewed studies have quantified local and regional production-level FLW in the U.S., documenting substantial variability by crop type, growing method, market demands, and geographic location. Mean unharvested or unused salvageable crop estimates range from 16% on vegetable and berry farms in Vermont (Neff et al., 2018), to 31.1% on conventional crop farms in California (Baker et al., 2019), to 42% on vegetable farms in North Carolina (Johnson, Dunning, Bloom, et al., 2018). An investigation across multiple states found that 40% of fresh tomatoes, 39% of fresh peaches, 2% of processing potatoes, and 56% of fresh romaine lettuce (Pearson et al., 2018) were lost. Such losses occur for many reasons, including intentional overproduction given the many uncertainties farmers face from natural and market forces (Johnson et al., 2019). These find-

ings, and the suggestion that more farm-level FLW occurs than was previously thought, have piqued interest in better recovery and use of these crops.

It is known that farm-level losses can negatively impact growers' financial viability (Papargyropoulou et al., 2016), which in many cases is already precarious. U.S. farming households' annual median on-farm income (US\$210 in 2021) has recently gone from nominal to negative profits (-US\$661 forecasted for 2022), and most U.S. growers consequently supplement their incomes with off-farm activities (USDA Economic Research Service [USDA ERS], 2022). Research links this financial uncertainty to increasing mental health issues and suicides in the farming community (Reed & Claunch, 2020).

Crop Rescue and Food Insecurity

The nongovernmental organization ReFED's national FLW loss model estimates that overall, only 1.6% of farm-level surplus is rescued in the U.S. (ReFED, n.d.-b), although this estimate excludes an unknown amount of crops that are "gleaned" (i.e., collected from fields after the harvest, usually by volunteers [Center For Health Law and Policy Innovation, Vermont Law School Center for Agriculture and Food Systems, & Association of Gleaning Organizations, n.d.; ReFED, n.d.-b]). While crop donation is not the solution to food insecurity, the loss of salvageable crops occurs simultaneously with high food insecurity rates. In 2021, approximately 10.2% of U.S. households were classified as food insecure, with over 640,180 people experiencing food insecurity in Maryland (Coleman-Jensen et al., 2021; Maryland Food Bank, 2022). Many food banks and rescue organizations have begun prioritizing offering healthy, fresh foods to clients (E. C. Campbell et al., 2013; Martin, 2021).

In part to meet this need, Maryland Food Bank's (MFB) Farm to Foodbank program rescued 2.5 million pounds of crops in 2021 (Maryland Food Bank, 2021). This program, initiated in 2010, aims to facilitate donation throughout Maryland by providing donation packaging and other resources, organizing field gleaning events, and providing donation pickups (Maryland Food Bank, 2020). The program also contracts with growers to pro-

duce crops specifically for Maryland Food Bank. The MFB then distributes produce to food pantries, soup kitchens, schools, and shelters, and uses the produce in their in-house FoodWorks culinary training program (Maryland Food Bank, 2020). This local program predated the federal Farm to Foodbank Program, which started in 2018 and distributes federal funds to states that are used to defray crop donation costs (such as transportation, organization of gleaning activities, packaging, and other costs) (USDA, 2021).

While rescue organizations frequently solicit surplus crops for donations, it is worth noting that crop donations are not exclusively composed of surpluses or crops that would otherwise become FLW. This is demonstrated by the MFB Farm to Foodbank program's contracts with local growers, who produce crops for the MFB to purchase (Maryland Food Bank, 2020). Additionally, not all undonated surplus crops must become FLW. Many surpluses are edible and can be sold in secondary markets, upcycled, preserved, or otherwise repurposed for human consumption (ReFED, n.d.-b). Other surplus crops that are inappropriate for human consumption, including those damaged by weather or those that have begun to rot, can be used as animal feed, to generate energy, or to supplement farm soil as compost (Gillman et al., 2019).

In the interest of both reducing FLW and addressing food insecurity, a growing literature explores the landscape of crop surpluses and donations in high-income countries (D. Campbell & Munden-Dixon, 2018; Gillman et al., 2019; Janousek et al., 2018; Johnson et al., 2019; Johnson, Dunning, Bloom, et al., 2018; Neff et al., 2018). Their findings emphasize that production-level FLW often occurs due to circumstances beyond growers' control, including market and weather volatility (D. Campbell & Munden-Dixon, 2018; Johnson et al., 2019; Neff et al., 2018; Soma et al., 2021).

A few studies evaluate specific aspects of rescue programs or assess producers' reasons for participating (Harvey et al., 2022; Hecht & Neff, 2019; Johnson et al., 2019; Kinach et al., 2020; Soma et al., 2021). Findings suggest that reducing farm-level FLW through donation is one option of many, and that not all situations merit recovering food for

human consumption. Some studies examining current donation programs have found that donating low-quality, perishable foods burdens recipient organizations with their disposal (Hecht & Neff, 2019), and that culling losses at the farm level may reduce their environmental impacts in comparison with the retail or consumer levels (Gillman et al., 2019). Research examining policies geared toward increasing crop donations has found that strategies like tax incentives may differentially benefit or appeal to crop producers (Kinach et al., 2020; Soma et al., 2021).

Maryland's Agricultural Context

Despite agriculture representing Maryland's largest commercial industry, it is small in comparison to other states, contributing only 1% of the United States' agricultural sales by value (USDA NASS, 2019). Maryland contains a sizable poultry production industry, concentrated mostly on the eastern shore of the Chesapeake Bay, which generates approximately half of the state's agricultural sales by value (USDA NASS, 2019). In contrast, crops contribute approximately 38% of the state's agricultural sales by value and are grown on approximately 1.53 million acres throughout the state (Maryland State Archives, 2021).

Table 1 presents information on the farming industries for the three counties represented in this study, compared to the rest of the state and the

nation. Charles, St. Mary's, and Calvert counties, located on the southernmost tip of Maryland's Western Shore peninsula, are bordered by the Chesapeake Bay and the Potomac River. They are considered relatively rural, although within geographic proximity of two major food banks: the Capitol Area Food Bank (serving the metropolitan Washington, D.C., region) and the Maryland Food Bank (serving the state of Maryland). Farming operations in southern Maryland are supported by the Southern Maryland Agricultural Development Commission (SMADC), which was created by Maryland legislators in the year 2000 to help growers transition from tobacco production to other farming models (SMADC, n.d.). SMADC continues to support and promote southern Maryland farming and diversification by providing training, research, grants, technical and marketing assistance, and information regarding laws and regulations affecting growers. Their board includes active farmers, legislators, business consultants, and other stakeholders (SMACD, 2023).

Local and National Donation-Related Policies

In recent years, state and federal legislators have undertaken policy efforts to facilitate crop donations. In Maryland, these include a tax incentive program enacted in 2017 whereby growers can earn a state income tax credit worth 50% of eligible donated food's value, or 75% for certified organic

Table 1. Selected Information Describing Agricultural Industries in the Three Maryland Counties (2017) Represented by Study Respondents, the State of Maryland (2017), and the United States (2023)

	Total # of farms	Average farm size, in acres	Net cash farm income, per-farm average (US\$)	Market value of crops sold (US\$)
Charles County ^a	385	107	-\$1,957	12,439,000
St. Mary's County ^a	615	100	\$5,941	20,465,000
Calvert County ^a	280	90	-\$7,256	5,701,000
State of Maryland ^a	12,429	160	\$52,997	948,125,000
United States	2.00 million ^b	440 ^b	\$92,400 ^b	Approximately 150 billion ^c

^a USDA National Agricultural Statistics Service [USDA NASS]. (2019). *2017 state and county profiles—Maryland*. https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Maryland/index.php

^b USDA Economic Research Service [USDA ERS]. (2023, March 14). *Farm and farming income*. <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/#:~:text=In%20the%20most%20recent%20survey,million%20acres%20ten%20years%20earlier>

^c USDA ERS. (2023, February 7). *Net cash income 2014–2023F*. <https://data.ers.usda.gov/reports.aspx?ID=17831>

donations, up to US\$5,000 (Income Tax Credit—Qualified Farms—Food Donation Pilot Program, 2017).

Additionally, Maryland law offers limited liability protections for growers who allow gleaning to recover crops on their operations (Md. Code Ann., Cts & Jud. Proc. § 5-404(b) Farmers and Gleaning, 2023). Similar liability coverage at the federal level through the 1996 Bill Emerson Good Samaritan Act absolves U.S.-based good-faith food donors from liability related to foodborne illness (Bill Emerson Good Samaritan Food Donation Act, 1996). Little is known about growers' perspectives regarding the utility of these tax incentives or liability protections in encouraging donations.

Given the complexity and diversity of challenges faced by farmers and the need to better characterize opportunities around FLW and donations, researchers have called for more place- and crop-specific studies (Soma et al., 2021) examining these issues. This qualitative study adds insights to a growing literature by examining crop growers' views on reducing farm-level FLW through donation in the U.S. Mid-Atlantic state of Maryland. While many studies about crop donations include only respondents who actively participate in donation programs, or do not describe respondents' donation habits (Kinach et al., 2020; Soma et al., 2021), we provide evidence from both frequent and infrequent donors and compare their perspectives about donation processes. Our results provide a contrast of farmers who choose to donate versus those who do not, and enhance a nuanced understanding about how these growers view donation feasibility, processes, and policies. We also identify priorities for future research and interventions, including needs to support crop recovery methods that enhance growers' financial stability.

Methods

Recruitment

We collaborated with the SMADC to recruit professional farmers from Maryland. We conducted two rounds of recruitment via telephone using purposive chain sampling from February 2016 to August 2017. For the first round, we recruited farmers ($n = 9$) who self-reported that they actively

engage in crop donation using a list provided by SMADC. In the second round (completed in summer 2017), we recruited participants ($n = 9$) who self-reported that they choose not to donate or donate minimally. We included participants who were over the age of 18, spoke English, and who farmed or owned farmland in St. Mary's, Charles, or Calvert County, Maryland, U.S. In total, we approached 42 individuals, and 18 agreed to be interviewed.

Interviews

The semi-structured interview guide gathered information about current crop donation participation, perceived benefits and challenges related to crop donation, and a Maryland tax incentive (Income Tax Credit—Qualified Farms—Food Donation Pilot Program, 2017). We amended the interview guide through an iterative process guided by tenets of grounded theory, to focus on facilitators and barriers of donation (Charmaz, 2006). Researchers conducted interviews in English either in person at informants' farms ($n = 6$) or via telephone ($n = 12$). The first round of data collection occurred in February and March 2016, and the second round occurred in June and July 2017. Each interview was audio recorded and transcribed.

Data Analysis

We used MAXQDA (VERBI Software, 2018) for data management and analysis. First-round coding took place in four phases: (1) initial deductive code development; (2) independent coding by two researchers using inductive line-by-line coding (Charmaz, 2006); (3) codebook discussions and revision based on emergent themes and concepts; and (4) codebook finalization. The final codebook contained 12 codes categorized under seven themes and was used to code all interviews. Interrater reliability was assessed based on double-coding a single transcript. Any coding discrepancies were discussed and resolved by the team (Saldaña, 2015). Second-round coding was conducted using the established code book, and first-round sample findings were compared to second-round sample findings to identify differences between frequent and infrequent donors by self-report.

After coding, the researchers extracted and organized the data by categories, which were then reviewed using constant comparisons between and within texts to identify key themes (Saldaña, 2015). Throughout data collection and analysis process, the research team kept analytical memos to record emerging ideas, themes, and reactions (Saldaña, 2015).

This project was deemed nonhuman subjects research by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Results

Respondents ($N = 18$) came from for-profit farms ($n = 15$) and nonprofit farms ($n = 3$). Seven were farm owners, two were farm workers, and one was a farm manager. Nine participants were frequent donors by self-report, and nine were infrequent donors. Respondent characteristics are further summarized in Table 2. In summary, in contrast to frequent donors, some of whom exhibited non-profit or hybrid business models, infrequent donors were all for-profit growers. Infrequent donors reported having relatively smaller operations by acreage than frequent donors. The sample of infrequent donors also contained more organic producers than the sample of frequent donors.

Descriptions of Crop Loss

Farmers in both donation categories discussed an aversion to crop FLW due to the money, time, resources, and personal investment involved in crop production. Causes cited for FLW included spoilage, weather, “over-planting,” customers’ demands for “perfect” (i.e., cosmetically appealing) crops, seasonal demands for growing space, competing time demands, and “bumper crops” that flood the market. FLW estimates varied from

about 20% of all crops planted to less than 5%, and growers frequently stated that the results differed based on crop type and other factors. For example, one grower stated that FLW “varies wildly by crop,” and “it’s hard to tell, obviously, if you don’t harvest it, how much is out there.”

Respondents identified multiple strategies they use to reduce FLW, including preserving excesses to eat themselves, giving food to their workers, feeding crops to farm animals, composting or tilling crops back into the soil, and donation. Respondents pointed out the benefits and simplicity of employing practices that upcycle nutrients for reuse on the farm. As one frequent donor explained, “you give [surplus crops] to your livestock ... and turn that surplus into meat or eggs ... [which] keeps so much better than a beautiful perfect cantaloupe.”

Overview of Themes

Interviews revealed three dominant themes related to reducing FLW through donations, including growers’ perspectives on (1) existing facilitators of crop donation, (2) existing barriers to crop donation, and (3) suggestions about how to facilitate

Table 2. Respondent and Farm Characteristics by Self-Report, by Recruitment Period

	Round 1	Round 2
Total, n (%)	9 (100)	9 (100)
Size in acres, mean (range)	179 (1–365) ^a	33 (5–100) ^b
Products		
Crops only	5 (55.6)	5 (55.6)
Crops and livestock	4 (44.5)	4 (44.5)
Growth method, n (%)		
Conventional	5 (55.6)	2 (22.2%)
Organic	4 (44.5)	7 (77.8%)
Business model, n (%)		
For-profit	5 (77.8)	9 (100)
Nonprofit	3 (16.7)	–
Hybrid	1 (5.6)	–
Frequent donor by self-report	9 (100)	–

Percentages may not total 100 due to rounding.

^a Two first-round respondents are missing acreage estimates.

^b One second-round respondent is missing acreage estimate.

donation. We provide a summary of these themes in Figure 1 below, along with specific examples from each category.

Facilitators of Crop Donation

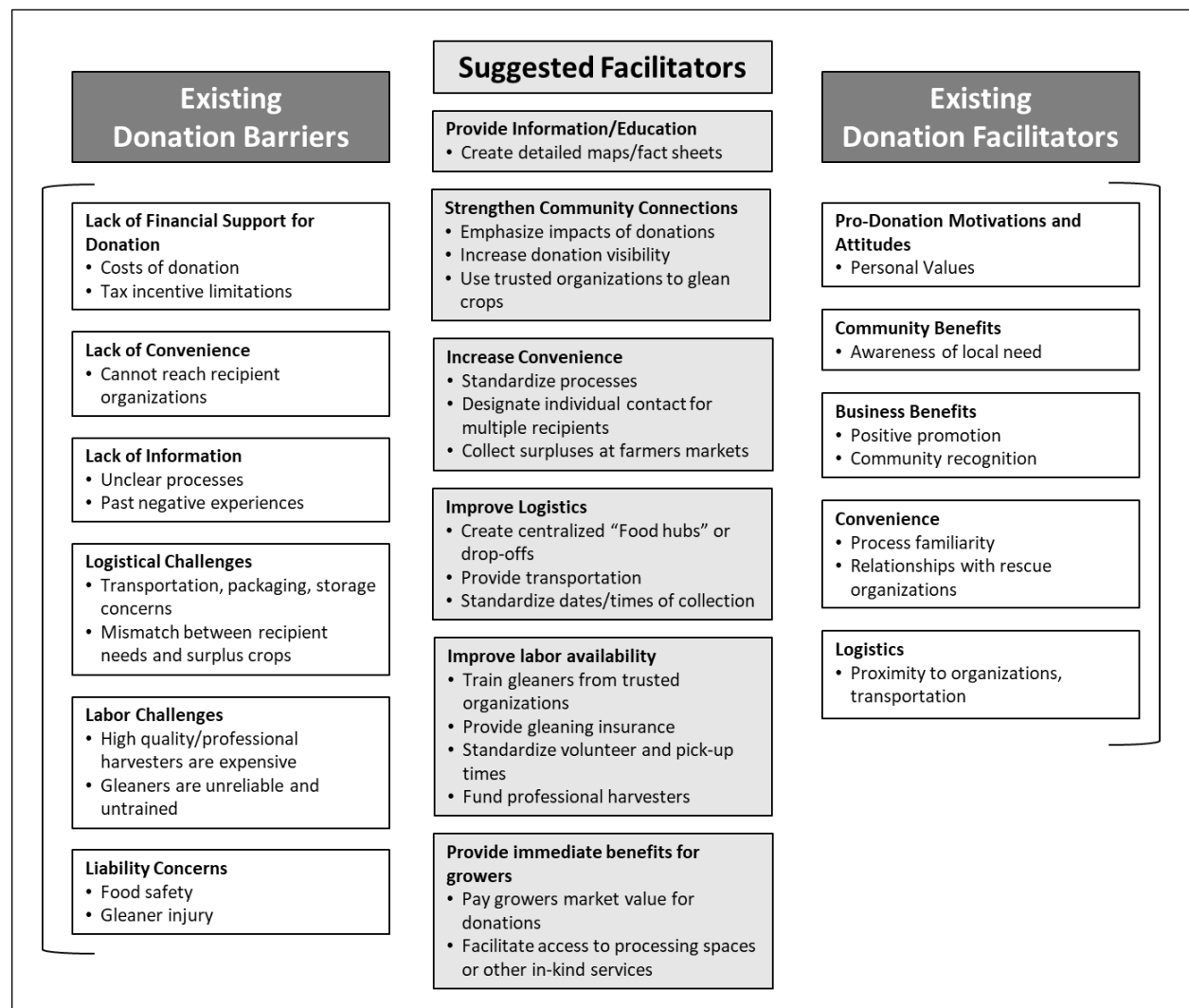
Pro-Donation Motivations and Attitudes

Personal Values: Both nonprofit and for-profit frequent donors expressed moral motivations, stemming from a desire not to waste food, combined with a moral conviction that donation is “the right thing” to do. A few for-profit growers prioritized donation even when it cost resources or diminished profits. These growers felt donation fits into

an ethical framework that dictates that growers care for one another, their land, and “the next generation.” Even though a frequent donor acknowledged that “the farmer and his family are struggling, too,” the respondent affirmed that “even though times are tough, the farmer always wants to help people in the community.”

Community Benefits: Similarly, the desire to address community food insecurity represented a deciding factor in some growers’ choices to donate. One frequent donor, who had previously declined to donate, described undergoing an attitude shift upon witnessing the line outside her local food

Figure 1. An Overview of Crop Donation Barriers, Existing Facilitators, and Suggested Facilitators for Crop Donation Reported by 18 Maryland-Based Crop Growers, 2016–2017



bank. She stated, “Any one of them could have been my family members. ... I was just floored that there was that kind of need for [emergency food].” Many frequent donors described transformative insights into the scope of hunger, especially in their local communities, as a driving force for overcoming donation hurdles: “We never even really thought about ... the poor, the needy, or anything like that ... until it was brought to my attention that there is a need.” The same frequent donor described growing food “specifically for the hunger community,” and hosting volunteer harvesters from addiction and recovery programs, which allowed his operation to provide support beyond food (e.g., job training), and thus, in his opinion, to address broader social needs.

Business Benefits: The perceived business benefits of donation mentioned by frequent donors included positive public relations, farm promotion, and community recognition, although these were never the only reasons for donating. Not all growers valued public recognition; for example, one frequent donor described it as inconsequential, saying, “I’m not doing it for credit and I’m not doing it to impress you or anybody else.”

Convenience

Most respondents, regardless of their donation frequency, knew about donation as an option and had investigated it previously. Both frequent and infrequent donors emphasized convenience as perhaps the most important donation facilitator. A frequent donor stated, “... On one side you could certainly argue that it will be nice to ..., pay less taxes or get a check back. On the other hand, I think personally if donating food is convenient it’s going to happen no matter what.”

Among frequent donors, existing relationships with rescue organizations incentivized them to overcome convenience challenges and sometimes contribute farm resources to the process (e.g., buying boxes or transporting food to rescue organizations).

Logistics

The distance from farms to food rescue organizations came up frequently in interviews. One fre-

quent donor described the importance of being close to a food pantry as a facilitator for donation: “It works for us logistically. It wouldn’t make sense for the ... Food Bank to be sending a truck and a driver from all the way up [there]. ... But it is worth it for the food pantry that’s about 5 minutes from here, if they send a truck and a volunteer over here to get it.”

Reported Barriers

Costs of Donating: Many frequent and infrequent donors viewed donation costs as potentially prohibitive. Examples of these costs included hourly labor to harvest, sort, wash, and package crops; the expense of boxes and bags; and transportation. One frequent donor explained that even when he wanted to donate crops, the financial costs sometimes stopped him from doing so:

I’ve already invested the time and the equipment and the land into growing that crop, harvesting that crop, packing it, ... putting it in a box or a bag or whatever, and ... then to have to ... put it in a truck and deliver it when you’re not getting any money for it, ... you can’t take that many hits.

Many infrequent donors expressed reluctance to invest their finite resources in donation. One grower described donating as counter to his primary goal of maintaining solvency,

With small growers, we don’t make much money anyway. ... To spend a bunch of time and labor doing something that you ... get [a] good feeling from and you’re theoretically helping your fellow man, [but if you don’t earn a profit] how do you do that and be a sustainable farm?

A formerly frequent and now infrequent donor questioned the overall societal expectation to “feed the poor on the backs of farmers.” This grower stated,

The food is not free ... [It] is expensive to grow. I ... have issues with the whole logic train. ... I can’t pay my bills and I can’t pay my

employees. I can't pay myself a living wage if I'm selling my products in, say, a food desert for a quarter of the price that I would get for them elsewhere. So, I feel like we need to come up with a better system.

While other infrequent donors described a moral aversion to wasting food, they generally did not report feeling ethically bound to donate their crops and did not comment on business benefits. Some suggested it was not worth their time to donate what they considered small amounts, especially at the expense of other farm responsibilities. As one infrequent donor stated,

If I had more, if I found myself with hundreds of pounds of produce that could otherwise be eaten, then I would feel more of an ethical/moral obligation [to donate], ... because I'm grossed out morally about food waste. ... It's not that I don't feel like that's ethically significant ... but at this point, it's not at the top of my list of reasons to do it.

Tax Incentive Concerns: Several respondents noted economic incentives as a potential way to facilitate crop donation on farms. When asked about the Maryland Crop Donation Tax Credit, or the utility of tax incentives generally, growers expressed various opinions about their potential effectiveness. Frequent donors viewed the tax credit as a "nice perk" that could spur action if a person was already considering donation. For instance, if one was looking for a donation site and realized the drive was longer than optimal, a tax credit could help a grower justify the expense and opportunity costs of transport. By contrast, many infrequent donors considered a tax credit insufficient as a primary motivator and raised multiple concerns, described below.

In terms of barriers to using a tax incentive, both frequent and infrequent donors noted that tracking donations and completing paperwork for this purpose incurred costs. For those with small production capacity, extra work for relatively small donation amounts would not be worthwhile, especially for a delayed reward at tax time.

Infrequent donors who were specialty and

organic producers questioned the thoroughness and equity of methods to determine donation values. They argued that because their specialty crops might sell for higher prices than conventionally grown crops, they should be valued more as donations. If all crops were grouped together (e.g., heirloom "Cherokee Purple" tomatoes with regular tomatoes), the system would be unfair and unrewarding. Similarly, growers of specialty greens and other light-weight crops pointed out that determining donation value by weight would disadvantage them.

Infrequent donors with relatively small operations perceived tax incentives as targeted toward larger farms. One grower explained, "For every piece of legislation that's ever come out, it's always benefited either the Eastern Shore or the larger ... hundreds and hundreds and hundreds of thousands of acres of farms. So there's nothing for the small farmer, I'll be very surprised if it helps the small farmer."

Importantly, growers pointed out that while well-intentioned, a tax credit would not serve them if they did not make enough money to pay taxes, or if their farm was not-for-profit. An infrequent donor stated that she is "on food stamps," so a tax credit would not benefit her. Another infrequent donor described the tax incentive as undesirable because it would not meet growers' immediate and substantial economic needs, e.g., "they can feed themselves, but that's all they can do. They'll have no retirement. Their kids aren't going to have any college fund. They're not going to have any healthcare." Another respondent explained frustration with any "government initiative" to increase donation that does not address immediate economic needs of smaller operations, saying "I would be irritated by it. ... There should be a government initiative to let small farmers figure out a way how to make a living. I think that's more important."

Finally, some growers expressed distrust of government involvement in their lives and suggested this feeling would be widespread in the farming community, thus reducing the likelihood that a tax incentive would be well-used.

Lack of Convenience: Both frequent and infrequent donors highlighted inconvenience as a major bar-

rier to donating. One reported that the convenience challenge included contacting rescue organizations to facilitate donation. Donors reported having to contact food rescue organizations themselves, rather than the opposite, and suggested that others may not take this initial step to find out where, when, or to whom they could donate. Both frequent and infrequent donors reported instances of composting or throwing away crops intended for donation because they could not reach rescue organizations during what they considered the organizations' limited hours (e.g., 7 am to 4 pm on weekdays), or if recipient contacts took too long to respond.

Lack of Information: Although frequent donors did not find navigating the donation processes challenging, they suggested that a general lack of clarity could prevent other farmers from donating. Infrequent donors confirmed that this was often the case. One infrequent donor described her questions: "I would ... want to talk to [recipient organizations] about ... is what I have appropriate for their needs? I could give you a hundred pounds of turnips, but do you really want a hundred pounds of turnips? Is that useful?"

Infrequent donors cited negative experiences that reduced their trust in donation systems. For instance, one grower donated a pallet of produce to a food bank only to see it rotting there a week later. Another found out, after a year of donating, that their crops were being sold for profit without their knowledge.

Logistical Challenges: Many respondents, even frequent donors, considered current donation processes logistically challenging. An infrequent donor stated, "Farmers can only do so much. ... Does [a donation] need to be washed and bagged? If [the food bank] said yes, I would just kind of go, well, forget it. That's too much trouble."

Even if growers decided to donate, they were sometimes prevented from doing so, which decreased future motivations to donate. Donors in both frequency categories described trying to donate and being turned away when weather patterns produced a "glut" of a certain crop that overwhelmed rescue organizations. A frequent donor

described experiencing this barrier: "I've had [food banks] tell me, 'Oh no, we don't want that, we have enough of that. We only want these crops.' So they're very selective." Others have offered fresh crops to rescue organizations who declined them because they only accepted canned foods at that time.

Many growers described transporting crops for donation as a major barrier. For example, an infrequent donor said he had not donated because, "You've got to transport everything. ... Some will come [pick up donations] but most [recipients], you have to bring it to them, then you've got issues in the travel. They haven't figured out a way to make it more donation-friendly, I guess."

Labor Challenges: Almost all respondents, regardless of donation frequency, considered it too expensive, and therefore unfeasible, to pay workers to harvest crops for donation. One frequent donor explained that she navigated these challenges by hosting tri-annual events where volunteer gleaners strip fields of salvageable produce. She stated, "I can't really think of any drawbacks ... other than just a few extra hours each year coordinating these events. ... It doesn't ... mess up our crop planning or anything like that." Another frequent donor who used volunteer labor described coordination as key to their success: "It is reliable if someone structures and works with the farms to know when their harvest yield time typically is, ... but if growers are unable to source gleaners when they need them, he is not going to keep calling many more times if no one shows up."

While volunteer gleaners can provide free labor, both frequent and infrequent donors described them as lacking needed skills, professionalism, or physical stamina. A frequent donor summarized his thoughts about gleaners: "I mean there are people [who] would be amazing assets and there are a lot of people who are just pure liabilities." He described carefully timing a school group gleaning event just before the first frost because, "We knew whatever damage they do [to crops], it's okay." Others noted hearing about growers' negative experiences with gleaners; for example, a frequent donor explained, "Some farmers get very upset when they open their farm to these gleaning

operations and there are water bottles and trash and stuff left at their location.” An infrequent donor explained, “I’m not farming because I want to be around a bunch of people who don’t know what they’re doing.”

Liability Concerns: Multiple growers expressed concerns about donation-related liability. This was true even among those who reported awareness of the federal 1996 Bill Emerson Good Samaritan Act. Growers also expressed concerns about selling or donating what they considered edible, safe foods because of federal food safety laws, including the Food Safety Modernization Act, noting, “In the United States what we do is we just throw it away. That’s pretty much what the health department wants you to do, is to throw it away.” Further, some growers feared legal liability associated with gleaners. For example, if a gleaner got injured while working on contaminated crops, growers feared lawsuits. As one grower stated, “All it takes is one gleaner with hepatitis...”

Suggested Donation Facilitators

Provide Education and/or Information: Many frequent donors offered suggestions to improve infrequent donors’ attitudes toward donation. These respondents recommended educating nondonors about needs in their immediate communities and the potential impacts of their donations.

Strengthen Community Connections: Frequent donors also suggested that forging and strengthening community connections could encourage more donation. To accomplish this, frequent donors recommended increasing formal community recognition for donation, because it provides growers with a sense of pride, confirms community appreciation for their efforts, and promotes the farmer’s business. One frequent donor noted that increasing donation visibility in this way could cultivate donation as a social norm, which could further incentivize nondonors.

Increase Convenience: To increase donation convenience and opportunity, several growers recommended interventions to increase donors’ familiarity with recipient organizations and clarify

processes. Suggestions included providing up-to-date maps and donor recipient lists on trusted websites or through trade groups. Others suggested that having a designated individual available to connect growers with multiple donation locations, organizations, and people could better facilitate donation than current practices, where they must call each potential recipient individually.

Improve Logistics: To address logistical barriers, multiple respondents suggested having a truck that drove from farm to farm on a set day each week to collect donations, to remove transportation costs and increase process predictability. Others suggested establishing a convenient location to donate, perhaps a central farm in the community that could deliver crops to recipient organizations. An infrequent donor suggested that, rather than a tax incentive, government funding should support “regional food hubs” that could provide in-kind services, like access to a commercial kitchen or other food processing space or equipment. He explained this could “solve the distribution problem...”:

... If I was a member of that food hub and I knew that I was giving them 50 pounds of free food that they were taking a write-off on, I would say, “Okay, what do I get for this?” “Well, what you’re going to get is you’re going to get access to the commercial kitchen we have on site for two days for free, to can tomato sauce.” Well, that’s great because that’s what I need.

Another infrequent donor suggested that recipients go where growers are already selling crops. He described the ease of donating leftover crops at the end of the farmers market, rather than reloading them and transporting them back to the farm or a rescue organization:

We’ve done the most crop donation ... through our grower’s market because, basically ... they made it easy. [They] would come through and pick up our leftover produce. For me, that’s great because it’s just less stuff that I have to take home and deal with. It also is good to know that it’s going to somebody who needs it.

Improve Gleaning: The growers provided several suggestions to improve available donation harvest labor through gleaning. One frequent donor suggested limiting gleaning to certain trusted organizations: “Even beyond churches and stuff, 4-H groups would have their own insurance, Boy Scout groups would have their own insurance, and again you have a closed community of volunteers that could be trained, as opposed to just kind of open to anybody.” Growers also suggested standardizing volunteer and pick-up times to be consistent and predictable, and having a dedicated person to coordinate gleaning efforts, training, and providing insurance.

One nonprofit grower and frequent donor, who grows crops specifically for donation, explained that he reduces labor costs by organizing volunteers or work-release inmates to not only glean, but also to harvest crops, instead of professional laborers. He explained that this practice produces lower-quality harvests, but is acceptable because products are sold to rescue organizations. We address concerns about this in the discussion. For-profit growers felt unable to cut costs in this way, explaining that only professional laborers harvest crops in such a way that they meet customers’ expectations for quality. Further, some for-profit growers expressed irritation that nonprofits undercut the crop market through this practice.

Discussion

This qualitative study adds to a growing evidence base documenting growers’ perceptions and decision-making around crop donation. To our knowledge, no other study includes both frequent and infrequent donors, or growers from the Mid-Atlantic U.S. We noted several differences between frequent and infrequent donors in terms of their motivations to donate crops, perceptions of donation feasibility and familiarity with processes, and general acceptance of pro-donation policies, like tax incentives. These differences have implications for the kinds of donation interventions these groups might find most attractive or effective. We also document infrequent donors’ concerns about the societal expectation to donate surplus crops without compensation. Some growers felt that this

expectation not only undermines their businesses’ profitability and longevity, but also reinforces the idea that excess crops have little value—when the opposite is true. Below, we present findings about how to make donation more feasible for growers who want to participate and suggest that fostering alternative, compensated avenues for reducing production level FLW could be needed.

Table 3 summarizes donation barriers identified by Maryland-based crop growers and provides a non-exhaustive list of potential responses to address these barriers.

Donation Motivations and Attitudes

Research shows that when dealing with unharvested or unsold produce, growers may choose convenient, inexpensive disposal methods that work synergistically with farm practices over those requiring extra planning or resources (Gillman et al., 2019; Johnson et al., 2019). For example, growers may compost or feed high quality crops to animals in lieu of donating them to rescue organizations to save time and money (Gillman et al., 2019). While respondents did report these practices, many also expressed the desire to reduce FLW by donating crops or otherwise upcycling them for people to eat, where possible.

Whether they are frequent or infrequent donors, many respondents emphasized the extra costs and labor associated with donating crops, often in return for little to no compensation. Despite this, many frequent donors’ ethical and religious donation motivations align with those documented by Kinach and colleagues (2020), who suggested that many crop donors may consider food part of the “moral economy” and therefore donate to the extent they can, regardless of market incentives or consequences. However, some infrequent donors’ frustration with the expectation that farmers provide emergency food highlights a need to develop surplus FLW interventions that support growers’ economic viability, such as emergency food purchasing or secondary markets.

Despite interest in increasing donations, our results align with those of Johnson and colleagues (2019), indicating that growers commonly receive limited guidance regarding processes (e.g., what to donate; where to donate; how to measure and track

donations; and state and federal food donation safety laws; liability protections; etc.). Frequent donors' suggestions for compiling guidance on this and other donation issues with targeted education campaigns could potentially increase nondonors' agency and confidence to donate. Our findings suggest that successful campaigns could leverage leaders within farming communities and trusted groups, such as agricultural extension, to help

growers access donation information. These resources might help overcome any previous negative donation experiences and could familiarize growers with donation processes, which have been reported as facilitating donations in food retail (Ceryes et al., 2021). Additionally, such guidance could prevent rescue organizations from receiving inappropriate or inedible food (Hecht & Neff, 2019).

Table 3. Barriers to Crop Donation and Potential Responses Reported by Respondents Organized According to Themes, Maryland-Based Growers, 2016–2017

Thematic Category	Donation Barrier	Potential Intervention Strategy
Motivations and Attitudes	Lack of exposure to donation benefits for recipients	<ul style="list-style-type: none"> • Forge relationships between recipient organizations and crop donors, including site visits and interaction with recipients • Share materials about donation impacts with farmers • Formally recognize and publicize donations to promote growers' businesses, increase donation visibility, and confirm community appreciation
	Concerns about liability	<ul style="list-style-type: none"> • Publicize and clarify liability protections
Convenience and Logistics	Transport unavailable or expensive	<ul style="list-style-type: none"> • Increase donation aggregation hubs, with refrigeration and storage • Reimburse or pay up-front for transportation costs
	Packing material costs	<ul style="list-style-type: none"> • Directly provide or fund donation packing materials
	Challenges identifying donation recipients (especially during widespread crop gluts)	<ul style="list-style-type: none"> • Improve capacity for value-adding at food hub or rescue organization • Create and distribute centralized and/or localized guidance, including donation network maps, quality standards, and accepting organizations • Increase access to rescue organizations through increased and more flexible hours • Establish and promote donation routing hotlines or apps
Labor Challenges	Lack of funding for professional labor or reliable volunteer labor	<ul style="list-style-type: none"> • Train a reliable and reputable pool of gleaners from trusted organizations to improve harvest quality • Compensate existing farm employees to oversee gleaners • Pay farm employees for donation-related labor or reimburse through tax incentives or other mechanism
Lack of Financial Support	Tax credit concerns	<ul style="list-style-type: none"> • Provide supports to encourage tax credit usage, including hired navigation helper positions and administrative support • Tailor methods for determining donation value • Promote tax credits through trusted organizations
	Inadequate benefits and financial and workload burdens for already-challenged growers	<ul style="list-style-type: none"> • Enhance the immediate financial and logistical benefits associated with donation • Prioritize purchasing emergency food at market value • Develop secondary markets for surpluses

In terms of policies, Hudak et al. (2022) found that donor liability protections were the most common type of U.S. state policy intended to facilitate food donations. We echo others' (e.g., Harvey et al., 2022) suggestions that clarification and education around food safety liability and gleaner injuries are needed, but note that such supports may best serve those already inclined to donate or participate in these programs.

Convenience and Logistics

Both frequent and infrequent donors emphasized convenience as a key factor in facilitating crop donation and suggested improvements targeting this aspect of existing processes. These findings align with other evidence that increasing convenience serves as an important predictor of voluntary, altruistic behaviors like donating blood (Shaz et al., 2009) and recycling (Domina & Koch, 2016). Many of the reported suggestions for improving donation convenience, including extending donation acceptance hours, leveraging existing networks and events for donation (e.g. farmers markets), providing crop transportation and harvesting, and creating regional food hubs are already underway (Gray et al., 2016; USDA, 2021). Especially for states and programs with limited budgets or supplemental funding, (e.g., those using the federal Farm to Foodbank program mentioned above [USDA, 2021]), our results suggest that prioritizing and expanding such supports could provide substantial impact among both frequent and infrequent donors.

Labor

Donation involves significant labor inputs at the farm level, and both frequent and infrequent donors suggested that finding volunteer labor of sufficient quality was a significant barrier to donation. Though gleaners are commonly part of donation interventions (USDA, 2021), many growers in our sample expressed dissatisfaction with gleaners for various reasons and suggested alternatives or improvements.

To our knowledge, only one other study has assessed how growers perceive gleaners. Harvey et al. (2022) found that gleaners from a nonprofit that provided reliable, trained, and organized volunteers

were generally seen as an attractive option to supplement a farm's labor for donation-related harvesting. These findings reinforce our respondents' suggestions that providing higher-quality volunteer labor, or better still, support for professional harvesters, may incentivize some growers in deciding to donate and possibly also improve the quality of donated crops. However, like Soma et al. (2021), we found evidence that when growers use such resources to sell deeply discounted crops to charitable organizations, this can be perceived by other growers as "undercutting," or unfairly lowering crop prices, with potentially negative economic impacts for the farming community. In this case, the grower reported using persons experiencing incarceration for low-cost labor so that they could sell cheaper crops to rescue organizations. We suggest that programs such as this are well intentioned and may have some benefits, but that this approach warrants further consideration regarding negative implications for social justice.

Farming represents one of the nation's most dangerous occupations (National Institutes for Occupational Safety and Health, 2022). Even though gleaners are likely minimally exposed to high-risk farm equipment and tasks, growers' concerns about gleaner safety on farms could be well founded. Some states do have liability protections for farmers who host gleaners, including Maryland (Goeringer, 2021), but they require that farmers disclose dangerous conditions to gleaners, which could be challenging or disputed in the event of an injury or illness. Importantly, neither donation nor civil liability protections can shield growers from bad press in the event of a donation-related foodborne illness or an injury of a volunteer.

Lack of Financial Support

Tax Incentives

Our results build upon existing literature that growers perceive significant limitations to current financial incentives for donation. Tax incentives have been widely promoted to increase crop donation and reduce wasted food, and have been implemented in at least nine U.S. states (Center For Health Law and Policy Innovation, 2022). Maryland's incentive is relatively generous in the U.S.,

providing a tax credit worth 50% of the crop wholesale value (or 75% for certified organic farms), up to US\$5,000 (Broad Leib et al., 2016). However, while some studies report tax incentives as major motivators for crop donation (Harvey et al., 2022), our findings align with others (Kinach et al., 2020; Soma et al., 2021) who report their limitations.

Reasons for these limitations aligned with Kinach and colleagues' (2020) findings that, while tax credits theoretically ease donation-related financial burdens, this is not necessarily true in practice for all growers. We also found that while many current donors could benefit from a crop value-based tax incentive, most would not consider it a deciding factor for themselves or others. This study adds to these findings that tax incentives may be limited in convincing nondonors or infrequent donors to donate crops, especially smaller or less profitable farms, heirloom or organic growers, and growers who distrust government programming.

If they are used, we suggest that tax incentives could be tailored to address the needs of existing taxpayers and farm types (Broad Lieb et al., 2022) and that navigation positions (who could provide outreach, education, and assistance with processes, similar to those found in the public insurance industry) within trusted farm and/or community institutions could make incentives more accessible to farmers. We also provide evidence supporting financial incentives for donation-related costs that are easier to compare or track than crop value, such as transportation mileage or labor hours, as implemented in California's crop donation tax incentive (Broad Lieb et al., 2022). Finally, our findings identify the need for financial incentives to be delivered more closely to when costs are incurred, including financial support for growers who do not generate enough profits to pay taxes.

Developing Alternatives to Uncompensated Donation

Our results suggest that FLW reduction efforts cannot rely solely on growers investing their finite resources to donate excesses. There are several important avenues for ensuring that high-quality foods reach people who can use them. In addition to investing in donation processes, other methods

could include expanding viable markets for surpluses, upcycling, and emergency food purchasing. Especially given the considerable economic and labor investments required to grow crops, and substantial financial stress experienced by many U.S. growers, monetizing what can be substantial farm-level surpluses could both curb farm-level FLW and support farmers' health and financial longevity.

Limitations

Our sample included only small farms in southern Maryland, and generalizability is limited, as in all qualitative studies. While our qualitative design allowed us to gather in-depth information on the barriers facing potential crop donors, it precludes us from assessing the prevalence of these barriers at the population level. We suggest that future research could explore the frequencies and prevalence among crop growers of the barriers described here. Additionally, the timing of interviews differed between the farms which did and did not donate, and all interviews occurred before the COVID-19 pandemic, which may have changed some donation procedures and perspectives. However, these findings remain relevant and useful for informing donation policies and processes, especially as the need increases for healthy emergency food. Including informants who do and do not currently donate, thus enabling comparison, represents a strength of this study and a valuable contribution to the literature.

Conclusions

This study demonstrates that crop donation motivations, barriers, and facilitators faced by growers are diverse. Frequent donors differed from infrequent donors in their motivations to donate crops, perceptions of donation feasibility, familiarity with the processes, and general acceptance of pro-donation policies, such as tax incentives. Growers' suggestions for increasing crop donation included not only financial support, but also educational interventions, process and logistical improvements, and clarification of existing state and federal donation-related policies. Interventions to enhance donations could focus on not only strengthening current donation systems, relation-

ships, and mechanisms but possibly more importantly, they could reduce considerable burdens related to donations and provide immediate, tangible benefits to donors. Growers' questioning the expectation that farmers give away crops without compensation highlights a need to prioritize interventions that would support both growers' economic viability and reduce production-level FLW.



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