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Assessing the profitability of scaling up for retail access: Lessons from local salad mix in Southeast Michigan

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Abstract

Changes to the supermarket supply chain in recent decades have "squeezed out" local and small farmers in exchange for more consolidated and global suppliers. As a result, these small-scale farmers have turned to more direct-to-consumer markets, which capture a higher price point but also bear higher marketing costs. Previous research indicates potential saturation and lack of profitability in this market type. Researchers have explored strategies for "scaling up" local farmers into intermediary supply chains, such as grocery retail, and have tested the profitability of hybrid marketing strategies with positive results. However, there are very few studies that utilize production costs to test market feasibility, and even fewer that include retailer willingness-to-pay estimates. To assess strategies from the perspectives of both producers and buyers, this study uses salad mix in Southeast Michigan as a pilot case. Farmer-generated production costs incurred for strategies and production types were estimated in focus groups, and retailer willingness-to-pay estimates were obtained in interviews. The analysis suggests that a combination of more efficient harvest technology and central processing would have the greatest impact on increasing profitability, but the dramatic effect that central processing has on output price makes it the most feasible strategy for small-scale farmers. In addition, the minimal costs of organic certification for small farmers are likely to be justified by the price premium that grocery

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retailers are willing to pay. Hydroponic production may be challenging to break even at a smaller scale but could potentially meet retailers' price preferences at larger scales. Pairing production cost estimates with buyer willingness-to-pay estimates may generate more comprehensive assessments of the relative profitability of potential scaling-up strategies. This method could be applied to other crops, regions, and produce buyers by cooperative extension, nonprofit, or local government personnel working with small farmers on their market development plans.

Keywords
Scaling Up, Salad Mix, Market Feasibility, Production Costs, Central Processing, Organic Certification, Hydroponic, Small Farmers, Local Food Systems

Introduction and Literature Review

Demand for local food is a growing trend among U.S. consumers, who are often willing to pay a premium price for it (Fan et al., 2019; Feldmann & Hamm, 2015). Triggered by the economic and environmental impacts of increasingly global supply chains, consumers seek local food for its better quality, connection to place, local economic development, and democratic values (Goodman et al., 2012). Though *local food* and *local food system* lack official definitions, they generally represent a more direct connection between producers and consumers (Martinez, 2010) and include both direct-to-consumer markets (farm stands, farmers markets, and community supported agriculture [CSA]) and intermediary markets (direct-to-grocery, direct-to-institution, or direct-to-restaurant) (Low & Vogel, 2011).

In response to this growing consumer trend, U.S. supermarket retailers have demonstrated increased interest in procuring local foods for their customers (Bloom & Hinrichs, 2017; Dunning, 2016; Gupta & Jablonski, 2016; Guptill & Wilkins, 2002; Robinson et al., 2017). This interest in sourcing local food reveals a departure from the "supermarket revolution" trends of the 1990s, when advances in wholesaling and processing led to the specialization of supermarket supply chains and procurement systems around the world (Reardon et al., 2009). While examples of both the inclusion and exclusion of local and small farmers are demonstrated in these supply chains (Reardon et al., 2009), increasingly consolidated supply chains in the U.S. put a greater emphasis on global imports rather than regional spot markets, and demand for larger suppliers has increased (Konefal et al., 2007). This has shifted procurement away from regional supply chains in which local farmers could participate and toward more centralized, consolidated, and global procurement systems. Increased consolidation among top producers, distributors, and retailers continues to limit small actor participation in the grocery retail sector (Howard, 2016).

In response, local governments and nongovernmental agencies have pursued a variety of strategies to link small farmers to supermarkets. Examples include the use of "hubs" or "parks" in Asia (Reardon et al., 2012); food hubs in North America (Barham et al., 2012; Blay-Palmer et al., 2013; M. Fischer et al., 2015); contracts in Ghana, India, Madagascar, Mozambique, and Nicaragua (Barrett et al., 2012); and producer cooperatives in South Africa (Chibanda et al., 2009). In the U.S., some researchers have worked directly with supermarkets to increase small and local farm inclusion in the supply chain (Bloom & Hinrichs, 2017; Dunning, 2016; Robinson et al., 2017), thereby both studying and dismantling the barriers to small farm participation in the grocery supply chain.

Ultimately, the squeezing out of small farmers from the mainstream grocery sector has shifted retailing opportunities for small farmers to more direct markets such as farmers markets, farm stands, and CSAs (Guptill & Wilkins, 2002; Schmit et al. 2019). These direct-market retail channels provide higher price points for lower volumes, as well as flexibility in terms of grades and standards for the producer (Low & Vogel, 2011). Direct market sales capture a larger portion of the consumer dollar, which can increase the overall income of a farm operation (Detre et al., 2011). However, the marketing labor costs associated with direct markets are quite high and significantly affect the producers' overall profitability (LeRoux et al., 2010).

Opportunities for conducting retail sales through direct markets have been increasing in the

U.S. nationwide: the number of farmers markets increased 180% between 2006 and 2014 (Low et al., 2015), and in Michigan, the number of farmers markets more than doubled during the same period (Michigan Municipal League, 2014). However, despite the growth in direct retail outlets, direct market sales plateaued between 2007 and 2012 (Low et al., 2015), indicating potential market saturation in this sector. Although the number of marketing opportunities has increased, the potential profitability in these market types remains less understood.

Evidence of low profitability in direct markets presents concerns for the viability of small farmers in the U.S. Farmgate profitability is important for small farmers who are not subsidized by governments to the same extent as they are in Norway, Iceland, Switzerland, Japan, or Korea (Organisation for Economic Co-operation and Development, 2020), nor do buyers commonly participate in resource-providing contracts with small farmers as in the palm oil industry in Ghana (Ruml & Qaim, 2020) or the dairy industry in Poland (Dries & Swinnen, 2004). Overall, profitability in direct market sales is more associated with short-term financial gains, rather than long-term viability (Ahearn et al., 2018), and farms selling in direct markets tend to experience smaller increases in sales over time than other farm types (Low et al., 2015). Park (2015) found that relying more on direct market channels actually had negative impacts on overall farm sales, and that sellers in direct-to-consumer markets tended to be less satisfied with their profitability than those selling to intermediary market channels (Silva et al., 2015).

In response to both potential market saturation and poor profitability in direct-to-consumer markets, researchers and practitioners have explored the idea of scaling up small producers into larger, more mainstream markets (Day-Farnsworth et al., 2009; Friedmann, 2007), including into the retail-distributor infrastructure (Bloom & Hinrichs, 2017; Clark & Inwood, 2016). One technique is to "piggy-back" on mainstream distributor infrastructure, but this strategy has yielded mixed results. Another option is to vertically build new supply chains that focus specifically on small farm viability. Better known as "value chains," supply chain actors work strategically to ensure equitable profit distribution across the supply chain while moving larger volumes of products to larger buyers (Lev & Stevenson, 2011; Stevenson & Pirog, 2008).

A third method for scaling up local suppliers into mainstream or wholesale markets is through horizontal producer collaboration. Cooperatives, as formal collaborative structures, can reduce transaction costs, improve farmgate prices, and increase market access for smallholder farmers (Hoken & Su, 2018; Ito et al., 2012; Verhofstadt & Maertens, 2013). However, the level of collaboration in farmer cooperatives depends on the marginal costs and benefits to the participants, and if a farm is highly diversified, the benefits of working with the group may be low (E. Fischer & Qaim, 2014). Though small, diversified farmers tend to have less incentive to invest in a cooperative (Grashuis & Ye, 2019), even in heterogeneous grower groups, all members tend to benefit from the cooperative's functions (Agbo et al., 2014; Biggeri et al., 2018). One example of cooperative development in scaling-up literature is at Tuskegee University, where researchers and practitioners worked to develop a supply chain between local smallholders and a local supermarket, which then evolved into a producer-managed cooperative (Robinson et al., 2017).

At the farm level, small farm profitability may be increased by developing a hybrid marketing strategy that includes both direct and intermediate markets. Bauman et al. (2018) found that top-performing direct-market producers had lower rates of profitability (measured in returns on assets) than top-performing producers with intermediated sales, thus demonstrating the importance of intermediated sales on profitability. Jablonski et al. (2022) reported similar findings, noting that direct marketing is quite labor-intensive. In a proof-of-concept project intended to evaluate the economic feasibility of shifting from a diversified direct-market cropping system to one tailored for wholesale accounts (fewer crops and more mechanization), Thompson and Gaskin (2018) demonstrated that small growers could feasibly produce for a wholesale market on small acreage and without sacrificing environmental production values. On a more qualitative level, Silva et al. (2015) found that farmers selling in intermediated markets are more satis-

fied with their profitability than those selling into direct-market channels.

However, a significant challenge to both scaling up small producers and hybridizing their market channels is their willingness to participate in intermediary markets. Small farmers report concerns over lost sales due to the lower price point expected in intermediated markets (Thompson & Gaskin, 2018). LeRoux et al. (2010) and Hardesty and Leff (2010) assessed this concern by evaluating the marketing costs in both intermediary and direct markets in case studies. While their findings support the profitability of hybrid marketing plans that include intermediated or wholesale sales, their research omitted production costs from the analysis. It is important to estimate feasibility more precisely in this market sector, as production costs are a substantial component of small farm viability.

Very few studies have analyzed cost-of-production figures in relation to wholesale price points to assess whether this market type is feasible for the small farmer. To address this gap, we paired production cost estimates from producers with willingness-to-pay estimates from wholesale buyers to better assess potential strategies for scaling up. This approach to analyzing market feasibility was successfully explored in a pilot case, as we describe below. Although this case identified promising market opportunities for one type of produce in one region, it could be applied to other crops and regions, as well as other types of buyers.

Southeast Michigan growers produce a wide variety of specialty crops for the local retail grocery market, but locally produced salad mix is relatively absent. Minimal competition for a differentiated local brand of salad mix makes it an interesting produce type on which to perform a small farm feasibility analysis. The salad mix industry differs from other commodities in that the technology required to efficiently harvest, process, package, and ship the product is more specialized than for other crops, and this limits competition in the wholesale sector (Cook, 2011). Additionally, foodborne illness outbreaks in bagged spinach and romaine lettuce have contributed to stricter food safety regulations (particularly Hazard Analysis and Critical Control Point [HACCP] requirements), which dissuades new entrants (Community Involved in Sustaining Agriculture, 2009). That said, in a supply chain case study on direct, intermediate, and mainstream salad mix supply chains, growers received a premium even in the intermediary market for salad mix (King et al., 2010).

Bagged salad mix for foodservice and retail grocery entered the market in the 1970s when TransFRESH worked with Whirlpool Corporation to adapt controlled atmosphere technology for bagged salad transport (Lugg et al., 2017). This technological innovation spurred the emergence of two lettuce shippers in the bagged salad industry: Fresh Express and Dole (Cook, 2011). By 2011, Fresh Express (now owned by Chiquita) and Dole made up 54.4% of the total market share for bagged salad (Howard, 2016). However, if factoring for private label sales, which could account for as much as one quarter of all bagged salad mix sales, the combined Chiquita and Dole market shares are likely much higher (Cook, 2011). While the bagged salad market for foodservice was developing, Earthbound Farm began supplying organic salad mixes to a high-end restaurant, Chez Panisse (Guthman, 2003), and by 2010, Earthbound Farm products were being produced at volumes of nearly 1 million pounds per day (King et al., 2010). The rapid growth of this market sector, due to both technological advancements and market consolidation, has resulted in a limited number of suppliers in the mainstream supply chain. Yet opportunities in a more localized, differentiated supply chain are currently poorly understood.

Applied Research Methods

Researchers commonly gather cost-of-production data using enterprise budgets—a listing of all income and expenses associated with a specific farm or enterprise—as demonstrated in research on hydroponic lettuce (Barbosa et al., 2015), high-tunnel tomatoes and lettuce (Galinato & Miles, 2013), aquaponic tilapia and lettuce (Rakocy et al., 1997), muskoxen (Starr et al., 2017), and blueberries (Fonsah et al., 2011). These studies are helpful in testing feasibility as they identify a common metric for analysis. Individual farmers may exhibit a wide range of cost of production figures, and true cost-of-production figures are often too laborious for farmers to gather themselves. The studies

noted above use data gathered from national survey statistics (Barbosa et al., 2015; Malaiyandi et al., 2010), demonstration trials (Rakocy et al., 1997; Starr et al., 2017), and farmer focus groups (Estes et al., 2003; Galinato & Miles, 2013) to create a single enterprise budget for analysis.

Cost of Production Data

Four types of production methods were analyzed for this feasibility study: field no-till, field mechanical, hoop house, and hydroponic. These were selected because they are the production methods most frequently used by small farmers in Southeast Michigan. Similar to the research performed by Galinato and Miles (2013), farmers worked in focus groups to develop a single enterprise budget for each production method. While the goal was to enlist four small farmers for each focus group, the COVID-19 pandemic added significant strain to farmers' availability. Four producers for field no-till production met in March 2020 before the state issued a stay-at-home order. The research was put on hold, and by December 2020, just three producers for field mechanical production and one producer for hydroponic production were able to participate. The hoop house production budget was extrapolated using the cost-of-production figures from the no-till enterprise budget and factoring in additional variables such as the fixed cost of the hoop house and extended seasonality.

Hydroponic production is quite varied in production styles, presenting a significant challenge to assembling a focus group to develop a single enterprise budget around common costs. Most hydroponic research is based on case studies, with a single production type analyzed. The single producer selected to participate in this research uses Nutrient Film Technique (NFT) to grow salad mix, herbs, and micro-greens in an enclosed warehouse in Detroit, the major urban center of Southeast Michigan.

Focus group participants met for one four-hour session to develop the enterprise budget. A description of all participants' production experiences is shown in Table 1. Their first objective was to determine a reasonable scale of production from which to develop the enterprise budget, which involved determining both the yield and the annual number of successions—i.e., intervals of crop harvests. Because this research is focused on small farm feasibility, the farmers were asked to develop the scale based on a gross cash farm income (GCFI) of US$350,000 or less (the USDA definition of a small farm). The participants chose a scale of production that also considered the necessity for a diverse crop and marketing plan, as these are important risk-management strategies for small farmers. Next, each focus group discussed the basic order of operations for their given type of salad mix production to develop a typical produc-

Table 1. Focus Group Participants

	No-Till				Mechanical			Hydroponic
Participant Characteristics	**Grower A**	**Grower B**	**Grower C**	**Grower D**	**Grower E**	**Grower F**	**Grower G**	**Grower H**
Time farming (yrs.)	8	8	14	8	11	21	17	5
Time owning and/or managing (yrs.)	5	6	9	8	9	9	12	2
Time growing salad mix (yrs.)	7	6	5	8	7	18	12	2
Land in production (acres)	3	1	3	1	6	13	4	1,400' sq.
Primary crops grown	Tomato Peppers Squash Greens	Greens Radish Turnips Carrots	Produce (diverse) Flowers Beef Seeds	Produce (diverse)	Produce (diverse) Meat Flowers	Salad mix Carrots Potatoes Onions Squash	Produce (diverse)	Salad mix Herbs Micro-greens
Volume salad mix produced in 2020 (lbs.)	2,000	3,560	1,898	1,200	700	2,500	N/A	1,088

tion method for the budget. Bed preparation, cultivation techniques, pest management, irrigation, and harvest techniques, for example, were all discussed. Then the group inserted labor costs and material costs for the inputs discussed in each stage and estimated the lifespan of those products that are used over multiple years. The final enterprise budget was organized by variable, labor, and fixed costs, which were depreciated using straight-line depreciation, to determine cost of production for both a single succession as well as annually.

Additional components of the enterprise budget were calculated following the focus group meetings. The cost of seed, sprays, irrigation materials, energy (for hydroponic), and hoop house materials were all calculated using product pricing information from recommended suppliers. Once the base enterprise budget was developed, adjustments were performed to test the scaling-up strategies under investigation: technological innovation in the form of more efficient harvesting equipment, centralized processing in a food hub–type setting, and organic certification.

Market Data

The pertinent market data to evaluate market feasibility include information on weekly volumes, wholesale prices, internal store organization, willingness-to-pay estimates, and previous experience working with local vendors. Using Google search engine results for grocery stores within the seven counties of Southeast Michigan (Jackson, Lenawee, Livingston, Monroe, Oakland, Washtenaw, and Wayne) and the expertise of Michigan State University Product Center Innovation Counselors, a list of 24 independent or cooperative grocery stores was assembled. Independent stores, rather than large grocery chain stores, were chosen for this study because these types of retailers are more agreeable to local food procurement, as they see themselves as embedded in the community (Guptill & Wilkins, 2002).

Each store was contacted up to three times by phone or by email, and of the 24 identified stores, 12 agreed to the interview. The produce buyer, produce manager, or store manager (as a last resort) were principal for conducting the interview, as these individuals have the most contact with pricing and ordering details for the store. The interview questions included basic store specifications, current salad mix purchasing (brand, type, price), a willingness-to-pay scenario, and qualitative questions on local salad mix procurement. Two additional questions on purchasing changes due to the COVID-19 pandemic were also asked. The interview questions are listed in the Appendix. Each interview lasted between 15 and 30 minutes, depending on the level of detail the interviewee was willing to provide.

Research on willingness-to-pay (WTP) typically recommends the use of a detailed description of the good being offered (Portney, 1994). The "local salad mix" product (see Appendix) described for this research was a 5-ounce clamshell of prewashed salad mix, similar to the few existing regional salad mix brands (Revolution Farms and Bright Farms) sold in the local grocery stores. The salad mix was described as conventional (not certified organic) so that a base price could be determined. Interviewees were later asked how much more they would be willing to pay if the product was certified organic, and what characteristics stood out to them as necessary for the product to perform competitively in their store.

The WTP scenario used an open-ended response format rather than providing dichotomous options. Since there are relatively small differences in estimates when comparing open-ended and dichotomous responses (Loomis, 1990), open-ended responses were chosen to reflect the interviewees' specific knowledge of wholesale salad mix pricing. One limitation of this WTP scenario was its failure to address hypothetical bias. Hypothetical bias is common in WTP research, especially when providing answers orally to the researcher, and oral responses tend to overstate their true valuation (Harrison & Rutström, 2008). Follow-up questions with certainty responses have demonstrated effectiveness in removing hypothetical bias (Blumenschein et al., 2008), although certainty responses were not used in this study. While it can be assumed these WTP responses could include some bias, it could also be argued that consumer perceptions differ from wholesale buyer perceptions, and that wholesale buyers, due to the nature of their job, have a more straightforward understanding of

the typical price range for the items they procure regularly. Indeed, the wholesale prices and the WTP prices provided by the produce buyers were similar, suggesting minimal bias.

Organizing the Data

Raw data were arranged on an Excel spreadsheet by grocer (y axis) and question (x axis). We then conducted cross-tabulations to analyze potential patterns or associations between data types, such as between the number of stores and previous experience working with local producers. Qualitative answers, such as those describing the challenges and benefits of working with local producers or the essential qualities in the WTP scenario, were assigned a theme, such as pricing, communication, quality, etc. Comments by theme were tabulated, and some key comments were extracted and shared in the findings.

Two pricing figures required further calculation: the wholesale prices paid for current salad mix brands, and the price-per-pound figures for the WTP scenario. Both pricing figures were calculated by dividing the given case price by the number of units, and then the number of units by package size (ounce). This price per ounce was then multiplied by 16 to produce a price per pound unit of measurement, which could then be compared to the output price per pound developed by the farmer-generated enterprise budgets.

Results

Below we describe the results of the analyses, starting with the break-even analysis for different production types, followed by the market analysis of retailer data.

Break-Even Analysis

A common tool to test production feasibility is the break-even calculation (Dillon, 1993). Rather than simply compare cost of production figures, the break-even calculation uses data on variable costs, fixed costs, profitability margins, and yield to calculate the output price for a given crop to break even. The output price for a break-even budget is calculated via the following equation:

$$P = (VC + FC + p)/Y$$

where price = (variable costs + fixed costs + profits)/yield

Break-even analyses were conducted for no-till, mechanical, and hoop house produced salad mix when hand harvested, harvested mechanically, produced without washing and packing, produced with both the mechanical harvester and without washing and packing, and produced organically (see Table 2). These modifications were chosen based on previous studies of small farm profitability and scaling up. The output price declines most dramatically when the wash-pack step is removed from the production budget.

We conducted a separate break-even analysis for hydroponic production (see Table 2). At this scale, hydroponic production is much less feasible than the field or hoop house production methods. The major costs in this budget included the growing medium, lights, cost to run the cooling fans, and clamshell containers. In terms of labor, cleaning out the NFT gutters was the largest expense.

To test improvements to the feasibility of hydroponic, we performed a break-even analysis for a budget without the packing step, as well as a budget with doubled production. Without the packing step, the output price decreases 13.8%. If the production doubles, using the same number of lights and no additional cooling fans, the break-even output price decreases 19.2%. If both the packing step is removed and production is doubled, the output price decreases 26.8%.

The material and labor costs involved in washing and packing salad mix were significant in all four production enterprises, and the output price decreased 58.6%, 46.2%, 55.7%, and 13.8% for no-till, mechanical, hoop house, and hydroponic production, respectively, when washing and packing were removed from the farmgate budget (see Table 2 and Table 3). However, if a food hub or other centralized processing facility were to perform this function, the final output price to the grocery retailer would need to reflect the additional expenses incurred by the processor.

While a separate enterprise budget for centralized processing and packing is outside the scope of this study, the food hub financial report by the Wallace Center at Winrock International (2019)

provides a benchmark for typical central processing expenses, which can then be applied to this situation. Of the 50 food hubs surveyed, the cost of goods sold (COGS) was 73.5–76.3%. Using a conservative estimate of 50% COGS to account for the additional cost of washing, we calculated output prices that include centralized processing (see Table 3).

Lastly, to provide the closest comparison between the locally produced break-even output price and the wholesale or WTP prices of the grocery retail market, a distribution mark-up of 30% was added. The Michigan State University Product Center, for example, advises their clients to factor a 22–30% mark-up for delivery costs, whether this is task is performed internally or outsourced.

Market Analysis

For the 12 retailers interviewed, two represented cooperatives, with one location each. Ten represented independent grocers, and with one exception (a chain of 16 stores), the number of retail locations was five or fewer.

Grocery Store Purchasing Trends, Order Volumes, and Wholesale Prices

Weekly salad mix orders ranged from two to 500 cases (typical case sizes are six units) with a median weekly order of 45 cases (see Table 4). One grocer mentioned that he prefers case sizes of six rather than eight or twelve for perishable or premium products. With larger case sizes, he is forced to purchase more inventory at once, which increases his costs if they do not sell.

Almost all the grocers noted increased consumer demand for salad greens in the month or two following New Year's Eve (see Table 4). Additionally, two grocers mentioned that salad mix sales decreased in summer. One reasoned that because most of its stores are in a college town, the loss of

Table 2. Break-Even Analysis for Field No-Till, Field Mechanical, and Hoop House Production

	Variable Costs	Fixed Costs	Profit (30% of costs)	Yield (#)	Output Price ($/#)
No-Till					
Hand Harvest	$12,764.04	$683.01	$4,034.11	2,200	$7.95
With Harvest Tech	11,606.57	848.01	3,736.37	2,200	7.36
Without Wash-Pack	4,963.06	609.43	1,671.75	2,200	3.29
Without Wash-Pack + Harvest Tech	3,800.97	774.43	1,373.62	2,200	2.70
Organically	13,268.66	683.01	4,185.50	2,200	8.24
Mechanical					
Hand Harvest	$14,655.17	$2,226.31	$5,064.44	2,200	$9.98
With Harvest Tech	13,260.67	2,391.31	4,695.59	2,200	9.25
Without Wash-Pack	6,934.27	2,152.73	2,726.10	2,200	5.37
Without Wash-Pack + Harvest Tech	5,501.15	2,317.73	2,345.67	2,200	4.62
Organically	15,155.17	2,226.31	5,214.44	2,200	10.27
Hoop House					
Hand Harvest	$15,403.94	$1,567.28	$5,091.37	2,700	$8.17
With Harvest Tech	13,819.28	1,732.28	4,665.47	2,700	7.49
Without Wash-Pack	6,023.74	1,493.71	2,255.23	2,700	3.62
Without Wash-Pack + Harvest Tech	4,439.08	1,658.71	1,829.34	2,700	2.94
Organically	15,903.94	1,567.28	5,241.37	2,700	8.41
Hydroponic					
Hand Harvest	$20,351.85	$695.85	$6314.31	988	$27.69
Without Packing	17,442.22	695.85	5441.42	988	23.87
Double Production	32,712.46	1,309.70	10,206.65	1,976	22.38
Without Packing and Double Production	29,485.71	1,309.70	9,238.62	1,976	20.26

students affects overall sales. The other stated that their customers often shop at the farmers market over the summer, and so produce sales decrease. The increased demand in January and February could be most easily captured by the hydroponics producers, who can reliably grow salad mix in the winter months.

Of the salad mix varieties carried by the grocers, Organic Girl and Revolution Farms are sold at the highest wholesale price per pound (see Table 5), which indicates the upper thresholds for salad mix on the wholesale market. It is important to note that the wholesale price per package never exceeded US$4.00, no matter the package size. One grocer mentioned that customers are willing to spend up to US$5.99 for a salad mix clamshell, but US$6.99 is too much. Two grocers mentioned that their customers would be willing to spend US$4.99 for a 5-oz. package, but not more. Interestingly, this indicates that one way a local vendor can increase the income per pound is to reduce the package size.

Certifications and Insurance

Most of the interviewees stated that their store does not require any type of food safety certification from local vendors (see Table 4). A few mentioned that their distributors handle those types of things, and one mentioned that there were food safety signs posted at the wholesale terminal offices. One store stated that they require a USDA Good Agriculture Practice (GAP) audit or an agriculture license from local vendors. Based on these responses, a food safety certification does not seem to be a common requirement for a local vendor to sell directly to retail grocery stores. However, if using a distributor, the distributor may require a food safety certification.

Similarly, product liability insurance is not required by any of the grocers (see Table 4). One grocer did mention that "it would be a nice thing for them to have," but none stated that this was a requirement. However, distributors may require product liability insurance, so if working with a distributor, this requirement might change.

Ten of the 12 grocers acknowledged that organic certification is an important quality for their customer base. Nine grocers said they would pay a premium of US$0.50–$2.00 per package for organic salad mix. Cost for organic certification varies widely for producers, but a USDA Organic Cost-Share Program can cover up to 75% of

Table 3. Output Prices with Processing and Distribution Costs Factored In

	Farmgate Output Price ($/#)	Output Price with Centralized Processing ($/#)	+ Distribution Mark-up (30%)
No-Till			
Hand Harvest (base)	$7.95	$7.95	$10.33
With Harvest Tech	7.36	7.36	9.57
With Centralized Processing	3.29	6.58	8.55
With Centralized Processing + Harvest Tech	2.70	5.40	7.02
Mechanical			
Hand Harvest (base)	$9.98	$9.98	$12.97
With Harvest Tech	9.25	9.25	12.02
With Centralized Processing	5.37	10.74	13.96
With Centralized Processing + Harvest Tech	4.62	9.24	12.01
Hoop House			
Hand Harvest (base)	$8.17	$8.17	$10.62
With Harvest Tech	7.49	7.49	9.73
With Centralized Processing	3.62	7.24	9.41
With Centralized Processing + Harvest Tech	2.94	5.88	7.64
Hydroponic			
Hand Harvest (base)	$27.69	$27.69	$36.00
Double Production	22.38	22.38	29.10
With Centralized Processing	23.87	47.74	62.06

inspection fees. Compliance requires a three-year transition period, education, an organic system plan, and extensive record-keeping (Coleman, 2012), all of which can be barriers to small farms interested in certification.

Willingness-to-Pay

Interviewees were willing to pay US$1.80–$3.90 per package (US$5.76–$12.48 per pound) for a local salad mix product (see Table 6). Nine retailers were willing to pay an organic premium of US$0.50–$2.00 per package (mean=US$1.25 per package), which if applied to the conventional figures, increases the WTP for an organic 5-oz. package to between US$3.05 and $5.15 per package, and between US$9.76 and $16.48 per pound. The average per-pound WTP figure for conventional and organic salad mix were US$8.84 and US$11.50, respectively. These estimates reflect the previously calculated upper limits of salad mix products currently carried in the grocery retail market (see Table 6).

Only one grocer was willing to pay more for hydroponic-produced salad mix, but of the brands carried in the 12 stores, the hydroponic brand had the highest price per pound. Organic was by far a more distinguishing factor in premium prices, and a few grocers stated that the customer knows and expects organic to carry a premium.

Table 4. Salad Mix Purchasing Specifications at Grocery Stores

#	Type [a]	Salad Mix Brands	Avg. Order/ Week (by case)	Volume Fluctuation	Price Fluctuation	Vendor Food Safety Certification	Vendor Product Liability Insurance
1	C	Bright Farms Earthbound Revolution Farms	26	Dec.-Mar. high	Rise during COVID-19	If local vendor: GAP audit or agriculture license	None
2	I	Earthbound Organic Girl	35–55	Summertime low	Very stable	None	None
3	I	Earthbound Farms Fresh Express Revolution Farms	90 [b]	Jan.–Feb. high June–Aug. low	Very stable	None	None
4	I	Dole Fresh Express	40–50	First half of month high	Increase in winter	None	None
5	I	Dole Organic Girl Revolution Farms	500	Jan. high	Very stable [c]	None	None
6	I	Dole Earthbound Farms Fresh Express Taylor Farms	30–40	Jan.–Feb. high	Very stable	None	None
7	I	Dole Earthbound Farms Fresh Express Organic Girl Taylor Farms	210	Jan.–Feb. high	Very stable [c]	None	None
8	I	Earthbound Farms Fresh Express Organic Girl	130–200	Jan.–Feb. high Apr.–May high	Very stable [c]	None	None
9	I	Organic Girl		May–Aug. high	Very stable	None	None
10	I	Earthbound Fresh Express	20–40	Jan.–Feb. high		Unsure	Unsure
11	I	Fresh Express	60–120	When on sale	Very stable	Yes—posted at terminal offices	None
12	C	Revolution Farms	2–3	Unsure	Unsure	None	None

[a] C=cooperative, I=independent

[b] Order volume for just one of the 16 stores in the company

[c] Under contract

Discussion and Conclusions

Local food is a growing trend in the U.S., and while retail grocers are increasingly interested in sourcing local foods for their stores, small farmers face significant challenges in serving this market type. Increased supply-chain specialization and consolidation have made it difficult for small farmers to compete on price or efficiencies accomplished by mainstream supply chains. As a result, small farmers rely on direct-to-consumer markets such as farmers markets, farm stands, or CSA programs, but these require significant marketing costs and are potentially becoming saturated. In response, researchers and practitioners have explored the idea of scaling up small farmers into intermediated markets, such as restaurants, retail grocers, and institutions. Such strategies have included "piggy-backing" on traditional supply-chain infrastructure, building new value chains, and collaborating horizontally among producers. Data show that farmers with a hybrid marketing platform that includes intermediary sales are more likely to be profitable than those selling in direct

Table 5. Salad Mix Wholesale Pricing (Estimate)

	Package size (oz.)	Wholesale price/pkg.	Price per oz.	Price per lb.
Bright Farms	6	$2.67	$0.45	$7.12
Dole	10	2.25	0.23	3.60
Earthbound Organic	5	2.38	0.48	7.62
Earthbound Organic	6	2.18	0.36	5.81
Earthbound Organic	10	3.33	0.33	5.33
Earthbound Organic	16	4.00	0.25	4.00
Fresh Express	5.5	2.24	0.41	6.50
Fresh Express	6	2.11	0.35	5.63
Fresh Express	9	2.44	0.27	4.34
Organic Girl	5	2.73	0.55	8.74
Organic Girl	6	3.50	0.58	9.33
Revolution Farms	4	2.82	0.70	11.26
Taylor Farms	6	2.44	0.27	5.63

Table 6. Willingness-to-Pay (WTP) Estimates by Weight and Production Types

#	WTP per oz. ($)	WTP per 5 oz. package ($)	WTP per lbs. ($)	Is organic important for customers?	WTP premium for:	WTP with avg. organic premium per pkg. ($)	WTP with organic premium per lb. ($)
1	$0.60	$3.00	$9.60	Yes	OG, RG	$4.25	$13.60
2	0.56	2.80	8.96	Yes	OG	4.05	12.96
3	--	--	--	No	OG	--	--
4	0.40	2.00	6.40	No	None	2.00 [a]	6.40 [a]
5	0.36	1.80	5.76	Yes	OG	3.05	9.76
6	0.62	3.10	9.92	Yes	OG	4.35	13.92
7				Yes	OG		
8	0.50	2.50	8.00	Yes	OG	3.75	12.00
9	0.78	3.90	12.48	Yes	OG, NT	5.15	16.48
10	--	--	--	Yes	OG, HP, HH, NT, OT	--	--
11	0.45	2.25	7.20	Yes	None	2.25 [a]	7.20 [a]
12	0.70	3.50	11.20	Yes	None	3.50 [a]	11.20 [a]
Avg.	**$0.55**	**$2.76**	**$8.84**			**$3.59**	**$11.50**

OG=organic certified; HP=hydroponic grown; HH=hoop house grown; NT=no-till grown; OT=grown outside; RG=regenerative grown
None=organic premium not applied
-- =declined to answer

markets only. However, many farmers' current lack of willingness to participate in intermediary markets presents a significant challenge to scaling up into markets like retail grocery. Research to date has not demonstrated the feasibility of intermediary sales for small farmers using cost of production figures, and very few studies also include buyer willingness-to-pay estimates.

Using salad mix in Southeast Michigan as a pilot case, this research used production figures from small farms to perform a feasibility study on salad mix sales to local independent and cooperative retail grocers. Four types of production enterprise budgets—field mechanical, field no-till, hoop house, and hydroponic—were developed to then incorporate strategies previously identified in the literature for scaling up small farm enterprises. These strategies included technology innovation, central packing and distribution, and organic certification.

The data show that of the four production methods studied at the base level, (hand-harvested) no-till had the lowest cost of production, due in part to the low labor costs for hand weeding. Small-scale hydroponic production, on the other hand, had the highest cost of production, and was found to be largely infeasible at this scale of production. When the enterprise budgets were adjusted by scaling-up strategies, centralized packing had the greatest impact on lowering the break-even output price for the producer. Centralized processing and packing was conservatively estimated to make up 50% of the cost of goods sold, in contrast to the 73% average reported by U.S. food hubs for their operations (Wallace Center at Winrock International, 2019). When added to the farmer output price, both no-till and hoop house production with central processing remained within the price range retailers were willing to pay. While not within the WTP range, mechanical production, adjusted for central processing, stayed within the current range of wholesale prices. This study stops short of developing an enterprise budget for central processing to test the true feasibility of this option, but this is recommended for future research.

The findings suggest that advancements in harvest technology reduce the output price the most when the technology is used more often, as in the hoop house production method, which has a greater number of annual successions. In addition, the impact of organic certification on output price is small enough compared to the price premium that this differentiation strategy is recommended for mechanical, no-till, and hoop house production. The cost barriers for organic hydroponic production, and the high price point for conventional hydroponic salad mix in the current market, make organic hydroponic a less recommended option at smaller scales, however.

The results of studies such as these are intended to supplement resource providers, such as cooperative extension, nonprofit, and local government personnel, with data to help inform small farmers' market development decisions. This approach could also be applied, with slight modifications, to numerous other crops and geographic regions, to develop more comprehensive assessments of potential market opportunities. It could be extended to other types of buyers as well, such as food hubs, hospitals, schools, and restaurants.

Since this approach focuses mostly on price feasibility, it does not address other qualities that may be essential for success in this market sector. Additional research is recommended to examine the characteristics of mainstream salad mix players—or other large produce firms—and how their scale, marketing, and production systems contribute to success in the retail grocery market. A deeper understanding of the needs of produce buyers or purveyors could also help bolster a more well-rounded feasibility study on this market sector. Another consideration to analyze is the ongoing consolidation of the retail grocery sector. As more independent grocers are acquired or squeezed out of the market by larger supermarkets, research that considers the feasibility of local products into larger supermarket retail chains is recommended.

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Appendix. Grocer Interview Questions

1. Store Specifications:
    a. How many store locations are in the company?
    b. What is the square footage of the store(s)?
    c. Which produce distributors do you work with?
    d. How is salad mix purveyed?
    e. What is your ownership model (independent retailer, cooperative, franchise)?

2. Current Salad Mix Supply
    a. What brands of salad mix do you carry and in what package sizes?
    b. What is the case size for each brand and package size?
    c. What price do you pay for a case of each type of salad mix?
        i. Does this price fluctuate throughout the year? If so, please describe.
    d. How many cases per week is an average order?
        i. Does your order volume fluctuate throughout the year? If so, please describe.
    e. Is organic-certified an important quality for you and/or your customers?
    f. Do you require any food safety certification from the vendor?
    g. Do you require product liability insurance from the vendor?
    h. What is the difference in both conventional v. organic in sale and price?

3. Contingent Valuation (Willingness-to-Pay) Exercise

    Description of Salad Mix:

    The good being offered is a pre-packaged salad mix in a 5 oz. plastic clamshell. The product is not certified organic. Upon inspection, you can see that the salad mix is clean, ready-to-eat, with attractive labeling. The phrase: "grown by local farmers" is displayed prominently on the front. The product holds food safety certifications from the USDA and is processed in an inspected facility.

    The packaged salad mix would be distributed by a regional distributor. The distributor is responsible for managing the cold-chain, providing invoices, and general customer service. The clamshells would arrive in a 6-unit case.

    An order could be filled in 1-7 days. Standing orders preferred.

4. Contingent Valuation Questions
    a. Based on the description above, how much would you be willing to pay for a case of this salad mix?
    b. Based on the description above, what details stand out to you that you deem necessary or are required for you to consider purchasing this item?
    c. Any other thoughts on the product description provided?
    d. Would you pay more for this local food salad mix if it was labeled as:
        i. Certified Organic
        ii. "Hydroponically grown"
        iii. "Hoop-house grown"
        iv. Produced using "organic no-till practices"
        v. Grown outside

5. Qualitative Questions
    a. Have you ever purchased produce from a local vendor for your store?
    b. Please describe that process. What were the challenges, what were the benefits?
    c. What is your perception on local markets as a risk-aversion strategy in times of market disruption?
    d. How has your purchasing changed since the pandemic?