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Machinery Sharing Manual for Fruit and Vegetable Growers

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Iowa Alliance for Cooperative
Business Development

PM 3064 June 2014

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Portions of this publication were adapted with permission from Farm Machinery & Labor Sharing Manual. NCFMEC-21, Midwest Plan Service, 2009. Written by Georgeanne Artz, William Edwards, and Frayne Olson.

Acknowledgements

Information for this publication was collected as part of these research grants from the Marketing and Food Systems Initiative of the Leopold Center for Sustainable Agriculture: Machinery management for small- and medium-sized horticultural farms, M2012-11; and Innovative equipment solutions to reduce costs and improve productivity for small-scale fruit and vegetable growers, M2013-07.

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Additional support was provided by Iowa Alliance for Cooperative Business Development, USDA Rural Business-Cooperative Service, Iowa State University Extension and Outreach Value Added Agriculture Program, Iowa State University Extension and Outreach, Practical Farmers of Iowa, and Iowa Fruit and Vegetable Growers Association.

The authors would like to thank the cooperating farmers for their time and feedback on equipment sharing.

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Contents

Preface

The number of fruit and vegetable growers in the Midwest has grown significantly over the past decade due, in part, to greater awareness of the benefits of local foods in the market place. A majority of these farms are small-scale, growing intensively on a few acres and selling direct to consumers through farmers' markets and Community Supported Agriculture models (CSA). Many, however, are looking to expand their markets to include wholesale to grocery stores, restaurants, institutions, and farm-to-school programs. This requires scaling up and increasing the number of acres in production. However, to scale up production yet remain profitable, growers need to find ways to improve labor efficiency through mechanization and other labor saving innovations. They should evaluate options for mechanization, including sharing, and understand the associated trade-offs between employing additional labor and/or purchasing additional equipment.

Small-scale growers are interested in working cooperatively by sharing machinery and labor. This interest is evidenced by responses to a survey of midwestern fruit and vegetable growers undertaken in January 2012: 70% of respondents answered they would consider sharing machinery with other growers. Additional post-workshop surveys conducted with growers in winter 2014 showed that 39% had shared machinery and 85% said they are interested in sharing machinery. Reasons cited for sharing included:

- I am planning to scale up and will have a labor shortage and/or can't afford to hire additional labor.
- I currently have insufficient labor.
- It will enable me access to machinery that I can't afford on my own.
- Specialized equipment will save me time and labor costs.

The concerns they gave for not sharing included:

- Lack of immediate access to the machine when it is needed.
- Difficulty finding a compatible partner.
- Distance for transport.
- It adds additional complications to a hectic schedule.

Small-scale fruit and vegetable growers in the Midwest face some unique challenges for sharing machinery. Relative to traditional row crop operations, there is a greater diversity and specialization of equipment used by fruit and vegetable growers, such as small tractors, transplanters, bed shapers, mulch layers, mulch removers, rotovators, and potato and root crop diggers. Access to this type of equipment is very limited. Sharing among these growers will typically involve a greater number of producers who are geographically dispersed, making the transportation and logistics of scheduling use more complex. Finally, many specialty crop growers are new to agriculture and are not experienced equipment operators. This raises an additional question of the necessary skills needed to safely and properly operate shared machinery.

Benefits and Costs of Sharing Machinery

Several growers in our survey indicated that specialized farm machinery for vegetable production is expensive and hard to find, but acknowledged that it can significantly improve productivity and quality and replace expensive or hard-to-find labor. Unfortunately, individual ownership of this equipment that is typically used infrequently is often impractical or infeasible on small-scale farms. However, shared use of machinery, with or without joint ownership, can provide access to expensive, specialized equipment. Higher capacity equipment can reduce the time spent to complete critical operations (e.g., laying plastic mulch, planting, and harvesting), thus significantly reducing production risk and even facilitating expansion. In many cases,

owning a share of a high-priced machine reduces individual investment and invested capital, increasing returns on assets and equity. A good equipment sharing partnership may develop a foundation on which people might build relationships that lead to other activities and enhance profitability and efficiency, such as sharing expertise and labor, buying inputs together, or creating a food hub or other joint marketing ventures. Grower and producer associations, like Practical Farmers of Iowa, play a role in helping growers network to build the trust needed for forming partnerships among growers.

Despite some obvious advantages, sharing equipment is not often practiced because of a variety of explicit and implicit costs. Transportation costs for moving equipment among farms can be significant, particularly if the farms are several miles apart. The geographic dispersion of fruit and vegetable growers in many states makes it difficult to find partners, especially partners whom you trust.

There may be costs incurred in setting up an agreement. For example, there may be legal fees for designing contracts or establishing a formal business entity, enforcing agreements, and settling disputes, should the need arise.

There are also non-monetary costs involved in joint use of an asset like farm machinery, such as reduced control or loss of timeliness in field operations, decreased autonomy in decision making, more complex management, potential problems with lenders and split lines of credit, and difficulty in dissolving the arrangement when partners chose to do so.

Case Studies of Machinery Sharing Among Small-scale Fruit and Vegetable Growers

A project funded by the Leopold Center for Sustainable Agriculture was conducted in 2013 to evaluate how five groups formed and developed sharing agreements, managed the financial obligations and purchased machinery, and balanced the use of it. The case studies in chapter three demonstrate that there are many different ways to share machinery. Each group has specialized needs, and they need to figure out what works for them. The project also identified some issues that may arise within groups that require good communication and cooperation.

Based on the results from this study and a previous one that investigated growers' equipment use, a few common themes and best practices were identified:

- There is clearly no one-size-fits-all strategy for sharing equipment.
- Farms producing large quantities of similar and/or few crops tend to use more and larger pieces of equipment.
- Farms that grew a more diverse set of crops tend to use more labor.
- Mechanization can help to offset labor costs, but it does not eliminate the need for labor entirely.
- Differences in production methods, such as organic or conventional, will determine if specific machinery can be shared, and increases the need to develop specific and complete standard operational procedures for the shared machinery.
- How growers choose to sell and market their crops has an impact on the purchase of equipment.

Chapter 1

Operational Issues

Choosing Partners

Choosing partners is a critical step in forming a successful equipment and/or labor sharing arrangement. It is important to find partners you can trust and with whom you can communicate and work with effectively. It is important to ask how the characteristics of the farming operation, methods of crop production, as well as the work habits, unique skills, and personality traits of potential partners mesh with your own.

Similarity versus Complementarity

One way to think about the types of characteristics you might seek in potential partners is to consider both similarities and complementarities. For some aspects of the farming operation you will want to find like-minded partners. For example, we have a natural tendency to associate with people who are "like" us. This can make communication among group members and group decision making easier, but assembling a group of "like" members may also result in overlapping skills and knowledge.

It may work to your advantage to have partners who complement you and your operation. If members bring different skills, strengths, and interests to the group, the total may be greater than the sum of the parts. For example, if you dislike bookwork and numbers, finding a partner who enjoys these tasks could provide a real benefit.

Farm Characteristics

A self-assessment can be a good place to start. Table 1-1 provides some examples of farm characteristics, work habits, unique skills, and personality traits that

may be important to consider. Some basic issues include whether you or your partners have an off-farm job, need time to care for livestock, whether your farming practices and machinery types are compatible or could be made compatible, and whether your cropping patterns are similar.

Work Habits

Work habits are another area for consideration. Do you like to start early, work long hours, or keep a regular schedule? Do you have an off-farm job? Do you want to take time out to attend your children's ball games or other activities? Do you prefer to fix machinery yourself or hire someone else to do it? It will be important to come to an agreement with your partners about such issues. Keep in mind that in some cases, having different work habits could work to your advantage. For example, you may grow crops that are planted and harvested earlier than your partners, enabling you to alternate dates for use of your shared machinery.

Personal Traits

Finally, while we don't often think about our personality traits as a factor in farm management, they can play a big role in the success of group activities like equipment sharing. Flexibility around issues such as when crops are planted and harvested is certainly critical. Other personality traits, like openness to new ideas and a willingness to take risks, can be important as well. Partners who complement your strengths may work to your advantage. If you prefer to work alone, a sharing arrangement may not be for you. But if you prefer to work with others, a joint operation may make farming more rewarding and enjoyable.

Which is more important – similarity or complementarity? Finding partners who are similar to you eases communication and helps to facilitate good personal relationships. Working with people who share your motives for farming could also be important. In contrast, complementarity can work to your advantage in other ways – having a variety of knowledge, skills, experience, equipment, and even land types could be a benefit to all group members.

Unique Skills

Knowing what skills you bring to the table and which ones you lack will help you identify characteristics you would like to have in your partners. Do you have specific skills to contribute to a group? Are you good at repairs? Do you like to manage people? Do you have an applicator's or commercial driver's license? Any of these skills could be useful to potential partners.

Reference

Baron, R., and S. Shane. Entrepreneurship: A Process Perspective. Mason, OH: Thompson South-Western, 2004, pages 109-113.

Table 1–1. What are you looking for?

Farm Characteristics
☐ Vegetables only
☐ Fruit only
☐ Mixed produce and livestock or grain crops
☐ Row equipment
☐ Row width/spacing
☐ Primarily “heavy” soils
☐ Primarily “light” soils
☐ Organic production
☐ Outstanding shop facilities
☐ Have extra labor available
☐ Have extra equipment storage space
☐ Off-farm obligations
☐ Close proximity
☐ Land base is scattered
☐ Land base is centralized

Personal Traits
☐ A planner
☐ Flexible on what land is planted first
☐ Detail oriented
☐ “Big picture” thinker
☐ Problem solver
☐ Creative
☐ Understanding
☐ Outgoing
☐ Quiet
☐ Independent
☐ Conservative
☐ Takes calculated risks
☐ Peacemaker
☐ Optimistic
☐ Desires change
☐ Diplomatic
☐ Accepts challenges
☐ Enthusiastic
☐ Quick learner

Work Habits Characteristics
☐ Early riser
☐ Night owl
☐ Work at a steady pace with breaks
☐ Work until the job is done
☐ Weekends off
☐ First to start – first to finish
☐ Wait until conditions are “right”
☐ Stop and fix it “right”
☐ Fix it quickly and keep going
☐ Neatness counts

Unique Skills
☐ Mechanical repair
☐ Record keeping
☐ Accounting/finance
☐ Marketing
☐ Fabrication
☐ Agronomy/horticulture
☐ Animal science
☐ Commercial driver’s license
☐ Commercial applicator’s license
☐ People management

Operational Issues for Informal Agreements

Many growers have reduced their machinery costs by owning equipment jointly. This helps smaller growers scale up and have efficient access to machinery, and enjoy the convenience of owning equipment. It also helps beginning growers get started with less capital tied up in machinery.

The key to successful joint ownership is for the partners to be able to agree on when and how to use each piece of equipment. Depending on weather and crop conditions, decisions may have to be made on a day-to-day basis. The objective is for all partners to complete field work in a timely manner, while minimizing the time spent transporting machinery.

All parties should have a written agreement explaining how the joint ownership will be dissolved in case of disagreement or termination of farming by one party. The agreement also should explain how to determine the value of the machinery at the time of dissolution.

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Sharing Costs

Costs of jointly owned machinery should be shared equitably. Many owners prefer to own machinery on a 50-50 basis, and provide fuel and labor for use on their own acres. If each owner uses the machinery over approximately the same number of acres, this arrangement works well. Repair costs, financing payments, and income tax deductions also can be divided equally.

The examples below divide costs on the basis of acres. In some cases, it will make more sense to divide costs on the basis of hours rather than acres. The worksheet on page 12 can be used to record time associated with the shared use of the equipment.

Unequal Use

When one owner uses a machine over more acres than the other, different arrangements are needed. For example, Jan and Chris together purchased a new plastic mulch lifter-wrapper that will be used to remove plastic mulch and drip tape from 50 acres for Jan and 25 acres for Chris. Both will provide their own fuel, tractor, and labor. The easiest arrangement is for Jan to own two-thirds of the machine and Chris to own one-third. Jan would also pay for two-thirds of the repairs and other costs.

But what if the partners use the machine in a proportion different from their ownership share? One method is for both owners to contribute to a special machinery account (example 1-1). The amount contributed is equal to an agreed upon rate (per acre or per hour of use), multiplied by each person's acres or hours. The rate may be set using a custom rate, if available, or may be based on previous years or estimated costs per acre or hour. All machinery related expenses such as repairs, interest, and depreciation are paid from this account. Depreciation and interest should be paid to each owner in proportion to their original investment. Or, financing payments can be

paid directly from the fund. At year's end, any excess or deficit is carried over to the following year or refunded in proportion to each owner's actual use.

Another common procedure is for the partner with the most acres to reimburse the other owner for the extra use. To calculate the amount of compensation, take one partner's ownership share times the total acres covered. Subtract it from the acres for which that partner actually uses the machine. Then multiply the difference by the agreed upon rate per acre.

In example 1-2, Jan pays Chris $20 per acre for each acre on which she uses the mulch lifter in excess of half the total. In this example, half of the 75 total acres is 37.5. Jan's acres exceed this by 12.5, so the total payment from Jan to Chris would be $20 × 12.5 acres, or $250.

Actual Costs

In cases where some costs are divided differently than others, a complete list of actual costs and who paid them is needed. Again, assume that Jan has 50 acres and Chris 25 acres, and they have equal ownership of the mulch lifter. They both supply their own fuel and labor, but Chris stores the equipment and does all the repairs and maintenance (example 1-3). At the end of the year, all costs are totaled and re-divided in proportion to the number of acres on which each one used the machine. In the example, the total cost of interest, depreciation, insurance, housing, and repairs amounts to $1,116 for the year, or $14.88 per acre. In order for the expenses to be divided in proportion to usage, that is $744.00 for Jan and $372.00 for Chris, Jan must pay Chris $263.50.

Example 1–1

1. Jan and Chris jointly purchase a new plastic mulch lifter-wrapper for $6,200, each paying half the cost. They agree to each contribute $20 per acre to a special equipment account. They determined this rate using last year's actual cost of $16 per acre, and adding a cushion to cover any additional or unexpected expenses.

Jan	$20/acre × 50 acres =	$1,000
Chris	$20/acre × 25 acres =	$500
		$1,500

2. The following expenses are paid from the account:

Repairs and maintenance	$124
Depreciation, interest, insurance, and housing (16% of value of the mulch lifter)	
Paid to Jan	$496
Paid to Chris	$496
	$1,116

3. The excess funds can be carried over to the following year or refunded in proportion to each partner's use of the mulch lifter.

Income	$1,500
Costs	$1,116
Excess	**$384**

Example 1–2

Jan and Chris purchase a new plastic mulch lifter-wrapper jointly, each paying half of the purchase cost $6,200.

The mulch lifter is used on 75 acres, 50 by Jan and 25 by Chris.

Both furnish their own fuel, tractor, and labor. Repair costs are divided evenly.

4. Jan's ownership share is 50%. Half the total acres is 37.5. However, Jan uses the mulch lifter on 12.5 extra acres beyond this.

   50 acres – 37.5 acres = 12.5 acres

5. Jan pays Chris $20 for each extra acre.

   $20/acres × 12.5 acres = $250

6. If Jan had owned a 60% share of the mulch lifter, she would have paid Chris for only 5 extra acres.

   50 acres – (60% × 75 acres) = 5 acres

Example 1–3

Jan and Chris purchase a mulch lifter jointly, each paying half of the $6,200 cost. Jan uses the machine on 50 acres and Chris uses it on 25 acres. They both provide labor, a tractor, and fuel for their own acres, but Chris stores the mulch lifter and performs or pays for all repairs.

		Total	Jan	Chris
1.	Investment or current value of machine	$6,200.00	$3,100.00	$3,100.00
2.	* Annual interest charge at 5%	$310.00	$155.00	$155.00
3.	* Depreciation at 10%	$620.00	$310.00	$310.00
4.	Insurance at ½% or actual	$31.00	$15.50	$15.50
5.	Housing at ½% or $ _____ × _____ sq.ft.	$31.00	$0.00	$31.00
6.	Fuel, lubrication (annual) (zero if all parties furnish their own fuel)	—	—	—
7.	Repairs and maintenance (annual)	$124.00	$0.00	$124.00
8.	Labor (_____ hours at $ _____) (zero if all parties furnish their own labor)	—	—	—
9.	Total of costs not shared in proportion to sum (sum of lines 2 through 8)	$1,116.00	$480.50	$635.50
10.	Annual use (acres, hours, etc.)	75	50	25
11.	Cost per acre or hour (line 9 ÷ line 10)	$14.88	—	—
12.	Cost to each owner (line 10 × line 11)	—	$744.00	$372.00
13.	** Reimbursement (line 9 – line 12) (Jan pays Chris $263.50)		– $263.50	$263.50

* Principal and interest payments can be substituted for depreciation and interest charges.
** The owner(s) for which line 13 is negative pays that amount to the owner(s) for which line 13 is positive.

An electronic spreadsheet version of this worksheet is available on the Ag Decision Maker web site at www.extension.iastate.edu/agdm/crops/html/a3-38.html.

Worksheet: Joint Machinery Ownership

List all costs that are not shared in the same proportion as the use of the machine. Indicate the amount paid by each owner.

		Total	Owner 1	Owner 2	Owner 3	Owner 4
1.	Investment or current value of machine	$ _____	$ _____	$ _____	$ _____	$ _____
2.	* Annual interest charge at _____%	$ _____	$ _____	$ _____	$ _____	$ _____
3.	* Depreciation at _____%	$ _____	$ _____	$ _____	$ _____	$ _____
4.	Insurance at _____% or actual	$ _____	$ _____	$ _____	$ _____	$ _____
5.	Housing at _____% or $ _____ × _____ sq.ft.	$ _____	$ _____	$ _____	$ _____	$ _____
6.	Fuel, lubrication (annual) (zero if all parties furnish their own fuel)	$ _____	$ _____	$ _____	$ _____	$ _____
7.	Repairs and maintenance (annual)	$ _____	$ _____	$ _____	$ _____	$ _____
8.	Labor (_____ hours at $_____) (zero if all parties furnish their own labor)	$ _____	$ _____	$ _____	$ _____	$ _____
9.	Total of costs not shared in proportion to sum (sum of lines 2 through 8)	$ _____	$ _____	$ _____	$ _____	$ _____
10.	Annual use (acres, hours, etc.)	_____	_____	_____	_____	_____
11.	Cost per acre or hour (line 9 ÷ line 10)	$ _____				
12.	Cost to each owner (line 10 × line 11)		$ _____	$ _____	$ _____	$ _____
13.	** Reimbursement (line 9 – line 12)		$ _____	$ _____	$ _____	$ _____

* Principal and interest payments can be substituted for depreciation and interest charges.
** The owner(s) for which line 13 is negative pays that amount to the owner(s) for which line 13 is positive.

An electronic spreadsheet version of this worksheet is available on the Ag Decision Maker web site at www.extension.iastate.edu/agdm/crops/html/a3-38.html.

Worksheet: Joint Machinery Time Use Log

Use this worksheet to record the approximate amount of time (in hours or minutes) spent transporting, setting up, adjusting, and operating each piece of shared equipment. Note any problems, issues, or observations in the Notes column. All participating growers should keep an individual record of their use of the machine. After the season, the total costs can be allocated according to the percentage of the total time used by each grower.

NAME _____

MACHINE _____

Activity Date	Transport	Set up, Adjustment, Clean Out & Maintenance	Operating	Other	Total	Notes
TOTALS						

Operational Issues for Joint Ventures

The previous section describes several types of informal joint ownership arrangements and gives examples of how costs can be shared. However, some growers prefer to have a more formal ownership arrangement, especially when several pieces of machinery are shared. Such arrangements increase the need for good record keeping and cooperation, but can reduce overall costs significantly, as well as increase labor flexibility.

A cooperative agreement can be set up with ownership vested in a separate entity such as a limited liability company, partnership, or cooperative.

Potential savings in joint ventures include:

- greater annual use of large ticket or crop specific machines
- more efficient use of labor during peak fieldwork times
- fewer weather delays because fields are spread out
- opportunities to do custom work for other growers or landowners
- greater use of individual operator skills and specialized labor
- more efficient use of repairs and maintenance tools and facilities
- volume discounts on purchases of inputs and supplies (i.e., mulch, drip lines, etc.)

Getting Started

Setting up a formal machinery joint venture requires some careful thought and commitment. First, develop an accurate estimate of the types of machinery needed and the minimum capacity needed for each unit. This will depend on the crops to be grown, the production systems used, and the number of acres included. Don't forget to allow additional time for transporting machinery.

Second, take an inventory of the existing machinery. Decide if each piece fits into the overall plan. If it does, the current owner can sell it or lease it to the joint venture. If it does not fit, the owner must decide whether to dispose of it or keep it for personal use. The joint venture should not take on financial responsibility for unnecessary equipment just because one of the members already owns it.

A third party should be contacted to determine an appraised value for items acquired by the joint venture. Smaller items may be purchased for cash, while larger pieces may have to be purchased on an amortized payment schedule. Be aware that selling items to the joint venture or to a third party may trigger recapture of depreciation for income tax purposes. Also, be sure the machinery that is transferred is released from any existing financing agreements or mortgages.

Third, decide how to acquire other needed equipment items. Choices include outright purchase, purchasing on an installment loan, leasing, or renting. Decisions regarding brand and dealer must also be made.

Finally, a fund for paying operating expenses must be established. Each member may be required to contribute an equal amount of capital of a fixed value per acre of land. A worksheet to help allocate costs for machinery joint ventures is available at www.extension.iastate.edu/agdm/crops/html/a3-38.html.

Operations

If each member uses the machinery only on his or her own acres, and provides all the labor for those acres, it is probably not necessary to keep a record of the hours contributed. However, one benefit of a joint venture is that two of more growers can work together and complete the operations more efficiently, without regard to whose land it is. Some specialized equipment, such as a transplanter, requires additional help, and in other cases, additional help makes the task easier, such as laying plastic mulch.

If labor is shared, each grower should keep track of the number of hours contributed. Having a logbook in each tractor, truck, or self-propelled unit will make this easier. The value of each person's labor can be used to offset his/her share of the expense later. Some activities, such as spraying or repairing machinery, may be given a higher value per hour than other activities. Don't forget to include time spent on maintenance, record keeping, travel, and group meetings.

A quick and efficient process for deciding which acres will be covered each day must be established. Some groups appoint a "field boss" on a rotating basis. Others try to move from farm to farm geographically, then reverse directions the next season or crop. Regardless of what system is used, it must be flexible enough to take into account different crop varieties, rainfall patterns, soil types, and crop maturities.

Cost Accounting

If possible, all costs associated with the ownership and operation of the machinery line should be paid by the joint venture. One exception may be fuel. If each grower fills the fuel tank from their own reserves after use, then fuel costs can be excluded. If members occasionally pay small expenses from their own pockets, they should submit the receipts for reimbursement.

At the end of the year all costs should be summarized and divided by the total number of acres farmed. This includes lease and rental payments, installment contract payments, repairs and maintenance, legal fees, insurance, licenses, fuel (if not furnished), lubricants, and other items. A depreciation charge may be established instead of purchase contract payments. A charge for the cost of machinery storage space contributed by members may also be built in, unless this contribution is nearly equal or relative to acres farmed.

Each member is billed according to his/her acres after deducting the value of labor contributed by that member. If there is significant variation in the crops grown or the number of trips over different members' fields, then charges can be allocated by the total hours spent on each member's land. However, this would require some added record keeping.

Machinery Replacement

One advantage often cited by participants in farm machinery joint ventures is the access to more specialized equipment than would be possible with individual ownership. Decisions must be made about how often to replace machinery and how to finance the transactions.

When equipment is owned, user fees charged to the members of the joint ventures should be large enough to cover a realistic economic depreciation rate, say 10 to 14% of the initial purchase price. These funds can

be retained in the joint venture account until they are needed for replacement of equipment items.

If machinery purchased by the joint venture has been financed through a company entity of a third party lender, the normal loan or contract payments can take the place of the replacement fund. Equipment can be traded when loans are completely repaid, but a shorter or longer replacement cycle can also be used if the lender concurs.

Income Tax Treatment

The exact handling of taxable income and expenses will depend on the type of legal entity selected. In general, though, the machinery joint venture will show income from the fees paid by the members for services, and deduct all the operating expense, interest, and depreciation associated with the machinery owned. Any profits or losses will be passed on the to members' tax returns. Before forming a machinery joint venture, members need to realize that they will not be able to deduct Section 179 expensing or other depreciation allowances on their own returns for equipment owned by the sharing entity. Moreover, they will probably have to recapture depreciation up to the value of any machinery that they sell to the joint venture, or transfer as equity capital.

Concerns

Some of the most common concerns expressed by members of machinery joint ventures include:

- The need to schedule machinery use equitably when timing is critical to planting and harvesting.
- The lack of care by some members when using machinery, leading to excessive repairs and depreciation.
- The lack of flexibility in tillage, planting, and harvesting systems when everyone is using the same set of machinery.
- Keeping equipment clean and maintained in good operating condition is all members' responsibility.
- The inability to use equity in the line of machinery as collateral for personal operating notes or other loans.
- The need to agree on a machinery replacement cycle.
- The need to agree on how members can enter or exit the joint venture.

Regardless of these concerns, trust and good communication among members can usually overcome these potential problems.

Summary

Joint ownership of farm machinery offers small- and medium-scale growers a chance to reduce costs per acre and increase labor efficiency. However, some flexibility and independence may be sacrificed. Joint ownership may be an informal agreement between two persons or a formal legal entity with a large membership.

However, if machinery is jointly owned, good records of ownership shares, costs paid, and all other acts are necessary for business and tax purposes. All parties should work together to develop a written agreement that explains how the machinery was acquired, and how the joint ownership will be dissolved in case of termination. The agreement should also explain how to determine the value of the machinery at the time of dissolution.


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Chapter 2

Organizational Issues

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Alternative Organizational Structures and the Operating Agreement

The main objective of a machinery and labor sharing arrangement is to create the greatest possible net benefit from cooperation. This section will discuss two key elements to an arrangement which can impact the overall cost of the arrangement and the potential risk exposure for the participants. These two elements are the choice of organizational structure and the development of an operating agreement.

Before beginning a discussion of the operating agreement and alternative organizational structures, it is important to establish the short-term and long-term goals for the sharing arrangement.

- Is the goal to share a single piece of equipment, or are multiple machines going to be included in the arrangement?
- Will the group members share labor and work together as part of the arrangement, or will each party work independently?
- Will the participants purchase inputs jointly to capture quantity discounts or economies of scale for items such as plastic mulch, drip tape, etc.?

Perhaps the plan is to start simple and add elements to the arrangement over time. The answers to these questions will help determine the organizational structure that is best suited to meet the needs of the group.

Alternative Sharing Structures

Five general structures for sharing machine costs are identified in the case studies. This section will briefly outline and discuss each of these structures. For simplicity, the examples used to describe each structure will assume that two individuals, Party A and Party B, are entering into a machinery and labor sharing agreement for a single machine. Each general structure can be extended to include more than two individuals and/or multiple machines.

Single Owner with Custom Hire Agreement

The simplest machinery sharing arrangement is to share a machine on a "custom hire" basis. Under this structure, Party A would purchase the machine and charge Party B to use it on a per acre or per hour basis. The custom hire charges could include or exclude operator labor and fuel. Repair and maintenance costs would normally be included in the custom rate paid by Party B. In addition, Party A would typically be responsible for providing housing, insurance, paying any property taxes, and financing the purchase. The custom hire income would be used to offset depreciation and would provide the cash flow needed for principal and interest payments on the machine debt. The agreement could be made for one season, a single year, or multiple years.

For income tax purposes, Party B would be allowed to deduct the custom hire charges, as well as any fuel, repairs, and/or hired labor expenses not included in the custom hire payment. Party A would be able to claim the appropriate fuel, repairs, and insurance expenses, as well as the entire allowable depreciation expense. The custom hire payments would be included as part of farm income for Party A. The Toolbar case study on page 34 provides an example of this arrangement. Sharon, the third member of the group, does not have an ownership share of the equipment, but has the option to rent it for $40 per use.

Joint Lease

In this structure, Party A and Party B jointly lease a machine from a machinery dealer or leasing agency. Each party is responsible for his/her negotiated share of the annual lease payment. Each party would also be responsible for his/her respective share of the operating expenses, like fuel, repairs, insurance, and property

Figure 2–1: Single Owner with Custom Hire Agreement

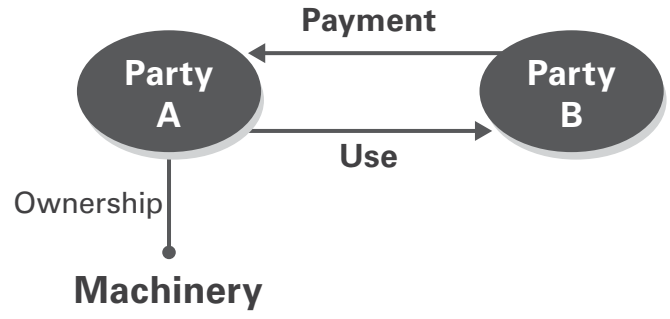
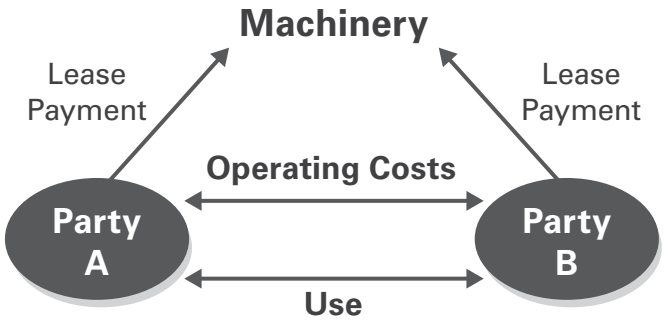


Figure 2–2: Joint Lease



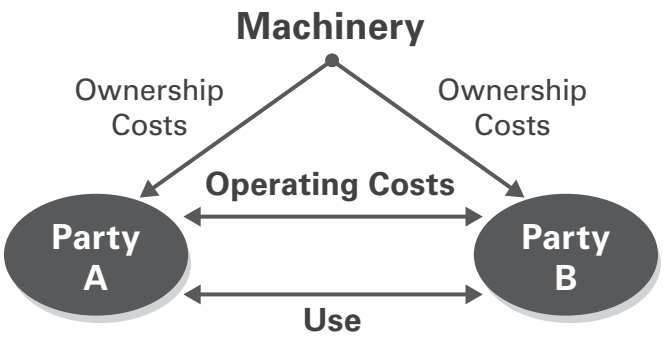
taxes. Payments to third parties, like lease payments and repair costs, could be made individually or from a joint account created specifically for paying shared expenses. Once again, shared expenses could be internally allocated between the parties based upon acres or hours of use, depending upon which is most appropriate.

Each party is allowed to deduct his/her respective share of the lease payment and operating costs as an expense for income tax reporting. One of the main advantages of a joint lease is that it is relatively simple to end the sharing arrangement, if necessary. The parties could simply wait until the lease expires, and choose not to renew the arrangement. There is no need to determine a salvage value for the machine, which would be required in the joint ownership structures. The parties could also end the sharing agreement before the lease expires, but would be responsible for any early termination fees.

Joint Ownership as Individual Persons

In a joint ownership structure, both Party A and Party B share title to the machine. The joint ownership could be as tenants in common or in joint tenancy. Operating expenses could be shared based upon acres or hours of use, and could be paid individually or from a shared expense account, as described above. The Mulch Layer case study on page 28, the Mechanical Weeder case study on page 31, the Toolbar case study on page 34, and the Garlic Clove Separator case study on page 37, each adopted this model of ownership structure.

Figure 2–3: Joint Ownership as Individual Persons



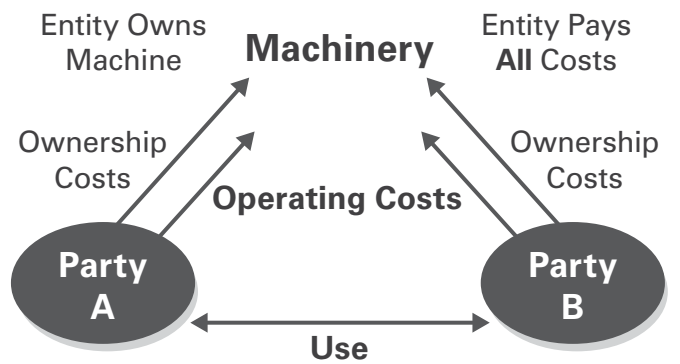
Financing the purchase of a jointly owned machine requires greater coordination between the parties and their respective lenders when compared to a joint lease agreement. If the parties use the same lender for the purchase, the lender will prepare a joint loan agreement and typically require a cross collateralization agreement. The joint loan agreement assures the lender that if either Party A or Party B do not fulfill their payment obligations, the other party can be held responsible for the loan obligations. The cross collateralization agreement allows the lender to use additional farm assets from each party as extra collateral for the machine loan. If the machinery sharing parties use different lenders, the process becomes more complex.

Each lender will need to clearly understand the sharing arrangement, closely coordinate and recognize the loan agreements at the other lending agency, as well as acknowledge any cross collateralization agreement across the lenders. For federal income tax purposes, each party is allowed to claim his/her respective portion of the depreciation expense and deduct their proportional share of the operating expenses.

Machine Owned by a Separate Business Entity

One alternative to jointly owning a machine as individuals is to create a separate business entity which owns the machine. This separate entity is, in turn, owned by the parties involved in the sharing arrangement. The business entity may be any of several

Figure 2–4: Machine Owned by a Separate Business Entity



types, including a partnership, a limited liability company (LLC), a corporation, or a cooperative.

This structure has two main advantages over jointly owning a machine as individuals. First, creating a separate entity may make it easier to obtain credit. The business entity maintains title to the machine and is responsible for the loan obligations, which simplifies the loan application process. The individual parties are responsible for providing the business entity with the funds necessary to establish the required equity base, make principal and interest payments, and pay any shared operating expenses. The individual parties may be asked to provide additional farm assets as supporting collateral for the business entity. The second main advantage for using a separate business entity is to provide an additional layer of liability protection between the individuals involved in the sharing arrangement.

Machine operating expenses, like fuel, repairs, insurance, and property taxes, could either be paid directly by the business entity or paid individually by the parties. Once again, if the business entity is responsible for paying operating expenses, the individuals owning the entity are responsible for providing the funds necessary to pay the operating expenses. This could be done by direct infusions of capital, or by the entity charging the parties a custom hire fee for each acre or hour of use.

There are also additional costs associated with forming and maintaining a separate business entity for sharing machinery. First, there are legal and filing fees required for creating a new business entity. In addition, business entities are required to file a federal income tax return to the Internal Revenue Service, which may require additional tax preparation fees. The specific income tax liability and payment of income taxes will depend upon the type of business entity chosen. In some cases, the business entity is responsible for paying the income tax liability directly. In other cases, the business entity reports the income and expenses, but passes the tax liability on net income through to the owners of the entity. The Aronia Berry Harvester case study on page 40 illustrates an example of this ownership structure for fruit and vegetable growers.

Table 2-1 provides an overview of key characteristics of alternative business structures. This table is intended to be a general guide for comparing alternative organizational structures. Each party's attorney and tax specialist should be consulted to determine which organizational structure best fits your situation and goals.

CUMAs

Farm machinery joint ventures have been common in France and Quebec for many decades. They are known as "Cooperatives for the Utilization of Agricultural Machinery," or CUMAs. CUMAs are organized according to traditional cooperative principles. They tend to include a larger number of members, typically smaller scale livestock and forage farming operations common in eastern Canada.

The structure of these machinery cooperatives allows members to share individual pieces of machinery among subsets of the cooperative's members, rather than whole machinery sets. The cooperative owns a larger set of machinery, and rents individual pieces to members at the lowest possible cost. Members in these cooperatives join "activity branches," which entitles the operator to the use of a particular machine. Each member must commit to a membership period of three to five years, which matches the term of the installment contract under which the machine is being purchased. Each member also contributes an equal share of equity capital to finance the down payment. Membership fees cover the financing payments and operating costs, and are assessed in proportion to each member's usage of the machine. In most cases, each member operates the machinery individually. Some have extended the sharing concept to supplying fill-laborers when a member must be away at home. For more information on CUMAs in Quebec and Ontario, see Harris, A., and M. Fulton. 2000. The CUMA Farm Machinery Co-operatives. Center for the Study of Co-operatives, University of Saskatchewan. Available at http://usaskstudies.coop/pdf-files/CUMA%20final.pdf.

Table 2–1. Business Organization Comparison for Machinery and Labor Sharing Agreements

Characteristic	Sole Proprietorship	General Partnership	Limited Partnership	Limited Liability Partnership	S Corporation	Limited Liability Company	Cooperative	C Corporation
Formation	No state filing required	No state filing required	State filing required	State filing required	State filing required	State filing required	State filing required	State filing required
Cost of Formation	None	None	State filing fee required	State filing fee required	State filing fee required	State filing fee required	State filing fee required	State filing fee required
Operational Requirements	Operating agreement recommended	Operating agreement recommended	Some, but less formal than corporation	Some, but less formal than corporation	Board of directors, annual meetings & reporting	Board of directors, annual meetings & reporting	Board of directors, annual meetings & reporting	Board of directors, annual meetings & reporting
Taxation	Single	Individual	Individual	Individual	Individual	Individual	Individual or entity	Entity and individual
Entity Tax Filing	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Liability	Unlimited	Unlimited	At least one partner is unlimited	Usually limited	Limited	Limited	Limited	Limited
Duration	Dissolved at death	Dissolved at death or withdrawal of partner	Fixed term and dissolved at death	Fixed term and dissolved at death	Perpetual or fixed term	Varies by state statue	Perpetual	Perpetual
Transfer of Ownership	Private negotiations	Private negotiations	Approval required by partners	Dependent on operating agreement	Limited by IRS regulations	Dependent on operating agreement	Dependent on operating agreement	Private negotiations

The Operating Agreement

Regardless of the organizational structure chosen, it is important to take time to design and periodically review the operating agreement for the machinery and labor sharing arrangement. An operating agreement is a written summary of the key rights and responsibilities of each party in the arrangement.

There are four very general categories of issues that should be addressed within an operating agreement: 1) operational issues, 2) division of benefits and costs, 3) financing issues, and 4) strategic issues. These categories are not intended to provide a comprehensive list of issues or topics, but rather to introduce important issues which can impact the effectiveness and efficiency of a sharing arrangement.

Operational Issues

This category outlines how the sharing arrangement will function on a day-to-day basis. It discusses what machinery and labor will be shared, how farm operations will be sequenced, the general expectations for machine service and maintenance, a time line for replacing machinery, the individual versus shared decision rights of the parties, the role spouses and employees may play in the sharing arrangement, and how possible disputes can be resolved.

Division of Benefits and Costs

This category outlines how benefits and costs will be distributed between the parties. This section identifies what records will be kept and who is responsible for keeping them, who has access to the records, how expenses will be paid, who is responsible for paying the expenses when due, how internal transfers of income and expenses will be made, and the appropriate insurance coverage for the machinery, employees and partners.

Financing Issues

Financial issues may occur if equipment is financed through a lender. Issues include which lender or lenders will be used to finance machinery purchases and shared operating expenses, how and when financial information will be shared between parties within the arrangement, how and when financial information will be shared with lenders or input suppliers, how much capital will be required from each party to begin the sharing arrangement, and how and when new capital contributions will be made.

Strategic Issues

The strategic issues focus on changes to the sharing arrangement which can have longer term impacts on its benefits and costs. These can include the process used to add or remove partners, how to transfer ownership between partners, how increases or decreases in land base will be handled, how the arrangement will be dissolved, and how to address the death or retirement of a partner.

The operating agreement can range from a formal contract prepared by an attorney, to a less formal set of procedures agreed upon by all of the parties. The primary goal is to develop some form of written statement, signed by all parties, that describes how the sharing arrangement is structured and what are the responsibilities of each party.

Preparing an operating agreement provides an opportunity for the parties to discuss the main elements of a sharing arrangement, and agree on a set of expectations about how the arrangement should function. Creating an operating agreement is a good way for potential partners to determine if they are compatible, especially during the early stages of establishing an arrangement. A well designed operating agreement can prevent disputes or disagreements from occurring in the future, and can be a good reference for resolving disputes or disagreements between parties if they do occur.

Details to Include in an Operating Agreement for Machinery and Labor Sharing

It is a good idea to have an operating agreement that spells out as many details of your sharing arrangement as possible. This will help you discuss important issues up front and provide a basis for resolving potential conflicts that might arise in the future.

A basic sample operating agreement for any business type includes language about the parties involved, management of the business, member voting procedures and rights, and dissolution. While there are many templates for operating agreements available, it is important that you take the time to tailor the agreement for your specific needs. In addition, you should seek the advice of your legal counsel before signing the agreement. Other areas that you might want to discuss with potential partners and legal consultants include:

- **Business organization**
  What type of business and legal structure is most suitable for the business venture you are considering, and how might this need change over time?
- **Capital contributions**
  How much is each member expected to contribute initially? Will only cash be acceptable, or will equipment contributions be accepted? How will contributions be valued? When and how often will contributions be expected? What will be the timing of payments? Is there the possibility of additional calls for capital?
- **Land holdings**
  How will unequal land holdings be dealt with? Will you charge an hourly or per acre rate for machinery use to compensate for the difference in use? Will the differences in ownership equity be adjusted?
- **Profits and losses**
  Is the company designed to make money, and if it is, how and when will the funds be withdrawn? How will the company deal with losses? Does it have the right to require that more equity be contributed by the members? What happens if a member fails to send the money?
- **Rights to file suit**
  Do you want to limit the legal rights of members, such as requiring them to go through arbitration before filing suit? Do you want to restrict them to "binding arbitration?"
- **Transfer of membership interest**
  Can I sell my shares to anybody? Does the company have any special rights to buy back? At what prices? Are there provisions to dissolve the company, provisions for retirements, death, or insolvency of a partner? How soon will capital funds be paid?
- **Spouses**
  What are the expectations for spouses? Do they need to sign loan documents? Are they legally bound to the terms of the agreement? Are they required to sign so they have full knowledge of the terms?
- **Termination and dissolution**
  Is there a specific life of the company? If the members decide to liquidate the company, what are the steps necessary and how would it be handled?
- **Personnel**
  Are you going to hire anyone to work for the company? Who is responsible for record keeping, machinery repairs, etc.? Is there a business manager? How will the manager be compensated?
- **Insurance**
  What insurance does the company need (i.e., Board of Managers, individuals), and how will these costs be allocated?

- **Record keeping**
  How will accounting records be handled and by whom? Who has access to records? How often will reports be issued?

- **Meetings and communication**
  How often will you have formal meetings? What business can be done at informal meetings? What is the standard procedure for communication? How are "emergency" decisions made?

- **Financing**
  Who is authorized to make financial commitments? Where will banking occur? Who will handle the finances? What kind of reports will be generated and how often? Who has access to the books?

- **Replacement of equipment**
  Is there a plan on how and when the decision to replace equipment will be made? How will the costs be allocated?

- **Use of equipment outside the system**
  What if a member wants to use a piece of equipment for outside custom or contract work? Is it allowed, and if it is, what is the fee?

- **Day to day issues**
  How will repairs and repair costs be handled? What about servicing, storing, transporting, and scheduling of equipment and operations? Who decides?

Worksheet: Operating Agreement Provisions

Where will the machinery and equipment be stored (long-term)? _____

_____

_____

Will compensation be paid for storing machinery? _____ If so, describe how it will be determined:

_____

_____

How will fuel be supplied for tractors and self-propelled equipment? Check one.

_____ Each operator will supply fuel for his/her acres

_____ Fuel will be supplied from a common location at: _____

_____ Other arrangements (describe): _____

Who will be responsible for performing repairs and maintenance? Check one or more.

_____ Designated owner(s): _____

_____ A third party: _____

_____ Other arrangements (describe): _____

How will each owner or lessee contribute to the operating costs of the property? Check one.

_____ In the same proportion as ownership. Usage by each owner/lessee will be approximately equal to the percent of ownership/leasing. If the number of acres farmed changes significantly, this agreement will be reviewed.

_____ Operating costs will be paid from a designated account. At the end of the year each owner/lessee will pay a percent of the total costs based on his/her usage for the year. Costs to be paid from this account are (check those that apply):

- _____ fuel
- _____ repairs and maintenance
- _____ labor
- _____ insurance
- _____ financing payments
- _____ lease payments
- _____ other costs

_____ Each owner or lessee will contribute a fixed amount per acre or hour of use toward operating costs, based on _____% of the current custom rate.

Custom rate value will be taken from: _____

_____ Other arrangements (describe): _____

Who will be responsible for insuring the jointly owned or leased property? Check one.

_____ Each owner or lessee will insure his/her own share of the property.

_____ Other arrangements (describe): _____

_____

Who will have the responsibility for paying joint expenses and other obligations? _____

_____

How will labor for operating the property be contributed?

_____ Each owner will operate or supply labor for operating the machinery on his/her own land.

_____ Labor will be contributed jointly to operate shared machinery on each party's land as needed.

_____ Labor will be contributed jointly to perform the following tasks: _____

_____

If extra labor contributed is to be compensated, how will its value be determined? _____

_____

The general goal or strategy for replacing machinery will be as follows: _____

_____

_____

The following records of the use of joint machinery and/or labor contribution will be kept: _____

_____

_____

Responsibility for keeping the above records will be assumed as follows: _____

_____

_____

Will use of the owned machinery for performing custom-hired work for parties not included in this agreement be allowed? Check one.

_____ No outside custom work will be performed with the property.

_____ Outside custom work may be performed as follows: _____

_____

_____

An owner who wishes to withdraw from this agreement shall give _____ advance notice to the others.
Time Period

In the event of withdrawal of an owner, liquidation of his/her share of ownership will be carried out as follows:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Signatures

Owner 1: _____ _____ _____
Name Signature Date

Owner 2: _____ _____ _____
Name Signature Date

Owner 3: _____ _____ _____
Name Signature Date

Owner 4: _____ _____ _____
Name Signature Date

Chapter 3

Case Studies

NOTE: Names of farms and growers have been changed to protect privacy. Photos are not related to actual case studies.

Mulch Layer

Background

One of the biggest challenges for small-scale fruit and vegetable growers is weed control. Growers need to control weeds throughout the season, but have limited time and available labor to do it. A good option for many growers is plastic mulch. Plastic mulches can dramatically reduce or even eliminate the need for weeding during the growing season. Plastic mulches also conserve moisture saving on irrigation costs, raise soil temperature resulting in earlier harvest for some crops, and reduce compaction.

Laying plastic mulch by hand, however, is a very time consuming and physically challenging task. Timing is critical as the mulch needs to be laid before planting. The window of opportunity for laying plastic in the spring is narrow and highly weather dependent. If it is too wet or too windy, it will not work. Given the time-sensitive nature of laying plastic mulch, having access to equipment is essential for even relatively small-scale production.

A plastic mulch layer is a highly specialized piece of equipment that is only used once or twice per year. This makes it a good candidate for shared use. While the window for laying plastic mulch is narrow, access to a machine greatly increases the amount of plastic that can be laid. It also presents a good opportunity to share labor since it is typically a two-person job.

John and Michael are two growers who were both looking to expand production. They each identified the opportunity to save labor by switching to plastic mulch in their operations. Given the infrequent use of the plastic laying equipment and the ability to adjust it to different tractors, sharing the machine was a good option.

Equipment Solution

John and Michael jointly purchased a Holland Transplanter Mulch Layer for $2,000 with each contributing $1,000 of the initial investment. They

CASE STUDY SUMMARY

Two Growers

John and Michael

Total Acres in Vegetable Production

2.25 acres (range 0.5 – 2 acres per farm)

Off-farm Employment

One grower works full-time as a food system planner, one works full-time year round as a cabinet builder

Age Range of Growers

27 – 51

Labor

One grower hires no outside labor, the other relies on family and some seasonal help

Equipment Purchased

Holland Transplanter Mulch Layer

Approximate Distance Between Farms

30 miles

divided the operating costs – repairs, maintenance, and insurance – in proportion to use of the machine. They simplified the shared use by standardizing their row spacing: both use 36" plastic (30" beds) with five-foot row spacing. The only adjustment needed between farms was for the drip tape: Michael used two lines per row, while John used one.

Michael has been responsible for hauling the equipment between farms using his truck and trailer. In exchange, John stores the mulch layer on his farm. They only moved the equipment twice during the first season. John used it first, Michael used it for a week, and then John used it again on his farm.

The major benefit of purchasing and using the mulch layer was the amount of labor it saved in each operation. Prior to acquiring the equipment, John estimated it took two people two hours to lay 350 feet of plastic mulch by hand. With the mulch layer, this task is now completed in minutes. Michael used leaf mulch prior to purchasing the equipment because of the labor intensive nature of laying plastic mulch by hand. Michael noted that the plastic mulch, plus straw mulch between the rows, eliminated the need to weed for the entire season. The plastic also conserved moisture, requiring less irrigation time and expense.

Given the time sensitive nature of laying plastic, the number of members sharing a mulch layer would be limited. John and Michael thought they could add one more person to the agreement, but that person would need to farm in relatively close proximity.

Labor

Aside from working together to assemble the mulch layer, Michael and John did not share labor. Operating hours comprised about three-fourths of the time they recorded for shared use of the mulch layer. They reported that the first use required some adjustment, but then little adjustment was required between farms. The way in which they scheduled use of the equipment minimized the time for transportation, so the bulk of time recorded was the actual use of the machine.

First Year Time Use

Activity	Hours	Percent of Time
Transporting Between Farms	1.5	10%
Set up, Adjustment, Cleaning, Maintenance	2	14%
Operating Hours	11	76%
Total Hours	**14.5**	**100%**

Best Practices Learned

Efficiency in scheduling can help to save on transportation costs and allows for sharing of time-sensitive equipment use.

Trading off services, such a transportation and equipment storage, can be a worthwhile partnership agreement.

Shared use of machinery can facilitate expansion.

FARM MACHINERY JOINT OWNERSHIP AGREEMENT
for
Mulch Layer

OWNERSHIP

Michael, Brown Family Farms (50% share)
John, Berry Farms (50% share)

GENERAL TERMS OF JOINT OWNERSHIP

1. The terms of this agreement are the extent of the life of the equipment or time that either party sells their half of the machine to the other party.
2. Cost of ownership. Each party agrees to pay half of the cost of the purchase of the equipment equal to $1,000.
3. Each party agrees to communicate with the other to determine when each party will use the equipment.
4. Amendments and alterations. Each party agrees to contact the other party to make any amendments or alterations to this agreement.
5. Right to rent. Both parties agree to speak and agree with each other in the case of one party interested in renting the equipment to any other party outside of this agreement.
6. No partnership is intended. It is understood and agreed that this agreement is neither be deemed nor intended to give rise to a partnership relation.

OPERATION AND MAINTENANCE

1. Maintenance and repairs. Each party agrees to share all annual maintenance costs, including the expense of any parts.
2. Both parties will discuss the best location to store the equipment when not in use.
3. Both parties will share the responsibility of transporting the mulch layer to and from each party's farm.
4. Both parties will share the responsibility of providing their own labor to lay the mulch in their own fields.
5. Both parties agree to purchase their own mulch and irrigation supplies.
6. If either party is responsible for any damage to the equipment, that party agrees to accept the responsibility of repairing the damage, including costs. Any decrease in value due to ordinary wear and depreciation of damages outside of either party's control is accepted.

Mechanical Weeder

Background

Most small-scale vegetable growers will say weed control is one of the most labor-intensive, time-consuming, and tiring chores. It is especially difficult to single-handedly spend several hours a day weeding when there are other activities that demand attention, such as planting, thinning, harvesting, and marketing. Herbicides are not an option for organic and small-scale growers, who grow several crops and often use production systems that include intercropping and succession plantings. Plastic mulch is frequently used for some crops, but weeds still need to be controlled between the rows of plastic mulch.

This kind of labor-intensive production adds to the difficulty small-scale growers face if they want to increase their acreage for greater production, without putting nearly all the additional profits into labor. An alternative to labor is larger equipment; however, specialized farm equipment is expensive and may only be needed a few times a year. A small group of growers in northeast Iowa solved this challenge by purchasing a piece of equipment that would save all of them valuable time and would help them to better manage weeds. Although this wasn't the first time the three growers shared equipment, it was the first time they co-purchased equipment and developed a sharing agreement.

Equipment Solution

The group purchased a Univerco ECO 1 mechanical weeder. The "weeder wheels," with rubber-mounted steel tines, rotate with power from the tractor power-take-off (PTO) to uproot weeds between and around the plants. The single-row weeder requires two people to operate it in the field, including a tractor driver and a person seated on the implement to operate the control arms of the weeder wheels. Each member paid one-third of the initial purchase cost, and each pays one third, or $12 per person, each year for insurance.

CASE STUDY SUMMARY

Three Growers

Sam, Frank, and Joel

Total Acres in Vegetable Production

10 acres (range 1.5 – 5 acres per farm)

Off-farm Employment

One grower works part-time in the winter months, one works full-time year round, and one is a full-time farmer with livestock

Age Range of Growers

59 – 70

Labor

One grower hires one part-time employee, the other two growers rely on family

Equipment Purchased

Single-row Univerco ECO 1 mechanical weeder

Approximate Distance Between Farms

20 – 25 miles

For market growers, weed control is an on-going task throughout the growing season, so sharing a piece of equipment that will be used several times by all members presents certain challenges. Its use is time sensitive because the crops and weeds can't be too large and the soil can't be too wet. The three growers in this group have found a way to work around these challenges. The small-scale of the farms enables them to complete their use of the mechanical weeder in a day or less. They estimate an acre of most vegetables can be thoroughly weeded in two to three hours and half an acre of sweet corn in one hour if the soil is in good condition.

"The ECO 1 weeder saves an awful lot of expenditure of energy if I had to do it by hand. I couldn't physically get that much done in a day," said 70-year-old Joel.

The group size is important for sharing a piece of equipment that is used more than once per season. "Having fewer people sharing it gives us more flexibility on when we can get the machine," noted Sam. "It wouldn't work as efficiently with more people or larger farms."

The three growers keep in close communication and usually can move the weeder on short notice. Sam owns the trailer that is used to transport it. The weeder stays at the farm of the last user and the grower requesting it picks it up or meets the other half way in between the farms. In less than two hours, the growers can leave home, pick up the weeder, return, and have it ready to use in the field. During the first season, approximately 25% of the total usage time was spent adjusting it to the tractor and field condition at each farm.

The equipment sharing agreement does not include a user fee because there isn't a large difference in acreage among the growers. However, they may consider a fee based on usage if one of the growers increases his acreage and has greater use for it than the others. In the future, they will consider renting it to other growers in the area or doing custom work for them. The proceeds from custom-hired use of the mechanical weeder would be divided proportionally among the three and a percentage retained for maintenance.

Labor

The group has considered sharing labor when needed because the weeder requires two people to operate it. Although Frank and Joel have family members to assist, Sam is single, works full-time on the farm, and needs to plan his weeding schedule around available help.

More than half the time this group recorded for its shared use of the mechanical weeder involved non-operating hours. A large amount of time was required to set-up the machine and test it before the first use. About 20% of the time recorded involved transporting the weeder between farms. They expect to log more operating hours next year, with plans to use the equipment in their asparagus and garlic plantings.

First Year Time Use

Activity	Hours	Percent of Time
Transporting Between Farms	3	21%
Set up, Adjustment, Cleaning, Maintenance	6.25	43%
Operating Hours	5.25	36%
Total Hours	**14.5**	**100%**

Best Practices Learned

The frequency of use per season dictates the maximum number of growers sharing the equipment.

Proper understanding and training on the use and maintenance of the equipment is essential.

Good and prompt communication among growers is essential for efficient transport between farms.

EQUIPMENT SHARING AGREEMENT FOR UNIVERCO ECO 1 WEEDER

OWNERSHIP. Sam, Frank, and Joel

EQUIPMENT STORAGE. The Univerco ECO 1 weeder will be stored during the off-season in a storage building located on Joel's farm.

OPERATING COSTS. Operating costs will be paid from a designated account. Costs paid include repairs, maintenance, insurance, and other obligations. The three owners will be responsible for the repairs and maintenance of the equipment when required. The first year each will be responsible for one-third of the cost, and in subsequent years it will be calculated based on the percentage of use. Equipment replacement cost will be covered by each farmer based on the percentage of use.

INSURANCE. The equipment is insured under Frank's policy. Each owner pays one-third of the annual insurance fee.

LABOR. Each owner will operate or supply the labor for operating the ECO 1 weeder on his own land.

TRANSPORTATION. During the growing season, the equipment remains at the previous user's farm. It is the responsibility of the farmer requesting the equipment to arrange transportation between farms.

RECORDS OF MACHINERY USE. Each owner will be responsible for keeping individual farm records, including the usage dates, hours, and maintenance (grease, bolts, adjustments, etc.) required. The group will meet periodically to compile and update records.

OUTSIDE CUSTOM WORK USING THE MACHINERY. The equipment can be rented to non-owners with the permission of all owners, or custom work can be performed directly by owners. The proceeds from the rent or work will be divided proportionally, and a percentage (to be determined) will be held in the designated account for maintenance and replacement costs.

An owner who wishes to withdraw from this agreement shall give 60 days advance notice to the others. In the event of withdrawal by an owner, liquidation of his share of ownership will be bought out by the remaining owners [at the depreciated rate].

Toolbar

Background

Beginning fruit and vegetable growers often find there is a steep learning curve as they scale-up production to meet their market needs. Often they learn from others, and through workshops and conferences. One group of new, young women growers, located within 20 miles of each other, found that by working together they not only learn from each other, but they can also aggregate their product and share equipment. Their informal partnership works efficiently for them because it utilizes the different skills and knowledge of the members, such as accounting, marketing, newsletter writing, and production planning.

The equipment needs for these three growers were similar because of the small farm sizes. They all needed somewhat larger equipment that could make the job easier and take up less time.The criteria for the shared equipment were prioritized based on need, cost, and ease of transport from farm-to-farm.

Equipment Solution

While attending a conference and trade show, they saw a three-point hitch with various small attachments on display, and they felt it fit their needs and gave them a variety of tools within their price range. Together, Susan and Julie purchased an undercutter with toolbar and attachments that included high-wing furrowers, cultivator tines, and disc hillers. Susan and Julie each have 50% ownership of the equipment, and Sharon has the option to rent it for $40 per use. If she opts to buy-in to the equipment-sharing group, the price will be set on the depreciated value of the equipment at that time.

Refer to their equipment sharing agreement on page 36 for details on the pick-up or delivery of the equipment.

CASE STUDY SUMMARY

Three Growers

Susan, Julie, and Sharon

Total Acres in Vegetable Production

4.5 acres

Off-farm Employment

Two growers work part-time off-farm

Age Range of Growers

30 – 56

Labor

One grower hires one part-time employee

Equipment Purchased

Three-point hitch with undercutter (root crop lifter) and other attachments from Woodward Crossings Country Basics, Aronsburg, PA

Approximate Distance Between Farms

18 – 20 miles

Beyond Equipment Sharing

Each grower contributes various products to Trio Share CSA, a multi-farm, 50-member Community Supported Agriculture (CSA), which helps manage the risk of production and provides a diverse selection of produce for their 16-week summer share and five-week fall share. Prior to the season, each grower "bids" on what they will grow and at least one other grower plants the same crop as back-up supply.

Living in different, small communities is helpful because it enables them to expand the market of their CSA. "A CSA pick-up spot in each community makes it convenient for our customers," says Julie. "We can talk to each customer and tell them how to prepare the vegetables. Distribution is the fun part."

Labor

The group did not share labor when using the equipment. The specific equipment shared was selected because it didn't require a lot of heavy lifting to haul and set up.

About two-thirds of the time this group recorded for its shared use of the toolbar involved operating hours. Transport time was very small since they only moved the equipment between farms once during the growing season. They reported spending about 15 minutes for adjustment each time they operated the equipment, but the bulk of the time reported was for operating the equipment. Future years will likely involve more transportation time as the group members increase their individual use of the shared equipment.

First Year Time Use

Activity	Hours	Percent of Time
Transporting Between Farms	0.33	3%
Set up, Adjustment, Cleaning, Maintenance	3.25	30%
Operating Hours	7.25	67%
Total Hours	**10.83**	**100%**

Benefits and Difficulties

The group experienced few difficulties with their equipment or the sharing agreement. Their multiple-farm CSA arrangement requires them to meet weekly to distribute produce. Their good relationship facilitates coordination of sharing equipment.

Best Practices Learned

Select equipment to share that is easy to transport and operate by an individual.

Versatility and multiple uses or attachments may be a desirable characteristic for shared equipment.

Communication among group members is critical in order to optimize its use.

EQUIPMENT SHARING AGREEMENT
TRIO SHARE CSA

EQUIPMENT PURCHASED/SHARED

Undercutter with toolbar and attachments. Attachments included high-wing furrowers, cultivating tines, and disc hiller.

Green County Organic Farm (Susan) and Produce Creek Acres Farm (Julie) will purchase the equipment. They will each have 50% ownership. The equipment will be stored at Produce Creek Acres. Providence (Sharon) has the option to rent and/or buy-in.

WHEN AND HOW THE EQUIPMENT IS USED

Equipment will be shared among the two proprietary farms on a week-by-week rotation. The sharing schedule is outlined on an annual calendar spreadsheet. If weather or crop conditions impact a grower's ability to use the equipment on their designated week, arrangements will have to be made with the other growers to share the equipment on a daily basis.

Providence will have the option to use the equipment at a rate of $40 per use, but must make arrangements with the farmer who is in possession of the equipment that week. Funds from rental will go into a repair fund.

Providence will have the option to buy-in to the equipment-sharing agreement if they find they would like to use the equipment more often. If Providence would like to buy in, the price would be set depending on the depreciated value of the equipment. The annual user schedule will be revised to reflect the new ownership arrangement.

It is the responsibility of the grower to pick up the equipment from the previous user's farm. Regular pick up days will be on Sundays, but days can be flexible depending on the weather and schedules. If the equipment is delivered by another grower, that individual should be compensated for their fuel and time at a rate of $0.50 per mile and $12 per hour.

COST SHARING

Each grower will be responsible for providing the labor and fuel when the equipment is used on their own acres and the transport of the equipment is to their farm. Repair costs will be funded through rental fees. All other repair costs and income tax deductions will be divided according to ownership percentages.

Funds generated from rental will be paid to Produce Creek Acres because a majority of the repairs will be done there. Rental funds collected will be recorded on the annual sharing calendar spreadsheet.

DISSOLVING EQUIPMENT SHARE

In case of disagreement or termination of farming by one partner, the remaining partner will be required to buyout the other. The value of the equipment at the time of dissolution will be determined by the depreciated value at the rate of $120 per year.

AGREEMENT OF PARTICIPATING GROWERS TO THESE TERMS **DATE**

_____ _____

_____ _____

_____ _____

Garlic Clove Separator

Background

Specialized farm equipment designed for specific crops is a luxury that most small-scale, multi-crop growers can't afford. Although it can make the job easier and the task can be completed faster with less labor, the high price tag often can't be justified or easily recouped. However, when need, innovation, and partnership merge, it becomes a possibility. This is what happened when one grower had a need and an entrepreneurial idea.

Joe has a seed garlic business and needed an efficient way to break and clean over 4,000 pounds of garlic heads into cloves for planting. He estimated that a worker can break and clean around 25 pounds per hour by hand, however, a person can't do the job for more than a few hours at a time due to hand fatigue. Besides Joe, Bryan, Randy, and a few other commercial vegetable growers in the area plant several hundred pounds of garlic annually. A jointly owned garlic separator seemed like a good, labor-saving idea for the group.

Equipment Solution

Garlic clove separating machines are manufactured commercially, but are expensive. Using parts purchased from a surplus center, Bryan built a separator. He estimates that his motorized machine cracks and cleans up to 500 pounds an hour. Fans help clear bulb wrappers and chaff. The separated cloves fall into a plastic tote below. "We dump a few bulbs into the hopper every few seconds, and usually run 30 pounds at a time," he says.

The garlic separator is not easily moved, so the other growers take their garlic to Bryan's farm to be separated. Scheduling time to use the machine was not an issue because garlic can be separated into cloves several days before it is planted in the fall.

Five growers planned to participate in this equipment sharing project. Jane and Lee were part of the original group, but decided against investing. Jane reasoned that

CASE STUDY SUMMARY

Three Growers

Bryan, Randy, and Joe

Total Acres in Garlic Production

Approximately 5 acres

Off-farm Employment

One grower works part-time off-farm, two are full-time growers

Age Range of Growers

26 – 38

Labor

None of the growers hire outside labor

Equipment Purchased

Homemade garlic separator

Approximate Distance Between Farms

10 – 30 miles

"the machine is about 20 miles from my house and I just couldn't justify the trip. For me to leave home, it needs to save me considerably more time than it would take to do the job with what we have available here already. I think, in the vegetable business at least, equipment sharers need to be in close proximity." Lee chose not to participate because she did not feel comfortable due to the lack of communication about the equipment that was being purchased and shared.

Labor

The growers were trained on how to use the garlic separating machine. They were responsible for providing the labor to operate it. When asked about efficiency of the equipment, Randy said it was a bit of a trade-off. "The machine seemed to damage 5% of the garlic and required some additional sorting after it had been separated. The trade-off was that it saves wrist and finger trauma."

Best Practices Learned

Before entering an equipment sharing agreement, compare the amount of time and fuel required for round-trip travel to use the equipment, and determine if it actually saves time and money.

Complete and prompt communication among growers is essential to build trusting relationships.

FARM MACHINERY JOINT OWNERSHIP AGREEMENT
for
Garlic Clove Separator

OWNERSHIP

Bryan, ABC Farms (80% share)
Randy, Organic Acres (10% share)
Joe, Sunnyside Farm (10% share)

GENERAL TERMS OF JOINT OWNERSHIP

1. The terms of this agreement are the extent of the life of the equipment, or until an owner choses to sell his/her share.
2. Cost of ownership. The minority owners agree to pay 10%, and the majority owner agrees to pay 80% of the original cost of the machine.
3. No partnership is intended. It is understood and agreed that this agreement shall not be deemed nor intended to give rise to a partnership relation.

OPERATION AND MAINTENANCE

1. Each owner agrees to share in all annual maintenance costs, including replacement parts.
2. The equipment will remain at ABC Farms, and will be stored and used at this location.
3. Each owner will provide their own labor to process his/her garlic.
4. All owners agree to purchase his/her own supplies.
5. Any owner responsible for damaging the equipment is responsible for the cost of repair.

Aronia Berry Harvester

Background

Until about 10 years ago, few growers or consumers were familiar with aronia berries. However, that is changing as the number of acres in commercial aronia berry production in the Midwest has increased from a scattered few acres to over 1,000 in past decade. Increased interest in the health benefits of the berries, coupled with the opportunity for traditional farmers to diversify their production, and for small-scale farmers to plant a high-value perennial crop, has spurred this growth. Aronia berry, also known as black chokeberry, is a perennial shrub that starts producing a small amount of fruit the second year after planting. Yields increase each year until maturity, which occurs by year five or six, when production is approximately 20 to 30 pounds per plant and 14,000 pounds per acre.

Like all fresh berries, aronia berries are a highly perishable crop, and growers quickly recognized the benefits of having a shorter harvest time to maintain the quality of the berries in cold storage prior to processing. Growers estimate that it takes nearly 35 people a total of two weeks to hand harvest three acres of aronia berries. "Anyone who has harvested berry bushes quickly realizes that hand picking is time consuming and costly," says Henry, who has been growing aronia berries since 2005.

With seven acres of aronia berries to harvest, Henry was motivated to find a harvesting alternative to hand picking on this farm. He approached three other growers initially about the possibility of collectively purchasing an aronia berry harvester to machine-harvest their crop. Soon the group grew to eight growers with a total of 40 acres of aronia berry bushes planted. Of the eight, only three had plants of bearing age in 2013. Others had two-year-old bushes and some were just planting. Many in the group were not familiar with the other members, but they soon learned that they were fortunate to have excellent group dynamics. The

CASE STUDY SUMMARY

Eight Growers

Henry, manager, plus seven other growers

Total Acres in Aronia Berry Production

40 acres when all plantings are in full production

Off-farm Employment

Three growers work off-farm

Age Range of Growers

40 – 65

Labor

Each grower provides two laborers at their own expense and the LLC hires one laborer

Equipment Purchased

JOANNA-3 aronia berry harvester from Poland for $33,000

Approximate Distance Between Farms

50-mile radius from a centrally located farm

members have diverse backgrounds, which include a few traditional farmers, a nurse, a retired school teacher, an owner of a lawn service business, and a retired engineer, providing additional valuable skills. The group is evenly split between members with off-farm jobs and retirees. All members own and manage their own aronia berry plantings.

Organization

The founding members decided to limit their group to 10 members. Each member signed a "Letter of Intent" that stated their intent to participate, and bound them to form and operate and use the equipment. Over the course of several meetings, the group discussed the type of organization that would suit their needs. They considered a cooperative, a limited partnership, and a limited liability corporation (LLC). They settled on an LLC primarily because of the liability and minimal individual investor risk. AB Harvesting, LLC was organized under the provisions of Chapter 489 of the Code of Iowa in March 2013, with eight investors. Legal documents included the Operating Agreement by the membership of the LLC and the LLC Buy-Sell Agreement that states the conditions, stipulations, or dissolution of members' shares of ownership. Also included in the document are the details associated with the transfer of membership interest, spousal participation, personnel, insurance, record keeping, regular meetings, and communication.

The LLC was established with each of the eight farms investing $5,000 and having one vote per farm. The LLC has three organizational officers: manager, treasurer, and secretary. Each member owns an equal percentage of the equipment and pays a pre-determined rental fee for harvesting their berries based on a per pound fee. The payment covers operating expenses, which the LLC pays as needed. If the LLC generates an income, the members vote on how much, if any, is returned to the members.

Operating Agreement

The articles in the operating agreement defined the following:

- minimum number of aronia berry plants as a membership criteria
- management of the corporation
- allocations and distributions
- transfer of transferable interest
- adding new members
- voting, quorum, and meeting of the members
- dissociation

- records and financial and fiscal affairs, including tax reporting
- procedures for buying and selling interest in AB Harvesting, LLC

Equipment Solution

To determine which type of aronia berry harvester to use, the group consulted with blueberry and aronia berry harvesters and growers in Poland on their personal observations of on-farm harvesting. The group then looked for a reliable and efficient harvester. The majority of the group voted to purchase a half-row, pull-behind JOANNA-3 slim model aronia berry harvester from a company in Poland for $33,000, and a few additional items including a hydraulic drawbar, small bush attachment, and PTO shaft. The equipment is jointly owned by the members of the LLC.

They decided the LLC needed to rent a tractor of no less than 50 horsepower and with very slow ground speed gears to operate the JOANNA-3 harvester. Because the growers' farms are located within a 50-mile radius, transporting the equipment between them requires a lowboy trailer to take the tractor to the harvest locations, and to haul the berry harvest containers to the storage and processing location. The harvester is either hauled on a trailer or pulled behind a truck, which, in the second case, requires slow-moving vehicle lights on the rear of the harvester when on the road.

The group also purchased a digital, portable scale with a printable scale ticket. The scale travels with the harvester from farm to farm, and a random sampling of berry crates is weighed to determine an average weight per crate, which is then applied to the total harvest. This weight determines the members' user fees for the harvester and tractor.

Labor Solution

A minimum of three people are needed to operate the aronia harvester in the field: a tractor driver and two on the harvest platform working with the picked berries. Each grower provides two laborers at their own expense, and the LLC hires one laborer.

Each farm must have its own farm liability insurance in place at the time of harvest. The LLC also has liability insurance for the laborer that it hires. The LLC pays workman's compensation insurance on the one employee. It is understood that each grower could run the machine, but one other member of the LLC must be present during harvest.

Group members logged more than 100 hours of time related to the shared use of their harvester. A little under 30% of the hours were accounted for by transportation of the machine between farms. Nearly 40% of the time involved training, set-up, and adjustment and cleaning of the machine, while only about 20% was spent actually operating the equipment in the first year. Due to the larger size of this group, organized meetings to discuss operating procedures and to set up the LLC that owns the harvester accounted for about 10% of the total time related to the total shared use of the machine.

First Year Time Use

Activity	Hours	Percent of Time
Transporting Between Farms	31	30%
Set up, Adjustment, Cleaning, Maintenance	29	29%
Operating Hours	21	21%
Meetings	12	11%
Training	9	9%
Total Hours	**102**	**100%**

Benefits and Difficulties

One concern is that not all growers in the group are certified organic. They developed a strict policy of cleaning and washing the machine after each use at the place of harvest before it was moved to the next

location. A gas-operated pressure washer travels with the harvester. An organic-approved cleaning solution is used and the cleanings are recorded on an equipment log sheet. This isn't a problem with equipment sharing when the machine is cleaned between uses. To eliminate cross-mixing of berries from several different growers and for food safety traceability, each grower developed their own farm lot number codes for the berry containers being shipped. The lot numbers stay with their designated containers through processing.

Scheduling can be difficult because it is weather-dependent. The hot, dry weather the first year of the LLC affected the berries. Their development "stalled" and did not ripen as they would in normal years. The heat was followed by cooler weather, resulting in a concentrated ripening and a narrow window for harvest. The tractor was rented for two weeks the first season to harvest berries from the three farms in production. All of the equipment was transported to the farms the day before harvest was scheduled to allow time for set up and to prepare the necessary support equipment.

Concluding Remarks

The group's dynamics helped in the decision-making process. Individuals had compatible, complementary business and farming skills. The equipment sharing has led to additional record keeping about field preparation, harvesting techniques, and berry maturity, and will help the group more accurately calculate scheduling harvest dates among the different farms.

To be successful, a group needs active participation from all members. "We are fortunate that everyone is willing to get their hands dirty and are able to bring their variety of different individual skills and interests to the table," said Henry.

As their production grows, the group is interested in purchasing and sharing other equipment, such as a de-stemmer or sizing machine for fresh-market aronia berries. They are also interested in buying inputs together, such as harvest totes and boxes.

Best Practices Learned

Everyone participating in the equipment sharing venture should be actively involved in the decision making and operation.

Liability insurance for the group is important.

If possible, plant spacing within and between rows should be planned to accommodate the equipment's parameters to maximize efficiency.

Aggregating the harvest of the same crop, such as aronia berries, from various growers for collective marketing and/or processing requires good record-keeping and careful attention to traceability.

Chapter 4

Lessons Learned

Trust and Communication are Important

Trust and good communication are important factors for making shared equipment use successful. These elements are extremely important when partnerships are forming. Transparency about what type of equipment is being purchased to share, who will store it, and what are the costs to operate and maintain the equipment are critical to build trust and a good business relationship. In the case of the garlic clove separator, a couple of potential partners pulled out of the sharing arrangement because they felt there wasn't enough communication about the machinery, its purchase price, and how it would save them time and money. They also felt excluded in the decision-making process.

Also, plant and row spacing needs of the equipment may need to be communicated early in the planning so that machine and crop spacing are compatible.

Compatibility Matters

When choosing partners for a sharing arrangement, growers should consider both similarities and complementaries of both the farms and people involved. The partnership of the toolbar group works because they are all beginning growers who have skills, strengths, and interests that complement each other and strengthen the overall team, which illustrates the idea that "the sum may be greater than the parts." Another group of three fruit and vegetable growers intended to participate in the project and share a plastic mulch remover. However, the partnership never materialized because their farm and off-farm job schedules prevented them from adequately communicating with each other. In addition, these growers were at different stages in their lives and farming experience, which complicated the equipment purchase and transportation logistics.

If farms have similar production methods, such as certified organic, the use and maintenance of the machinery is less complicated. AB Harvesting, LLC is made up of compatible growers of diverse backgrounds and skills, however, not all were certified organic. The certified organic growers required a strict policy for cleaning and washing the machine at the place of harvest after it was used and before it was moved to the next location. Each cleaning is documented, and a portable pressure washer, purchased by the LLC, and a cleaning solution travels with the harvester.

Consider the Complexity of the Equipment and the Learning Curve

Unlike a lawn mower that works the same in most backyard situations, farm equipment does not perform the same from field to field, under a variety of soil types and terrain, and when pulled by different sizes and types of tractors. Even equipment that appears relatively easy to operate, such as a plastic mulch layer and the mechanical weeder, requires some initial time to learn how to adjust and run it in different fields. More specifically, if the plastic mulch layer is used incorrectly, the plastic will not lay properly and can blow away. Also, various tractor tire spacings and hitches can require time-consuming adjustments for some equipment. The rotary tines on the mechanical weeder need to be adjusted to fit the slope of the land. A lead partner or equipment coordinator may be needed when a shared machine is complicated to operate or requires specific routine maintenance. This was important for the group to share the JOANNA-3 aronia berry harvester and the early success of AB Harvesting, LLC.

Distance Matters

We typically assume that close proximity will make sharing equipment easier by reducing transportation costs and allowing it to be used more frequently. However, in certain long-distance situations, sharing can also make sense. One advantage of long-distance sharing is that conflicts with regard to scheduling can be avoided if there is enough variation in the growing seasons of participating farms, and the equipment is used only once per season, such a plastic mulch layer, plastic remover, or potato/root crop digger.

Not Everything is Worth Sharing

In addition to considering the cost of mileage and time spent in transport, think about the labor required and the difficulty of the task the machine would perform. For example, two early partners in the garlic clove separator group determined that as much time was needed to haul their garlic to another farm to use the separator as it took to separate the garlic cloves by hand, thus timeliness wasn't a critical factor.

Equipment Sharing Can Evolve into Greater Partnerships

There is a lot of potential for small-scale fruit and vegetable growers to expand their partnerships from equipment sharing to cooperatively purchasing transplants and supplies, such as crates, boxes, and bags, to reduce unit costs. These partnerships can also carry on through marketing of the product. The group of three women who purchased the toolbar first teamed up as beginning growers to help each other with their marketing, which lead to the development of a three-farm CSA. Aggregation and the development of local food hubs for wholesale distribution can also be an outcome of an equipment sharing partnership.

Chapter 5

Resources and References

Machinery and Labor Sharing

Farm Machinery & Labor Sharing Manual

Georgeanne Artz, William Edwards, and Frayne Olson
MidWest Plan Service, 2009
Available for purchase at https://store.extension.iastate.edu/product/12750

Potential for Machinery: A Case Study of Fruit and Vegetable Growers in Iowa

Nicholas Pates and Georgeanne Artz
Leopold Center for Sustainable Agriculture, January 2014
Available at https://dr.lib.iastate.edu/entities/publication/50b2ec24-3280-4a58-8efd-95d0318631e5

Can We Share? Benefits and Challenges of Sharing Equipment in Fruit and Vegetable Operations

Georgeanne Artz
Iowa Alliance for Cooperative Business Development, May 2013
Available at www.extension.iastate.edu/coops/presentations_publications/can-we-share.pdf

Joint Machinery Ownership

William Edwards
Iowa State University Extension Ag Decision Maker Publication File A3-34
Available at www.extension.iastate.edu/agdm/crops/html/a3-34.html

Farm Machinery Joint Ventures

William Edwards
Iowa State University Extension Ag Decision Maker Publication File A3-37
Available at www.extension.iastate.edu/agdm/crops/html/a3-37.html

Farm Machinery Joint Venture Worksheet

William Edwards
Iowa State University Extension Ag Decision Maker Publication File A3-38
Available at www.extension.iastate.edu/agdm/crops/html/a3-38.html

Equipment & Tools for Small-scale Intensive Crop Production

National Sustainable Agriculture Information Service
Available for purchase (print and electronic) at https://attra.ncat.org/product/equipment-tools-for-small-scale-intensive-crop-production/

Business Organization Resources

Sample Operating Agreement for an L.L.C.: Operating Agreement of Acme Machinery, L.L.C.

Iowa Alliance for Cooperative Business Development, 2007
Available at www.extension.iastate.edu/coops/presentations_publications/acmeoperating.pdf

More information on business entity forms and fees from the Iowa Secretary of State can be found online at http://sos.iowa.gov/business/FormsAndFees.html. Other states have similar resources available online.

Machinery Management

Estimating Farm Machinery Costs

William Edwards
Iowa State University Extension Ag Decision Maker Publication File A3-29
Available at www.extension.iastate.edu/agdm/crops/html/a3-29.html

Machinery Adoption Decision Example: A Mechanical Harvester

Georgeanne Artz, Tim Eggers, and William Edwards
Iowa Alliance for Cooperative Business Development publication, April 2011
Available at www.extension.iastate.edu/coops/presentations_publications/mechanicalharvester.pdf

Transferring Ownership of Farm Machinery

Don Hofstrand and William Edwards
Iowa State University Extension Ag Decision Maker Publication File A3-32
Available at www.extension.iastate.edu/agdm/crops/html/a3-32.html

Notes