2016 Southern Wisconsin
Vegetable Production Workshop

Organic Weed Management

	Heidi Accola **Roots & Shoots, LLC**	John Middleton **Fazenda Boa Terra**	Steve Pincus **Tipi Produce**
Location	Sauk Prairie, WI	Spring Green, WI	Evansville WI
Acres in vegetables	1.3	8.5-10	45
To give a sense of the level of mechanization:			
direct seed	by hand with hand-scale tools	by hand with hand-scale tools	with a tractor
transplant	by hand with hand-scale tools	with a tractor	with a tractor
seed cover crops	by hand with hand-scale tools	with a tractor	with a tractor
incorporate cover crops	with a tractor	with a tractor	with a tractor
prepare stale seed beds	with a tractor	with a tractor	with a tractor
flame weed	by hand with hand-scale tools	do not flame weed	with a tractor
weed between crop rows	by hand with hand-scale tools	by hand & with a tractor	by hand & with walking tractor & with a tractor
weed in crop rows	by hand with hand-scale tools	by hand & with a tractor	by hand & with a tractor
lay plastic mulch	with a tractor	with a tractor	with a tractor
lay organic mulch	by hand with hand-scale tools	by hand with hand-scale tools	by hand & with a tractor
farming style	certified organic	certified organic	certified organic

Crop Rotation

Notes	My rotations are based on crop families. While some of them have weed-suppression benefits, it's entirely about keeping 3-4 years between crop families for disease issues.		Can't really lay out a rotation in this form- we base our rotation on keeping 3-4 years between botanical families, minimizing disease issues. We usually plant early-established crop like lettuce and onions into fields that had late-harvested crops (carrots, brassicas) the previous season and were bare over the winter.
Year 1	brassicas (some weed issues)	Over wintered rye vetch to cole crops, if possible we undersow a winter cover and mow the cash crop when finished otherwise a fall cereal will be drilled after incorporation of cash crop	
Year 2	lettuce, fennel, etc. (repeated planting and weeding)	Over wintered or winter killed cover crop into potatoes and/or cucurbits followed by rye and/or vetch	

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Year 3	carrots, beets (benefitting from previous year's good weed control)	Over wintered rye/vetch or spring drilled oats/peas into a summer fallow if needed or a buckwheat or sudan grass, sudan grass is allowed to grow tall, chopped and plowed in for organic matter or undersown with vetch or soybeans and clipped to promote root mass and allow under sown legume to grow, sudan stubble winter kills	
Year 4	cucurbits or nightshades (used to have poor weed control but now are much better on plastic mulch and woven landscape fabric)	Same as Year 3	
Year 5	legumes	Various small grains and/or cover crops (an opportunity to play around with things)	
Year 6		Over wintered or spring drilled grains into sweetcorn and/or plasticulture, fields removed from production early enough will get a quick buckwheat rotation before going into fall rye/vetch	

Perennial Weeds

Most Problematic Perennial Weeds	perennial chickweed, quack grass in 1 field as of 2015, bindweed (in one very limited area)	We really don't have perennial weed issues with some exceptions for perennial grasses when we convert hay ground into veggie production.	quack grass in perennial crops, Canada thistle and bindweed in both perennials and annuals
Managed Fallow for Perennials	No fallow	We typically go after very grassy fields with fairly aggressive (regular) tillage while fallow and follow with a cover crop.	For the past several years we have used every field for row crops each year- no fallow years
Overall Approach for Perennials	**perennial chickweed** - hand hoeing and removal of all plant material from the field **quack grass** - new problem that may require extra tillage for control in 2016 **bindweed** - a problem in 1 row of asparagus, but starting to creep. I plowed under a bed of raspberries that was full of bindweed, and planted walking onions, which I can mow after harvest to keep the bindweed down. If it continues to creep, it's a small enough to smother with landscape fabric	We will often use allelopathic crops such as sorghum Sudan or rye for annual weed problems but they rarely have an effect on perennials. If we do see a Canada thistle or the like it will be immediately hand weeded out (preferably whiles still small) and monitored. Tillage with a cultivator will help but NEVER rotovate thistle as it as an adventitious rooter and each chunk could represent a new thistle plant.	We tend to rotate long-season crops like peppers, melons, kales with crops that are in the ground for a short time, like lettuce, carrots, beets. Weeds can build up in crops that are difficult to cultivate all season, but are weakened during and after short-term crops.

Creating Weed-Free Planting Beds

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Preceding Cover Crops		We don't specifically use cover crops for weed control. Any weed suppression is a plus. General notes on cover crop practices: **For early seeded crops**: We forgo a cover crop in favor of fall fallow and stale seed bed. We will use oats or barley or young green rye crop on occasion, but we do not like to do heavy tillage in April, so fall bed prep is preferred. Due to increased risk of soil loss, we will plow in a heavy biomass crop with an under-sown legume before bed prep and hope it balances out by September. **For summer and fall crops**: Over wintered vetch is a favorite for biomass and nitrogen, it may or may not be mixed with rye. We prefer cover crops that over winter, as we do our deep tillage in the fall with the chisel plow (straight shanked) prior to seeding, and then we can keep the tractor off the soil in the spring. We do use winterkilled crops like oats, barley, sorghum and occasionally buckwheat. **After a spring or summer cash crop**: We will sow singly or in combination sorghum Sudan, buckwheat, sweet clover, hairy vetch, or soy beans. These winter kill or are incorporated in fall and drilled to rye and/or vetch. This is also a great time to use up old seed stock and clear up storage space with a mix of any and all seed on hand.	Cover crops in themselves don't lead to weed-free beds, and can work against this goal. When cover crops are growing, there is no direct weed control. There's a balance/conflict between maximum cover crop growth and time for decomposition and weed control before a crop is established. Tillage of any sort to kill and work in cover crops releases a flush of weeds.

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Tillage Just Prior to Planting	One deep tilling with my Massey-Ferguson and rotavator, then repeated tillage after new flushes of weeds have germinated, up until day of or day before planting.	If the preceding crop is large, it will be mowed with either the batwing rotary mower or the flail mower. If timing allows, we allow the residue to dry down for a day or two. If time is tight, we use the rotovator to speed the crop kill ahead of heavier tillage. We generally use the rotovator sparingly if possible but it does often replace the chisel plow and disc as the primary tillage tool for early season field operations. After the primary tillage pass we will make a pass with the disc. If necessary we will follow the disc pass with the field cultivator. We categorize all of these operations as 'primary tillage' and the timing depends on the total amount of residue to deal with. In low residue situations, all operations may happen in one day. In a high residue situations, it may take several days to a week to complete. It is only after we complete primary tillage that we will move into stale seed operations which take an additional 2-3 weeks.	
Stale Seed Beds	Depending on the previous year's weed problems, I may start up to 3 weeks in advance, starting with a light surface tilling, then repeat surface tilling or hand hoeing with stirrup hoe every week until planting. If possible, I will water the area or time tillings around rainfall, after new weed seeds have had time to germinate.	After primary tillage and 14-21 days before transplanting or direct seeding: 1. Final prep pass with field cultivator as deep as possible 2. Raised bed formation with bed shaper 3. 2-3 passes with basket weeder at ~1" deep (1 pass at 21 days, 1 pass at 14 days and 1 pass immediately prior to planting). If conditions don't allow for basket weeding we will do a pass at ~2" with the rotovator over raised beds to kill larger weeds. Should we need to have a fallow period between cover crops we will simply follow our normal tillage protocol except that we will make weekly passes with the field cultivator for the period of bare fallow until the next crop is drilled in.	We'll run the Lely tine weeder through if weeds are very small, or make a shallow pass with a 7' Perfecta field cultivator if weeds are larger.

Minimum Weed-Free Periods

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Broccoli	until canopied	until after fertility sidedress	4-6 weeks
Beans	until canopied	flower/pod formation	4 weeks
Carrots	entire crop life	entire crop life	entire crop life
Cucumbers	until canopied	N/A, plastic mulch	3-4 weeks, until vines spread off plastic
Lettuce	just pull weeds going to seed	N/A, plastic mulch	0 weeks from transplant
Melons	plastic mulch, pull weeds going to seed	N/A, plastic mulch	plastic mulch, 4-6 week
Onions	plastic mulch, pull weeds going to seed	N/A, plastic mulch	10-12 weeks, toughest weed control
Peas	need new method for 2016	until we give up or at trellis	0 weeks
Peppers	plastic mulch, pull weeds going to seed	N/A, plastic mulch	plastic mulch/all season
Potatoes	until canopied	until final hilling	not grown
Salad Mix	entire crop life	entire crop life	not grown
Spinach	entire crop life	entire crop life	3-4 weeks
Sweet Potatoes	plastic mulch, pull weeds going to seed	N/A, plastic mulch	6-8 weeks, spread cultivators
Tomatoes	plastic mulch, pull weeds going to seed	N/A, plastic mulch	plastic mulch, 3-4 weeks
Winter Squash	plastic mulch, pull weeds going to seed	N/A, plastic mulch	6-8 weeks, spread cultivators

Keeping Beds Weed-Free

Crop Spacing	My crop spacing is more for getting a lot out of a little land, but also helps with weeds. For example, Brussels sprouts are planted with kohlrabi such that I get 300 Brussels sprouts and 200 kohlrabi per bed. After 1-2 hoeings the weeds are shaded out. 5' wide bed, 3 rows Brussels sprouts per bed with 18" between rows and 12" between plants in row. In between each row of sprouts there is 1 row of kohlrabi, with 6" between plants. If B = B. sprouts and K = kohlrabi, it looks like this: B k B k B / k k / B k B k B. Lettuce, beets, carrots, celery and celery root also get spaced 1-12" apart in row with 5 rows per bed. With this spacing, 2 hoeings gets good weed control (except in carrots) and then hand weeding where necessary to keep weeds from seeding.	Increased plant density improves yield per acre as well as competitiveness with the weeds, though if too dense, yields will suffer. We plant many of our direct seed crops such as beets, turnips and radishes on 5 row at 6" row spacing and a dense .5-1" in row spacing. After one hand weeding (hopefully basket weeding in 2016) they will begin to close the canopy. We rarely thin our seedings and find that we can prolong harvest by using the harvest for thinning so long as the tops hold up. Mini fresh cabbage are an example where we condense the plugs to 10-12" to keep the heads smaller but also quickly crowd out in row weeds after final cultivation.	Planting cabbage in 3 rows 18" apart (instead of 2 rows 36" apart) allows the large plants to fully cover the ground, shading late-germinating weeds. / On the other hand, planting leeks in 3 x 18" rows just complicates weed control, since the leeks offer no resistance to weeds. We stay with 2 x 36" rows, spacing the plants closer within the row.

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Irrigation	**Drip** (nearly exclusively). For direct seeded crops that are slow to germinate (like carrots), I put drip tape directly over the row, turn it on for 30 min or so, then pull the main back 6" and allow another 30 min of irrigation (to hit all seed in the row). The idea is to get moisture on the rows of seeds only, not in between row. It helps germinate the carrots before the weeds and eliminates a lot of hoeing between rows. For transplanted crops I'm considering lining up the drip emitters directly next to the transplanted crop (those that are planted every 12") for the purpose of watering only exactly where the new transplant is, thus increasing weed control while the crop is still tiny. **Sprinkler** when I have a large swath of land that needs to be watered, for example when establishing a cover crop.	We use **overhead irrigation** as soon as possible after direct seeding (or application of row cover). Keeping the seedlings moist gives them much quicker and more uniform germination. It of course helps the weeds as well but the cash crops almost always have a leg up or are at least present enabling you can get in to hand weed or cultivate sooner after seeding giving a significant advantage to the crop. Without irrigation, the weeds almost always have the high ground against spotty and slow germination.	**Drip irrigation** under plastic or organic mulch keeps the rest of the field dry, reducing weed germination. However, drip laid on or next to a crop row on bare ground will stimulate hard-to-handle weeds right in the row. If needed (and possible), we irrigate stale seedbeds to bring out a weed flush that is killed before planting.
Organic Matter Mulch	**Living mulch** - clover in tomato, pepper and sweet potato aisles. Unsure if I will continue using this practice. I will try another year and see if I can get better at mowing to keep control of weeds. **Straw** - aisles between all black plastic mulch. Laid as soon as plastic is laid, for immediate suppression of weed germination. Some hand weeding is still necessary, especially where soil meets plastic. I also use straw on spring-mowed raspberries, asparagus, and for covering strawberries in winter.	We really only use organic mulch straw for our garlic which is currently about .2 acres. We have used it between plastic as well in the past but we have moved away from it with labor constraints. We may consider using it more for plastic crops in the future if we are able to produce and distribute it more efficiently.	We have a few hundred cubic yards of city leaves brought to our farm each fall, and use a portion of this for mulching tomatoes some seasons. We usually buy 20 big square bales of wheat straw each year for winter mulch on strawberries and garlic.

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Plastic Mulch	**Black Plastic** - Onions, tomatoes, peppers, eggplant, sweet potatoes. I like the spacing created between rows with the black plastic and the increased heat for the crop. Straw or clover is used in between plastic for weed control. 2015 was the first time using clover for aisles with mixed success. Some weed problems since the troughs created in the aisles due to the raised beds made it difficult to mow. 2015 was the first time I planted alliums into plastic and I'm never going back. I use a rented plastic mulch layer, 0-4 weeks before crop is planted. **Landscape Fabric** - Melons & winter squash. Holes are melted into the fabric. Fabric is laid 0-4 weeks before crop is planted. Soil is pretilled but not mounded into raised beds. Nearly 100% weed control. Drip tape is laid on top, 2 lines per row. Melons planted in groups of 5 plants, 5 feet apart. Winter squash planted 2 plants per hole, holes 2 feet apart, rows 3 feet apart. 1/3 of land is in plastic mulch.	We use plastic mulch for a variety of crops such as celeriac, onions, tomatoes, cucurbits, head lettuce, peppers, eggplant, parsley, basil, chard, sorrel and fennel. Though in 2016 we are going to try and move at least some cucurbits, peppers and eggplant out of plastic mulch in order to reduce plastic usage and gain better pest control (planting with kale to be on the same spray cycle). We use plastic mulch for weed control, water conservation (drip irrigation), and soil temperature moderation (black for warming and white for cooling). For weed control between plastic mulch we use a combination of a special cultivator from Hillside Cultivator, hand weeding, straw mulching and inter-seeding (annual ryegrass, white clover and/or berseem clover). Despite our best efforts we have, at best, variable success at weed control between plastic mulch occasionally resulting in weed whacking and/or push mowing. Under our current production plan we have about 1 acre under plastic though if we are able to move winter squash, melons, peppers and eggplant out of plastic we should be able to cut it down to ~.5 acres. If we are able to reduce usage to that level we will consider switching to a biodegradable film to further reduce waste.	**4' wide green plastic** - for 1st plantings of zucchini & summer squash, cukes, sometimes 1st pepper planting and for 1st & 2nd melon plantings. **4' wide black** - for all eggplant, most tomatoes & peppers, 2nd & 3rd plantings of zucchini & cukes, 3rd planting of watermelons, sometimes winter squash. **4' wide silver** - for some onions, especially white and early Walla-Walla and reds. Plastic is laid with a Rainflo 2550 and a 65 hp tractor, usually just before transplanting. We make a low bed, just 3-4" high, since our sandy loam soils don't need extra drainage. We'll use 7-8 acres of plastic mulch w/drip each season. We use a water-wheel transplanter for plastic mulched beds. We've had pretty good luck using that water wheel for transplanting a 2nd planting of zucchini into a killed (by flail chopping) rye-hairy vetch no-till field.

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Hand Weeding	**Stirrup hoe** for lettuce, beets, carrots, brassicas, hill edges of potatoes, unmulched aisles, beans, herbs **Cobrahead cultivator** for between tightly planted crops in row, like salanova lettuce, leeks, celery **Triangle-headed flat hoes** are good for undercutting grassy weeds in hard crusty soil, as it slices like a razor blade, but we rarely use them any more	We hand weed as soon as there is enough germination to find the rows. One hand weeding is generally enough except on some crops like carrots, which often require a second round of weeding. **Long handled diamond hoes** (with a P-handle) for manual weeding in the transplanted crops. When all of the timing works for mechanical cultivation we should never have to hoe transplanted crops, but things don't always go as planned. **Onion hoes** come in both left and right handed configurations, which makes them comfortable to use both between row and in row. We often carry along a conventional hand hoe for chopping as well. Do not cheap out on hand tool. A $115 hoe or a $40 hand hoe from Dewitt, Green Heron, or Sneeboer is worth it's initial cost over and over again. These are very well designed tools that are meant to work hard for a very long time. As such, they should also be treated well. Clean the dirt off them when finished and oil the handles in the fall to preserve the wood and prevent splintering. Cheap tools will make you work harder and will often not make it through a day of hard work let alone a season! Cheap tools will cost you much more money and wear and tear on your body in the end.	Our favorite long-handle hoes are Rogue brand, usually bought from Jordan Seeds. Short-handle hoes are the type Johnny's sells as #9187, but we buy them from A.M. Leonard - 510HW (left-hand style 710HW)
Wheel Hoeing	Wheel hoe (maxadyne) for crops with 3 rows per bed (brassicas, beans, corn)		

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Flame Weeding	Flamer when the weather or the weeds are out of control. Most recently used in the very, very rainy year of 2014 when weeds got to be a carpet in the raspberries. Flamed, then laid heavy straw mulch before the weeds could gain strength again.	no flame weeding	A 3-row 3-point mounted unit, uses 8 gallon forklift LP tanks. Has 6 smaller 150,000 btu burners, which can be used right over the rows or adjusted to flame perpendicular through rows. / We use this pre-emergence with carrots, parsnips, sometimes peas, beans, beets. / Sometimes will flame at the base of growing onions, leeks, corn.

Breakdown of Total Time Spent Weeding

Hand Weeding	70%	80%	89%
Wheel Hoeing	20%	0%	0%
Flame Weeding	1%	0%	1%
Tractor/Mechanical Cultivation	9%	20%	10%

Mechanical Cultivation Specifics

Tool 1	**Rotvator** - for deep and shallow tilling, requires 24.5 hp PTO, 33 hp tractor, $1,500	**KMC** - to cultivate & sidedress, requires 60 hp tractor, $1,500 - $4,500	We have several sets of cultivators that are effective on the whole range of crop and weed sizes, from small weeds emerging with direct-seeded crops like carrots, to carpets of ragweed and grass in perennials like asparagus and rhubarb. Also use a Lely tine weeder when crop is well-rooted and weeds are small and immanent. Will show many tools in the presentation.
Tool 2	**Potato Hiller** - for hilling potatoes and simultaneously cleaning weeds in potato aisles, requires 24.5 hp PTO, 33 hp tractor, $300	**Super C Tractor** - to cultivate, $2,000 - $3,000	
Tool 3	**Walk-behind rototiller** - used once to clean up potato aisles after hilling is no longer possible, or spots where hiller didn't reach between aisles, $300	**Basket Weeder** - for cultivation and making stale seed beds, requires a tractor with belly mount, $1,000 - $2,000	
Tool 4		Hillside Cultivator - used for plastic cultivation, requires 45 hp tractor, $3,500	
Tool 5		**Bed Shaper** - to make raised beds, requires 60 hp tractor, $1,500 - $4,000	
Tool 6		**Plastic Mulch Layer** - requires 40+ hp, $1,500 - $5,500	

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Bed System	5-foot width, 100-foot length	We run a 6' on center bed system. Raised beds that have ~50" top and a 7"-8" height. Harvest lanes of 10' by about 300' run between each section of 8 beds so that each cash crop section is 1/3 acre. This harvest lane and headland system means we sacrifice about 1/5 or our acreage to permanent grass. It allows us access to our fields in any condition, limits truck (and field transit) traffic to designated lanes, and means the harvest vehicle is always reasonably nearby. It also provides lots of buffer against erosion. This system also means that our beds are always in the same place, meaning that the areas of compaction are always in the same wheel tracks and that the production beds are rarely driven over (our version of a controlled traffic system).	Most beds are 6' wide. Watermelons and zucchini are often 7' wide. Winter squash and pumpkins are usually 8-10' wide. Most fields are 620' or 520' long, some are 300-400'. 1, 2 or 3 rows per bed. Plastic mulched beds have 1 or 2 rows.
Seeding & Transplanting		We hope to buy a carousel transplanter but in the meantime the water wheel works well at giving us perfect spacing for cultivation. It works with or without a raised bed system as long as the bed prep is done well enough for the spikes to penetrate the soil. The bed shaper indicates where tractor tires need to run (transplanting) and in our case where to walk with the push seeder. As we scale up, our weed control in direct seeding has yet to catch up in mechanization and efficiency. While direct seed crops use only about 1/4 of our acreage they take up about 3/4 of our weed control efforts. This is one area where we feel the worst growing pains. In general we are pretty tooled up, but direct seed systems have lagged. We still use a single row push seeder (Jang) which works well but is nearly impossible to create perfect enough spacing to allow mechanical cultivation.	We use a water-wheel transplanter for plastic mulched beds. We've had pretty good luck using that water wheel for transplanting a 2nd planting of zucchini into a killed (by flail chopping) rye-hairy vetch no-till field.

	Roots & Shoots, LLC	Fazenda Boa Terra	Tipi Produce
Recommended First Purchases	Wheel hoe Long-handled stirrup and cobra-head hoes Tractor with rotovator Plastic mulch layer (or at least rent one), as this eliminates a vast majority of weeds	**Tractors** 1. For the money, a Farmall Super C with a simple shovel set up is hard to beat. 2. As the price of diesel offset tractors soar, a late model Farmall 140 or even a Farmall Cub or Farmall A with a mid-mount lift can be great for running a basket weeder, shovels, bezzerides, torsion weeders, spiders, planet juniors or any number of tools that help with seeding and cultivation. 3. Allis G is a good option. There are ready made kits to convert them to electric if you have the know how and ~$3500 to make the switch. On a G I always recommend a hydraulic lift, if possible. All of these tractors are quite adjustable to work on bed spacing from 40" to 72" **Implements** 1. A water wheel is a must on most farms and can be set up as a 3pt. mount or a pull behind for smaller tractors. 2. Rear mount Lillistons and Danish tine cultivators can also be found for $500 or less and can work wonders on 2 and 4 row crops such as brassicas, beans, or corn. Look for one with a centering disc to prevent it from wandering for rear mount cultivation. 3. A tine weeder such as a Lely or a rotary hoe can be a good cheap option for blind cultivation.	1. A small belly-mounted cultivator with discs that can move dirt away from the row during early cultivation of just-emerged or transplanted crops. 2. Less costly, get a rear-mounted Danish-tine row crop cultivator w/gage wheels (usually 6-row) at an auction, then cut it apart to make two units to fit your farm, and use it often. Find row shields that work for you. 3. A tine weeder.
Should Have Purchased Sooner	tractor, above	The Super C for 2 row crops should have been a much earlier purchase. We have yet to purchase a multi-row seeder but we hope to take the plunge this year.	More important than having the exact piece of equipment, is using whatever you do have frequently and at the right time- when weeds are small and field conditions are right. And having your cultivators precisely adjusted so they kill all your weeds.

When all Else Fails

Weeds that Threaten to Seed	Hand pull, mow, weed eat, flame. Dump in husband's conventional field.	We have very little tolerance for weeds (even more so their seeds) so we fairly regularly order a 'quick burn' which is simply moving rapidly through the field to hand pull big weeds that are threatening to set seed. This most often happens in potatoes, sweet corn, cole crops, or between plastic mulch.	If these maturing weeds are not bothering the crop, we usually tolerate them. We have such a large weed seed bank that a few percent more won't mater.
Weeds that Do Seed	Where seeds do drop I increase my diligence in dealing with those problem areas the next year and consider adjusting my planting plan for that area, possibly plastic or organic mulching instead of leaving it open. Finally, I will make stale beds in that area before planting.	If we do have weeds set seed we will pull or snip them out and remove them from the field.	See above.
Plow in a Weedy Crop?	Yes. If I'm spending so much time on the crop that I can't possibly make it pay for itself, I till it under. I believe it has only happened once with weedy beets.	Absolutely, sometimes even joyously. We first make a calculation to estimate roughly what the cost of weeding the crop with be and what it's return will be. The second criteria is to consider the opportunity cost, as in what job are we not getting done in order to save this crop and which makes more financial sense? Then we consider the successions. We can bear a loss or two of greens out of 20 seedings but we cannot bear the loss of a winter squash crop with which we have only one shot at success. So the basic questions are: 1. Can we afford to lose this crop? 2. Can we afford to save this crop? 3. Will saving this crop force us to lose another crop? 4. Is the opportunity cost bearable? There is certainly a small curve and the grade that asks: How will this affect our quality of life?	Sure, this still happens. Some years we have a July planted carrot field that doesn't get pre-emergence flamed (rain interferes) or gets swamped by foxtail (which is set back but not killed by flaming). Better to till and replant as soon as possible. If we put too much hand weeding time into a very difficult field, we will usually miss out on optimum weeding windows on other fields, and it gets harder to catch up. If an essential CSA crop needs a rescue job, we will do what's necessary.