



Diggin' Roots Farm

Understanding Cost of Production: A Case Study

Overview of Diggin' Roots Farm

In 2012 we, Sarah Brown and Conner Voss, along with our families, purchased the property that became Diggin' Roots Farm. The certified organic land is just under 50 acres with vegetable cultivation occurring on 2.5 acres. On the remaining land, we nurture pasture, shepherd a flock of 50+ heritage sheep, rotate a herd of heritage hogs, and are restoring a four-acre riparian zone along a seasonal creek. Vegetables and fruits are sold through the local farmer's market, a Community Supported Agriculture program, and to nearby restaurants. We also sell hay, silage, meat, and other livestock products directly to consumers. Sarah maintains a job off-farm and Conner manages all daily activities with help from one full-time employee and an intern. The farm is moderately mechanized. We have a 45hp tractor as well as an Allis Chalmers G for cultivation and a flamer for weed management. Irrigation is all drip. We have approximately 2,150 sq. ft. of high tunnel space for crops, do not use plastic mulch, rely heavily on row cover for plant establishment, and do all transplanting and harvesting by hand. We prioritize open-pollinated crop varieties with few exceptions: some broccoli, early-season roots, cauliflower, and brussels sprouts. We produce all of our own plant starts.

On our land, Soil is a Proper Noun, the heart of the farm, and the arbiter of our actions. We invest in our soil through luscious cover crops, diverse and extended crop rotations, and minimizing soil disturbance as much as possible.

For more information please visit: www.digginrootsfarm.com

Project Background.

The initial years on the farm focused heavily on systems development and production: investment in high tunnels, fencing, marketing, harvest & wash/pack system development, equipment selection, irrigation development, etc. The 2016 season was our fourth season on this land, growing at this scale. After the first few years we felt we had relatively stable production and a secure market for our crops. We began reevaluating our goals around growth and development and realized we needed additional data to inform decision-making and to ensure long-term financial viability. Using an approach developed by Oregon Tilth and Oregon State University, we set out to determine our unique on-farm costs of production. This case study demonstrates how this functioned on our farm and what we learned.

Why is this important?

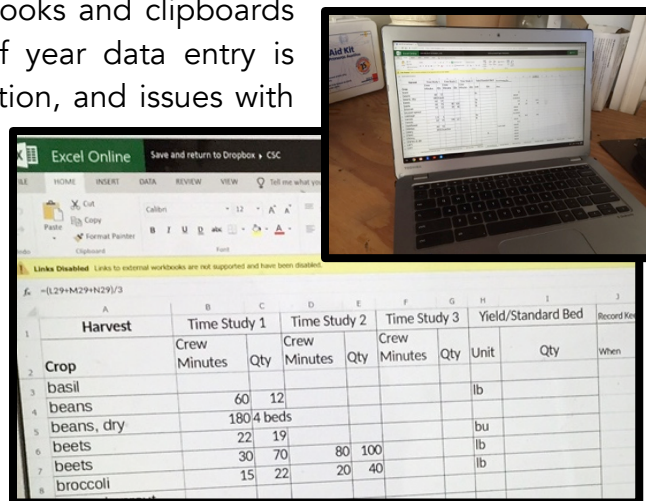
Cost of production information can be used to determine which crops are more or less profitable, where to employ labor-saving mechanization, and how to be more strategic about the mix of crops offered through our various marketing channels.

The method.

During the 2015 and 2016 growing seasons, Diggin' Roots Farm participated in a Cost Study Cohort Pilot project that was developed and facilitated by Oregon Tilth and OSU. This project used an activity-based time study approach that focused on one activity on the farm at a time. For example, during the spring we spent a few weeks recording the time it takes to do various activities in the greenhouse. The activity areas followed the typical progression of the growing season starting with greenhouse, and moving on to bed preparation, seeding and planting, watering, weeding and trellising, harvesting and post harvest handling, marketing, cover cropping and field clean up. The majority of what was tracked focused on the time it takes to do various activities related to a unit of space of a unit of crop (count or weight).

The set-up.


Data entry on the farm is a constant challenge. Notebooks and clipboards are moved; pages fade, and papers are lost. End of year data entry is difficult due to messy handwriting, incomplete information, and issues with unit consistency and conversion. With this project, we developed data entry stations using networked tablets. Creating centralized locations, or hubs, where the farm crew naturally congregates is key to making data entry successful. By using networked tablets, papers weren't lost, data was easily calculated and summarized, and we avoided issues of duplication, redundant data/pages, and illegible handwriting. Time study data on harvest, post harvest, and transplant production were recorded in these locations.



In addition to setting up these stations, we integrated data collection into pre-existing forms. This simplified and streamlined recordkeeping for our organic certification, time studies, and production records.

Fall Share 2 - 11.7.2016			Harvest			Pack			Time Study			
	Crop	Unit	Planned	Actual	Unit	Full	Partial		Harvest	Pack	Who?	
				15	Actual	0	Actual					
4	Celeriac	each	15		each	1.0	0.0		25m	5m	SH	incl. defoliation
5	Chard	bunch	15		bunch	1.0	0.0					
6	Escarole	each	15		each	1.0	0.0		7m	10m	SH	double wash
7	Winter Squash	each	19		each	1.0	0.0					
8	Beets	bunch	15		bunch	1.0	0.0		25m	14m	SH	
9	Potatoes	pound	45		pound	3.0	0.0			20	CV	bagging
10	Onions	each	30		each	2.0	0.0					
11	Fennel	each	50		each	3.0	0.0		12m	7m	SH	
12	Radish	bunch	15		bunch	1.0	0.0		20m	15m	CV	

For data collection of fieldwork, transplanting, weeding, irrigation, and plant care, we printed out and laminated a poster-sized entry form and posted it adjacent to the harvest data entry location.



Time Study 1		
Minutes	Number of Plants	Notes
11	37	squash
100	325	lettuce
60	50	tomatoes
Minutes	Bed Feet	Notes
15	100	

Time Study 1		
Minutes	Bed Feet	Notes
20	100	removal + seed bags
60	300	in 6 beds - of
15	200	wine

The people.

Developing systems and infrastructure are critical to ensuring that information is collected and recorded. An equally critical piece of the puzzle is to give farm workers (ourselves included) the training, guidance, and accountability needed to ensure that the people part of the system is functioning. For the 2016 season, this meant an all staff pre-season training and planning meeting. As noted on the record keeping sheets, time study responsibilities were assigned at our weekly meetings or in the morning on harvest days.

The analysis.

Once data was collected we relied on the calculator developed by Oregon Tilth and OSU to compute our farm's unique costs of production. The calculator utilized the time studies as well as information that we inputted on overhead, marketing costs, yields, salary, and all other expenses.

Lessons Learned

This project has impacted our farm in unparalleled ways. More than anything, it has created awareness for everyone working on the farm that minutes matter. That's not to say that we cannot enjoy or take pleasure in the work, but rather that in order to sustain the farm and support those working here we must be cognizant and aware of how we use our time. There are many additional lessons that we learned about the process and our farm itself. These lessons are unique to our operation- soils, humans, equipment, varieties, etc. - and we offer them with the hope that it will inspire others to embark on similar journeys to ensure their own farm's long-term viability.

The method.

First we must express our deep appreciation for the work that Oregon State University and Oregon Tilth have done to develop a method for determining on-farm costs of production. Their efforts have made this work feasible for us to deploy on our farm. Additionally we'd like to highlight the following lessons learned:

- Start small. Undertaking the work to capture representative time studies for all activities and crops on the farm cannot be taken lightly. Not only do you need a plan and system for

accomplishing this but you also need the time. We could never have done this in the first few years of farming. Come up with a reasonable plan and don't expect too much in one season.

- Work with staff. It will take more than just putting this on the agenda one time to get staff prepared. Your crew needs to understand the bigger picture of why this is important and how it will lead to certain decisions. Get their buy-in about systems creation and help foster staff ownership. Work together to figure out how to create accountability and recordkeeping methods that are easy for everyone to use.
- Talk about it everyday. Time studies should not be a solitary project. It should be mentioned at every morning check-in- who is doing what and when?
- Make notes of times studies that are not representative of the average. (i.e. Did all parsnips get harvested in the mud? Did leek harvest take longer because of overgrown weeds?) You'll be able to prioritize these crops for new time studies next year.
- Doing this work creates a great foundation for discussing productivity on the farm and encouraging quick work. Ultimately it provides you with real numbers to inform staff expectations and transparent conversations.

Our farm.

It is clearer than ever that we have a lot to learn. In 2016 we made a significant effort to invest time, capacity, and resources towards effective time studies and still we did not collect all the information we could have. Even so, the collected data (in addition to some borrowed industry averages) that is run through the OSU/Oregon Tilth calculator provides results that are extremely powerful in terms of usefulness and insight. Examples of some of those lessons are highlighted below:

- There are considerable differences in marketing costs per channel. Marketing costs account for approximately 26% of revenue at farmer's market, 12% of revenue for direct-to-restaurant sales, and 18% of revenue for CSA. These costs are specific for those market channels (i.e. staffing the market booth, CSA delivery mileage, CSA newsletter creation, farmer's market fees).
- A handful of specific lessons learned-
 - Hand thinning/weeding carrots 1x changes our margin by 13%- from a positive to a negative.
 - Our lowest performers were radish, snap peas, corn, cilantro, and cucumbers. These relied on some borrowed data so we'll be confirming that this season.
 - Poor germination on a bed means it's worth reseeding.
 - Stale seed bedding is ALWAYS worth it. It is a no brainer cost saver.
- Overhead is overwhelming. The balance between being intensive (to maximize space and overhead allocation) and doing long rotations is tricky to navigate. There are different ways to allocate overhead that we'll need to assess this next season.
- Estimating yields is not easy based on our current recordkeeping methods because the information is tracked in many different places. It's possible but not ideal. We'll be evaluating a new system in 2017.

- Some things can't be measured. We farm because we love it but also recognize we can only continue to do so if we are financially viable. That being said, it's impossible to empirically measure the satisfaction of hula hoeing vs. climbing on a noisy tractor or picking pole beans vs. straining our knees and backs hunting for bush beans.

In conclusion.

The data that we've collected has been incredibly informative for determining prices for 2017 as well as for assessing our crop mix. As an example, we are able to establish a crop list and pre-season prices for a new restaurant relationship. We are also looking closely at our crop mix and scaling back the least profitable crops while conversely scaling up those where we see clear, healthy margins. Already in early 2017 we are capturing yield and time study numbers to check our data and reassess pricing.

Nothing in our small handful of years farming has been nearly as impactful as this work (except maybe our first tractor purchase). We've always known that a farm needs to be treated as a business, but the resources and tools out there are often not applicable or appropriate for our scale, diversity, or production system. The insights gained by adopting OSU/Oregon Tilth's approach impact our work everyday. The systems and resources that we develop to support this approach on our farm are expected to be in use indefinitely. As Diggin' Roots Farm grows, learns, and adapts, we intend to continue the training, integration, and time study work implemented in this project to ensure that we stay efficient, productive, and viable now and into the future.

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