Small Farm Systems

MSU Extension 2017 Beginning Farmer Webinar

30 January 2017

Abbey Palmer

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USDA
United States Department of Agriculture

Form AD-475-C (revised 9/2006)


Chatham, MI


Purple Bumble
3-23


New Giants

EDUCATION

INTERNSHIPS

SHORT COURSES

Soil Health · May 21
Perennial Fruit Crops · June 4
Organic Small Grains · July 9
Insects on the Farm · August 13

NOVICE FARMER PROGRAM

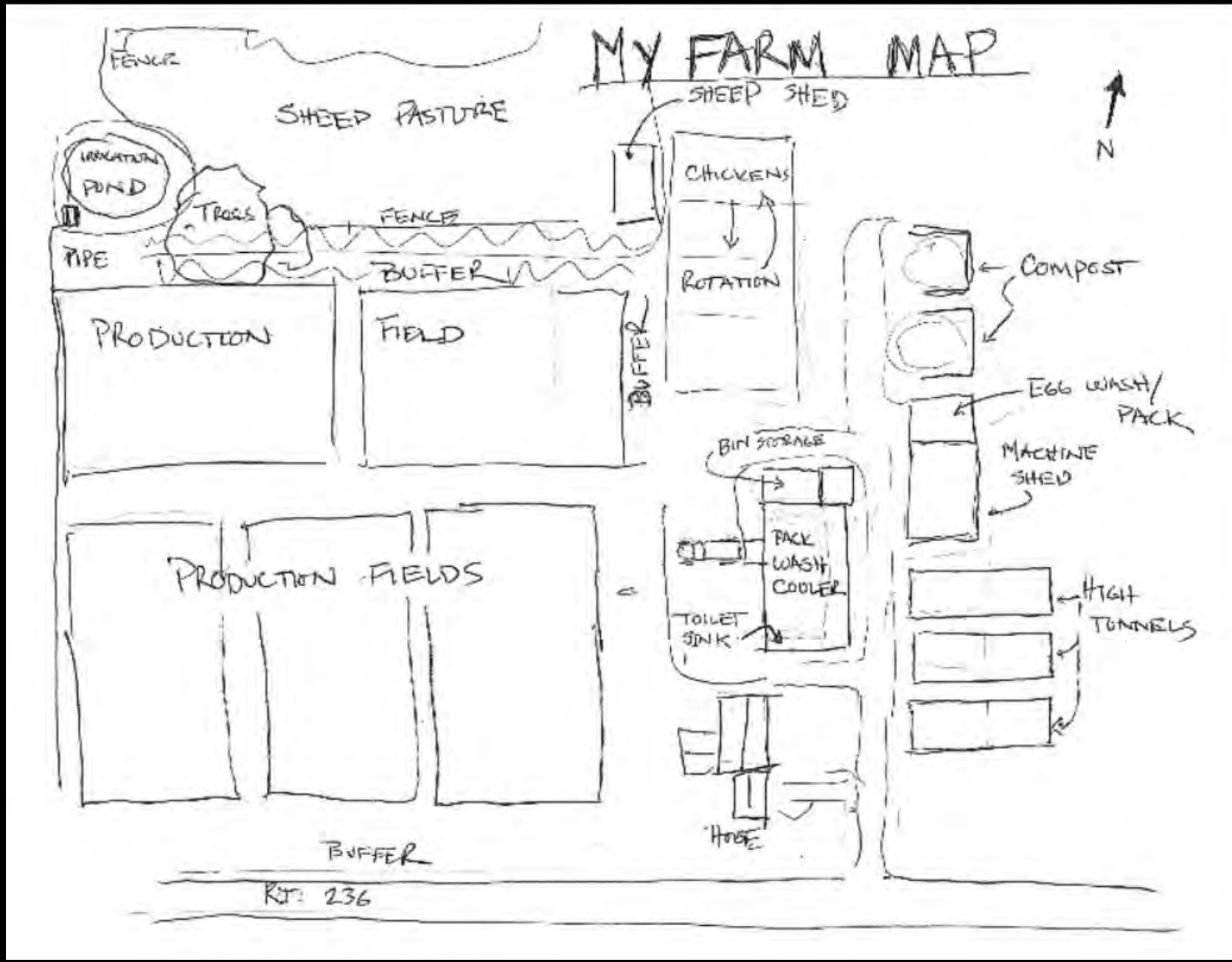
APPRENTICE FARMER PROGRAM

Visit www.msunorthfarm.org for info on our programs.


The NORTH FARM
Chatham, Michigan
Full Heart Garden
Bean Pole Farm
TREASA'S TREASURE'S
MICHIGAN STATE UNIVERSITY
UPPER PENINSULA
PLANT IT FOR THE PLANET

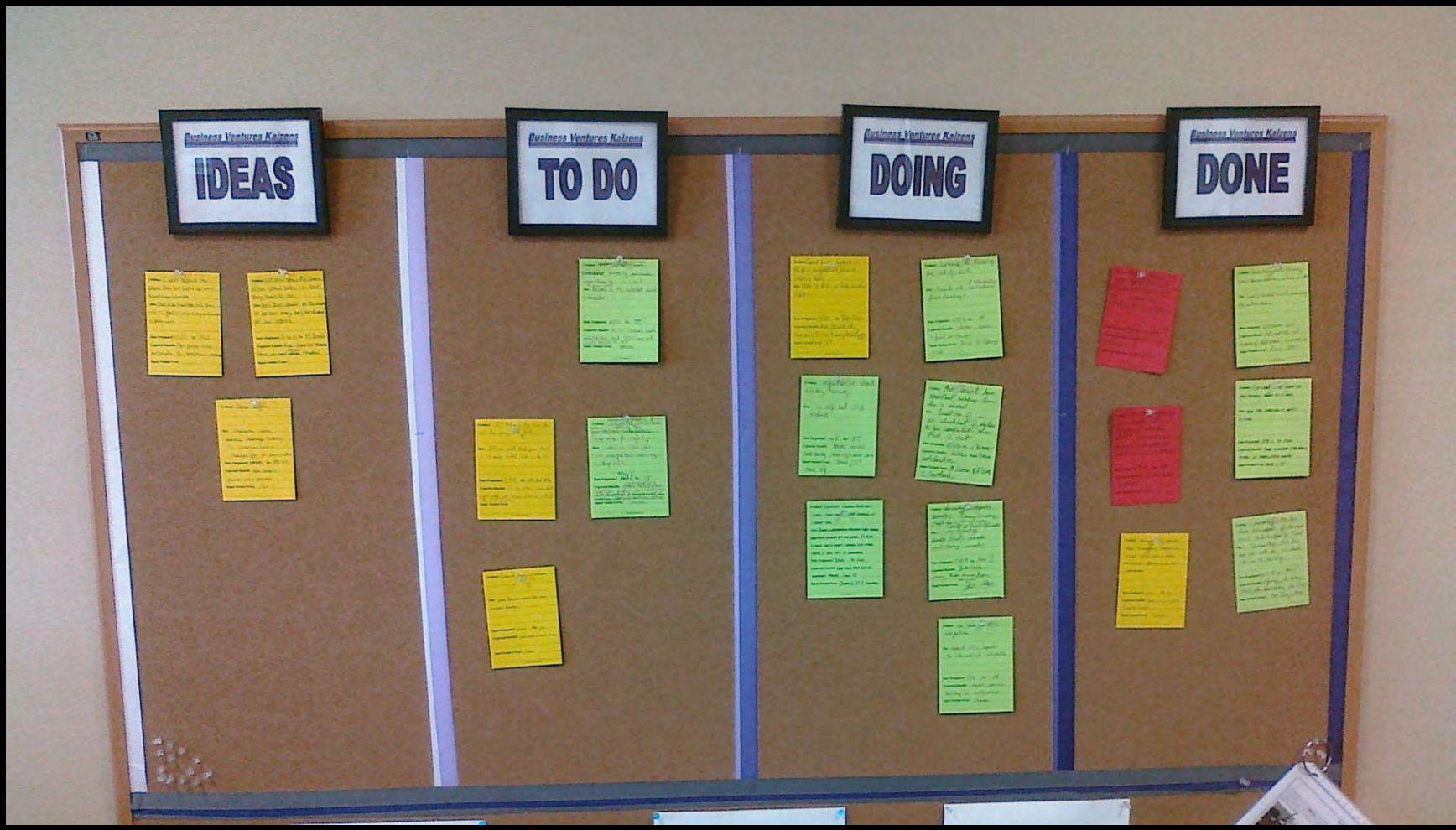

SUNSHINE
ADVANCED


N Fields
4 acres
Rock River Rd
Fence Line
FT1
FT2
Camp Shaw Well
X
NW Fields
2 acres
NE Fields
3 acres
X Field Water Access
X Valve Pit
X
Farm Well
Septic System X
Manager's
House
Holstein Hilton
Quonset
X
Septic System
Dairy Barn
Packing Shed (The Grange)
X Septic System
X
Valve Pit
Hoophouse (HH)


MY FARM MAP
FENCE
SHEEP PASTURE
SHEEP SHED
N
IRRIGATION POND
TREES
FENCE
PIPE
BUFFER
CHICKENS
ROTATION
COMPOST
PRODUCTION
FIELD
BUFFER
EGG WASH/ PACK
BIN STORAGE
MACHINE SHED
PACK WASH COOLER
TOILET SINK
HIGH TUNNELS
PRODUCTION FIELDS
HOSE
BUFFER
RT. 236

GROWING POWER PLAYS A VITAL ROLE IN THE MILWAUKEE FOODSHED, PROVIDING PEOPLE FROM DIVERSE BACKGROUNDS EQUAL ACCESS TO HEALTHY, HIGH-QUALITY, SAFE, AND AFFORDABLE FOOD. their national outreach programs teach community leaders across America how to grow, process, market and distribute food in a sustainable manner. Training today covers such topics as anaerobic digestion for food waste, bio/phyto remediation, aquaculture, vermiculture, small + large scale composting, urban agriculture, permaculture, food distribution, marketing, youth and leadership development, community engagement and project planning. &


"Everything has a place;
everything is in place"


Business Ventures Kaizens
IDEAS
Business Ventures Kaizens
TO DO
Business Ventures Kaizens
DOING
Business Ventures Kaizens
DONE

TRANSPLANT PRODUCTION

PLAN THE SYSTEM

Structure

- Heated? Whole structure?
- Fuel Source
- Lights
- Circulation/Ventilation
- Tables/Benches

Soil

- Plugs
- Open Flats
- Soil Blocks

Crop Selection

- Field or tunnel
- Ease of production

Schedule

- Field or tunnel
- Work backwards

See how they

Stretch

toward the light?

Red Surf


OWENS CORNING
R-7.5
1½ inch Thickness
pulg. de espesor

Scheduling and Timing

Example – Tomatoes

Specifics

Seed Start Date: March 15
Transplant Date: May 1
Spacing: Single Row/bed, 21" in-row
Estimated First Harvest: July 7
Estimated Yield: 15#/plant

Culture

Indeterminate: Long and Continuous
Prune and trellis

Determinate: Quick and Heavy
Terminal clusters, bush type

Recommendations

Mulch with drip irrigation
Soil fertility and water access are essential for maximum yields.

HH 1	March				April				May				June				July				August				September				October				November				December			
Row #	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	DS	Guardsmen Scallion						H	H	H	H	50	TP	Bianca Pepper							H	H	H	65	DS	Salad Mix			H	H	28										
1	DS	Deep Purple Scallion							H	H	H	60	TP	Islander Pepper							H	H	H	60		DS	Salad Mix		H	H	28										
2	DS	Zena Fino Fennel									H	80	TP	Jalepeno/Hot Wax Pepper							H	H	H	63		DS	Salad Mix		H	H	28										
3			DS	Black Summer Pac Choi					H	H	H	50	TP	Cal Wonder								H	H	H	65	DS	Spinach				H	H	H	H	40							
4		DS	Radish		H	H	21						TP	Habenero Pepper											H	H	91	DS	Spinach				H	H	H	H	40			
4				DS	Radish		H	H	21				TP	Fish Pepper								H	H	H	80	DS	Spinach				H	H	H	H	40			
4						DS	Radish		H	H	21		TP	Cayenne Pepper								H	H	H	75		DS	Spinach				H	H	H	H	40			
5			DS	Bulls Blood Beets				H	H	H	40		TP	King of N Pepper								H	H	H	75		DS	Spinach				H	H	H	H	40			

SYSTEMS QUESTIONS TO CONSIDER

- Where will I do transplant production – a place that has easy access to water and electricity? If you don't have a transplant space yet, where could it go on your farm map
- How will I move transplants?
- How will I manage transplant planting schedules?
- Is it cheaper to buy transplants from another farm?

IRRIGATION

PLAN THE SYSTEM

Drip Irrigation

- Efficient use of water
- Low flow/pressure requirements
- Can be used with mulches
- Can interfere with weed management
- Works best on loamy-clay soils

Overhead Irrigation

- Mimics rain
- Higher flow/pressure requirements
- Even wetting of soil surface
- More evaporation = less efficient
- Works better on sandy soils

Water Management

Calculating Water Usage:

Necessary Information

1 Acre inch = approx. 27,000 gallons

1 Acre = 43,560 Ft^2

Flow Rate and Pressure of System

Flow Rate and Type of Irrigation

- Drip/Overhead
  - Calculate by length or area and time
- Hose and Breaker
  - Fill a bucket

Estimating Your Flow

Seconds to fill a 1 gallon container	GPH*
5	720
6	600
7	450
8	400
9	360
10	300
11	240
12	180
13	120
14	90

***If filling a 5 gallon container multiply the GPH by 5**

Drip Irrigation

Constants for System

- 8 mil drip line
- 12 inch emitter spacing
- 0.22 gpm/100 linear feet

Flow Rate/Bed

- 30" (2.5') x 140' beds = **350 ft^2**
- 2 drip lines/bed = **280 linear feet**
- 280 linear feet = **0.616 gpm**

Water Requirements/Bed

- 1 Acre Inch Equivalent / bed
  - 350 ft^2/43,560ft^2 = 0.008 acres/bed
  - 27,000 gallons * 0.008 = **217 gallons/week/bed**

Drip Irrigation

Constants from Previous Calculations

- 0.616 gpm
- 217 gallons/week/bed

Irrigation Time

- 217 gallons/0.616 gpm = **352 minutes**
- 352 minutes/60 minutes = **5.8 hours**

Options:

- 7 days @ 50 minutes
- 5 days @ 70 minutes
- **3 days @ 117 minutes**
- 2 days @ 176 minutes

Overhead Irrigation

Constants for System

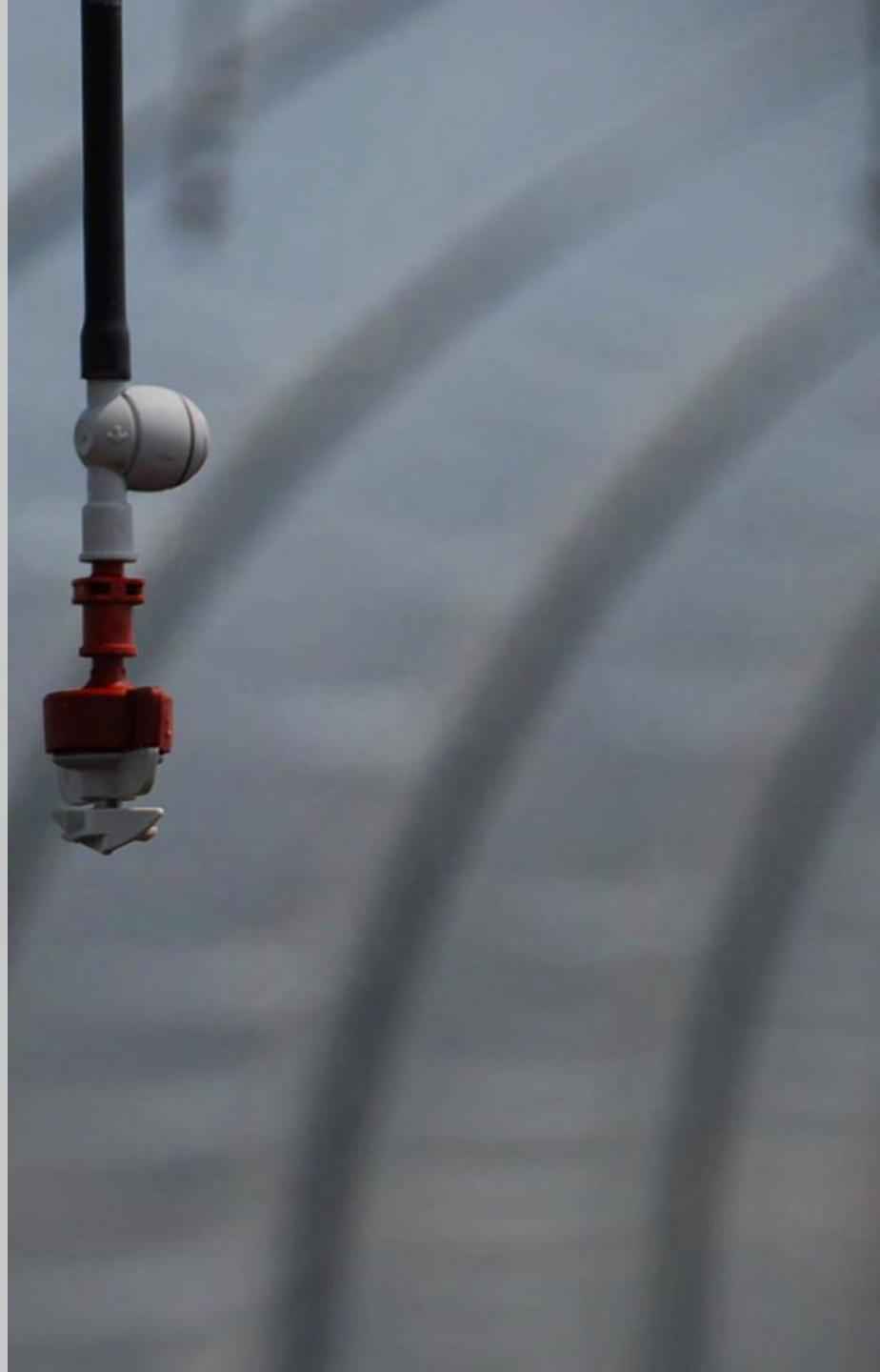
- Mini-wobbler overhead sprinkler
- 20’ spacing
- 0.5 gpm/wobbler flow rate

Area

- 40’ diameter, overlapped pattern
- 30’ x 140’ = **4,200 ft^2**
- 140’ length = 8 wobblers * 2 lines = **16 wobblers**

Water Requirements/Plot

- 1 Acre Inch Equivalent / plot
  - 4,200 ft^2/43,560ft^2 = **0.1 acres/plot**
  - 27,000 gallons * 0.1 = **2,700 gallons/week/plot**



Overhead Irrigation

Constants from Previous Calculations

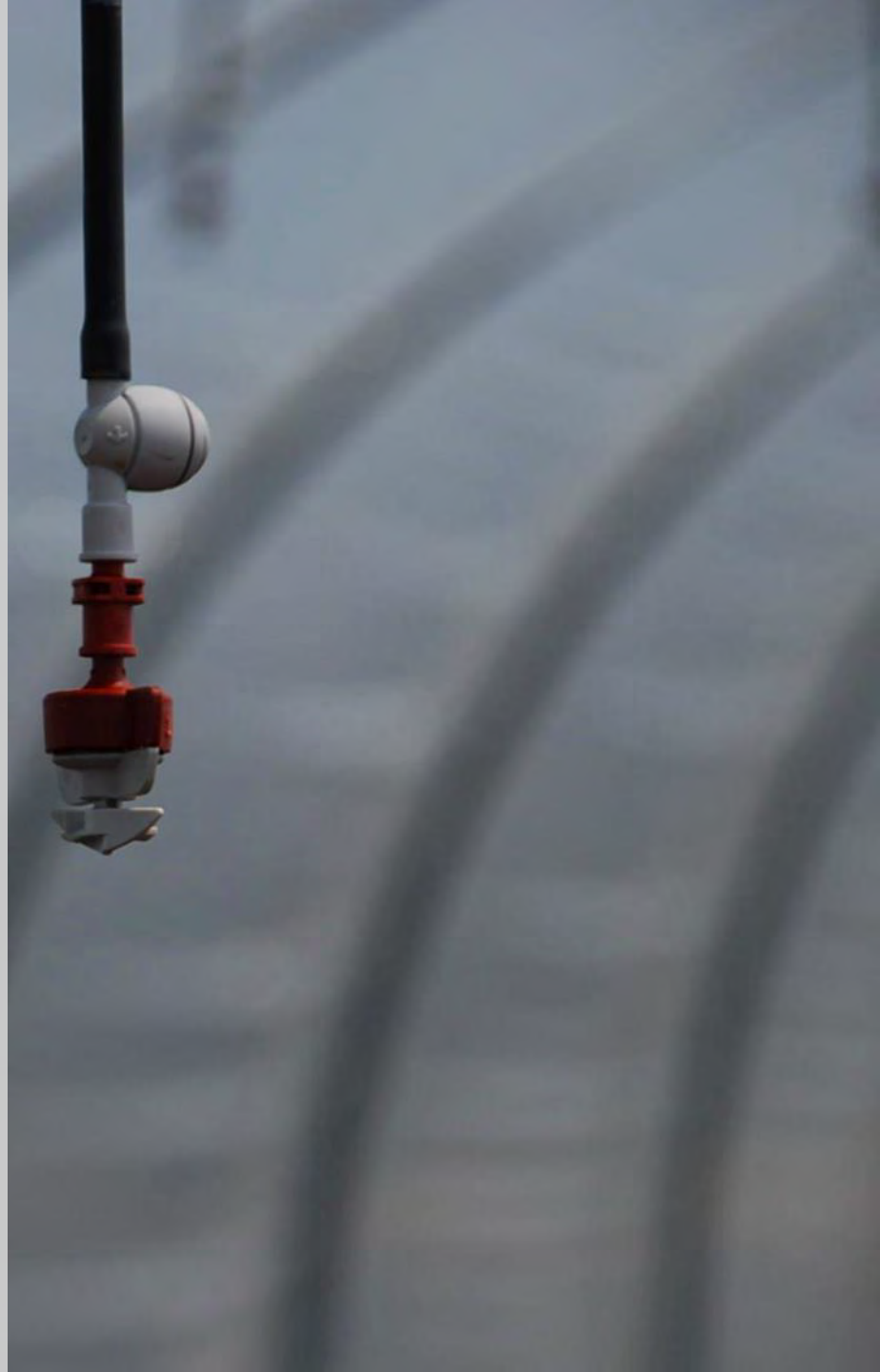
- 0.5 gpm/wobbler
- 2,700 gallons/week/plot
- 16 wobblers

Irrigation Time

- .5 gpm * 16 wobblers = **8 gpm**
- 2,700 gallons/8 gpm = **337.5 minutes**
- 352 minutes/60 minutes = **5.6 hours**

Options:

- 7 days @ 48minutes
- 5 days @ 67.5minutes
- ***3 days @ 112 minutes***
- 2 days @ 169 minutes



SYSTEMS QUESTIONS TO CONSIDER

- Add wells, water lines, and frost free hydrants to your map.
- How will the irrigation you install be affected by other activities that take place in that area throughout the year?
- How will you winterize your system?

TOOLS

PLAN THE SYSTEM

Buy a tool when...

- The tool you want is available for a price you can afford
- You answer any of the following with "no":
  - Do I have the skill set to design and build this tool?
  - Does someone in my network have the skill set?
  - Do I have the time?
  - Do I have the tools?
  - If not, is it time to invest in tools?
  - Is it the right time of year to try this?

Make a tool when...

- Reduction in financial investment is worth it
- You can improve an existing design
- You need to invent something new

Salad Spinner


BRUTE
Rubbermaid


Fenthal
BRUTE
FEED-SEED


LON
UP
E WITH CARE

Germination Chamber


FOAMULAR 150
Owens Corning
R-7.5

Bed Shaper


RHI

Barrel Washer


ODUCE OF USA

Root Lifter

Water Wheel Transplanter

Plastic Mulch/Drip Tape Layer

SYSTEMS QUESTIONS TO CONSIDER

- Look at your map and see if there are any good places to put tools near to work areas.
- What areas of the farm does equipment need to cross to get from storage to action – think gates/fences, irrigation lines, roads?
- Do any of the tools you'd like to get work for multiple enterprises? Calculate ROI based on both revenue streams.

RECORD KEEPING

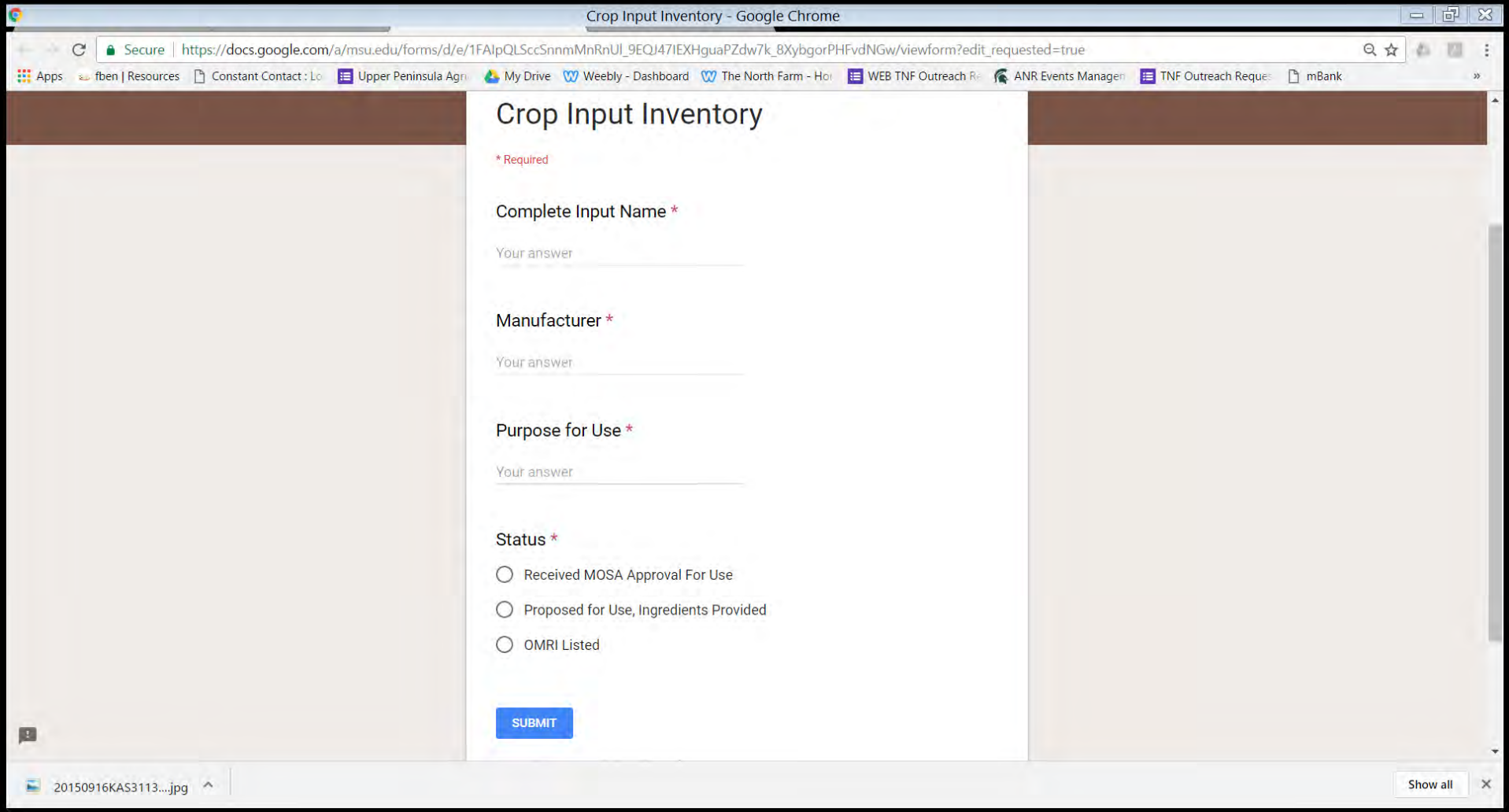
PLAN THE SYSTEM

Paper

- A binder is easily used by anyone on the farm
- Easy for everyone to learn
- Clipboards may be scattered around the farm, or all in one place

Electronic

- Internet access across farm is most convenient
- Do you want to use your phone or a tablet?
- Can access records for planning while off-site
- Can be easily shared with financial experts, verifier, etc.


Crop Input Inventory - Google Chrome
Secure
https://docs.google.com/a/msu.edu/forms/d/e/1FAIpQLSccSnnmMnRnUl_9EQJ47IEXHguaPZdw7k_8XybgorPHFvdNGw/viewform?edit_requested=true
Apps
fben | Resources
Constant Contact : Lo
Upper Peninsula Agri
My Drive
Weebly - Dashboard
The North Farm - Hor
WEB TNF Outreach Re
ANR Events Manager
TNF Outreach Reque
mBank
Crop Input Inventory
* Required
Complete Input Name *
Your answer
Manufacturer *
Your answer
Purpose for Use *
Your answer
Status *
Received MOSA Approval For Use
Proposed for Use, Ingredients Provided
OMRI Listed
SUBMIT
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Show all

QUESTIONS TO CONSIDER

- Are you considering verifications, such as Good Agricultural Practices, Organic, or MAEAP? Find out which records you need to keep.
- Look over your farm map and think of your whole system. Which areas contain data points you want to measure?
- How will you process that data – spreadsheets? How/when does it become meaningful to you for planning?
- How will FSMA affect your operation? http://sustainableagriculture.net/fsma/

The NORTH FARM

Chatham, Michigan

MICHIGAN STATE UNIVERSITY Extension | MICHIGAN STATE UNIVERSITY AgBioResearch

Collin Thompson – Farm Manager
thom1264@anr.msu.edu

Abbey Palmer – Education Coordinator
palmerab@anr.msu.edu

Upper Peninsula Research and Extension Center
Michigan State University
E3774 University Drive
PO Box 168
Chatham, MI 49816
906-439-5058

UPCOMING EVENTS

March TBA – DIY Hoop House Build
May 21 – Soil Health Short Course

Register at www.msunorthfarm.org