Module 4: Finding Land & Farm Design

Introduction

When starting a farm, there are many big picture considerations, such as land acquisition. You will also have to consider your farm layout, design, and set up systems. Investing time and thought into this before you begin will significantly increase your efficiency once your farm is up and running.

Finding Land

Land Access

Many people believe they need to save and buy the perfect 10-50 acre piece of property before starting their dream farm. The reality is, if you want to start growing food and selling it to your community, you do not need as much land as you think.

Josh's whole farm is an eighth of an acre (in production). The entire property is a two-acre, suburban lot in Raleigh, North Carolina. According to most conventional schools of thought, his property should not have a farm. While it isn't always ideal, Josh has implemented some efficient design features and workarounds that have allowed him to succeed.

If you don't own land, don't let that stop you. You can lease land, you can barter, or you can make some sort of creative arrangement with an organization like a church or school. Someone in your community will more than likely have some land not being used that you can use to start your farm. Whatever the case, if you want to start growing food, there are ways to do it. You just have to get creative.

Open Space

When you're looking at a piece of property and trying to figure out if it's the right fit, the first thing to consider is how much open space is available. When Josh and his family purchased their property, there were no plans of farming, so a lot of the space was shaded by trees. When his farm started to get more serious, they decided to remove trees to create more farming space. While properties with trees aren't impossible for creating farmland, be prepared for a substantial expense and a lot of time and effort to transform it.

Soil Type

It's also important to determine the soil type on the land you are considering and test it to see what you're dealing with. Is it heavy clay, sandy, loamy, or rocky? Will you have to bring in material to remediate it? Bring a shovel when visiting a potential plot, and dig around. If you have a lot of rocks, it will be tough to grow food there. If it's heavy clay, you may need to bring in

sand or a lot of compost and organic material. The important thing is to make sure you understand what you're getting into before getting started.

Contamination

Another thing to think about is soil contamination. If you're in an urban area, you need to test your soil for contamination. There are a lot of situations where there was a previous building or structure at the site that may have contaminated it. You don't want to have anything in the soil that would poison the food. This doesn't just apply to urban areas. In rural areas, there may have been a large farm conventionally growing food with harmful pesticides and herbicides.

Water Source

Consider your source of water. You'll be needing water not only for irrigation but also for washing produce post-harvest. Not only does your water quality need to be used for irrigation purposes, but you need to make sure there's enough supply for your needs.

At Sattin Hill Farm, they irrigate using well water, the same source for the water that services his home. While the water itself is free, the supply is limited. If a well is servicing your farm, make sure the gallons per minute flow rate is up for the task, both for your irrigation and whatever other water needs you have on the property.

The location of the water source is also important. Running water lines may not be feasible if the well is too far from the plot. Drilling a new well is always an option, but it's expensive and not guaranteed.

Water bills can become quite expensive if you have an urban farm on city water. If that's your context, this is also an important consideration.

Electricity

Electricity is also an essential utility on a small farm. Whether it's heating, ventilation, charging tools, lighting, or refrigeration, adequate electricity is necessary.

Road Access

Road access is another consideration. How are you going to get in and out of the farm? How will delivery trucks access the farm? You'll likely have large trucks delivering materials like wood chips, compost, or greenhouse infrastructure. Will customers come to the farm?

Structures

Are there buildings on your property you can use for the farm? One could be for a wash station. One could be used to hold events. Maybe a building on the road could be used as a farm stand or a farm store. Think about all the structures and how you could use them.

Housing

If you're looking into buying a property, will you also be living there? Often farmers will sacrifice a lot in terms of housing to get a decent piece of land. Make sure you know what you're getting into if your dream farmland has an old rundown farmhouse. If it's rural, really think through the realities of living in the country. If this is a first for you, it can take getting used to. Make sure your family and/or partner are also okay with it. Operating a farm is not just a job; it's a lifestyle.

Slope

When purchasing a new farm property, the slope of the land is important. Josh has to contend with a steep slope on his farm, thus the name "Sattin Hill Farm." Having a slight incline is beneficial and allows the water to drain during heavy rain. A completely flat piece of land is more prone to flooding, with nowhere to drain.

Wind

Wind is another significant factor when scoping out a potential farm site. Trees in proximity to your farm plot can help a lot as wind blocks, but when they're too close, they can bring unwanted shade and slow the growth of your crops.

When Josh managed Raleigh City Farm, most of the winds would come from one side adjacent to an open softball field. With no protection, the wind would whip across the farm and cause many issues. Wind can significantly affect overhead irrigation, blowing the water so it can't reach the crops. It dries out the soil exceptionally quickly and knocks over crops. Hedgerows can be planted to help mitigate wind damage, but those take time to grow and become established.

Heavy wind storms can be one of the most damaging things to a small farm. Greenhouse structures can be ruined if they aren't heavily reinforced. Make sure to find out what kind of wind events have taken place in the location you're considering.

Neighbors

Neighbors are a big consideration if you're farming in the suburbs like Josh. People that live around you may not like what you're doing. If you're trying to raise some animals, will they make noises that could be a nuisance? While a working farm may not always look tidy, you'll likely have to put a little more effort into ensuring your farm is aesthetically pleasing in a suburban context. Neighbors may complain about your farm enterprise being an eyesore.

In a rural context, you may still need to consider your neighbors, especially if there are conventional farms around you spraying pesticides and herbicides that you don't want drifting over to your plot.

This could play a big role in your decision of where to place your growing space on the property. It might also affect your organic certification if you're applying for that.

Farm Design

Constraints

Once you have decided on leasing or purchasing the right property for your farm, you are then ready to move on to designing the layout of your farm. When planning, first consider the constraints of your property and create your plan based on those constraints.

Previously mentioned land features such as roads, trees, structures, slope, electricity, and water sources will all come with their constraints. Figuring out what those are will inform your design plan.

Standardized Field Blocks

A field block is a group of beds put together in one block. At Raleigh City Farm Josh designed field blocks to be standardized with eight beds each. One of the reasons for choosing eight beds in a block was to accommodate the silage tarps they were using.

Each tarp was 32 feet wide, which was the width of 8 beds, including paths. Knowing that these tarps were going to be part of their system in advance allowed Josh to design the layout accordingly. The silage tarps were able to cover one whole block at a time; this allowed them to prepare all of those beds for planting simultaneously or cover them for the winter and prevent erosion.

Field blocks also help regarding your irrigation design. Many folks will set up their farm first and then think about irrigating it, but irrigation should be considered beforehand. Overhead irrigation with sprinkler posts and wobblers can be rigged up nicely to fit one field block at a time. This allows you to rotate your irrigation schedule, and water different blocks at different times. Rotating sections will ensure you don’t overtax your water source, which reduces pressure and shortens the reach of your sprinklers.

By standardizing your field blocks, you can also standardize your infrastructure to accommodate them (i.e. tarps and irrigation). This will significantly assist in your flow of operations and create less friction down the road.

Minimize Movement as Much As Possible

Minimizing footsteps is crucial on a small farm. Design your farm so that tools and supplies are stored closer to where they need to be used. A lot of time is wasted on a farm simply by walking

from one place to another. It's incredible to calculate how many steps you take in a day and how much time it costs you. Smart design can reduce this drastically.

Drainage

Watching a rainstorm wash away your beds can be devastating. This is why coming up with a drainage plan is one of the most important things when designing your farm. Heavy rains, like Josh experiences in the South, can have huge detrimental impacts on your farm. When you don't tell the water where to go with strategic drainage ditches, it will go where it wants to.

After some frustrating experiences at Josh's first farm, and then again at the urban farm he managed in Raleigh, he focused heavily on drainage when designing the second phase of Sattin Hill Farm.

In locations where rain is not as abundant, farmers will often orient their raised beds (or greenhouses) on contour with the slope, or parallel to it. Recessed pathways just above a slightly raised growing space can act as swales, slowing the water from rushing straight down a slope and cutting through the beds. Water diverted into swales can protect a slope from erosion while also hydrating the space even further for the future. In some situations, this is smart design.

However, water needs to be more aggressively diverted away from the growing space in areas with heavy rains. At Sattin Hill Farm 2.0, Josh purposely oriented his beds (under caterpillar tunnels) to be off contour (not perfectly parallel with the slope).

He strategically dug drainage ditches between the caterpillar tunnels, so the water off of the tunnels goes into the ditches, channeling away from the growing space to a lower part of the property. Josh made the distance between his tunnels 3.5' so that a run of 4' wide run of landscape cloth could line the ditch. This increases water flow, protects against erosion, and suppresses weeds.

While some growers will recommend specific orientations for tunnels to maximum light exposure (east to west vs. north to south), Josh recommends letting drainage and slope determine how you orient your tunnels. The only situations where light exposure may be more important would be in extreme northern climates where winter growing is the focus. In that scenario orienting your tunnels from east-west would ensure maximum southern exposure, heating the space as quickly as possible with limited daylight.

Josh believes it's more important to think about how your tunnels fit on the property and how the water will flow off the tunnels. Think of a greenhouse space like a house. How will the water flow off of that structure, and where will it go? If you don't have a ditch to take the water away, it's going to lead to a lot of water inside your tunnel, and that's going to be problematic.

Standardization

Josh is a massive proponent of standardization when it comes to farm design. Standardizing bed length in particular, is important for many reasons. Regardless of what length you decide your beds will be, do your best to keep them all the same. Josh's preferred dimensions are 50' long and 30" wide. 30" is the most common bed width in the market garden space, with many of the tools being customized to work best with this width. 30" is also a comfortable width to straddle while working the beds.

Josh has found the 50' bed length to be more manageable for crop planning and harvesting at his farm size. However, when redesigning his farm, he purchased 100' tunnels and changed his bed lengths to 48', allowing him to fit two bed lengths in one tunnel. Whether it's drip tape, row cover, or insect netting, all of his materials will be the same length and ready to accommodate any of his 48' beds. This eliminates time wasted on sifting through your materials to find different sizes for different lengths.

While standardized beds are ideal if you are working with an odd-shaped or confined space but still want to maximize the growing space, you can certainly have some beds that may not perfectly fit your standardized size. There is no need to sacrifice needed growing space just to keep everything standardized. Just do the best you can with what you have.

Tool Storage

Tool storage is another important aspect of farm design to consider. Not only is it important to keep your tools organized, clean, and easy to access, but make sure that wherever you're keeping the tools is as close as possible to where they will be used. Some tools are heavy to move. Minimizing the distance they travel will help your flow tremendously.

Aside from some of the more expensive seeders and the tilther, Josh keeps most of his field tools hanging under a simple lean-to right next to his caterpillar tunnels. Everything is readily accessible and ready to use when he needs it.

At Raleigh City Farm, one of the first things Josh did when he was hired was to move the tools shed from the periphery of the lot to the center of the garden space. Being situated next to the beds made a huge difference in getting tools quickly.

Setting up multiple tool storage spaces for your different areas is a good idea if you have a larger farm. Even if it requires purchasing some duplicate copies of regularly used tools, the reduced labor cost will more than makeup for the extra tool cost.

Composting System

Having an area dedicated to composting on a small-scale farm is crucial. You will have crop residue, and composting it is a great way to maximize your resource usage. Like your tool storage, it's beneficial to have the compost area close to where you're working.

Many farms will have designated piles, but a bin system has worked out well for Josh's small-scale urban context. With the compost bins not being an eyesore, they can be situated right next to Josh's growing space, tying in nicely to the aesthetic of his farm.

He uses a five-bay system which has proved to be more than enough for his little farm. All of his crop residue from his beds go into the compost bins along with the food waste from their house. It's easy and accessible. A more in-depth explanation of his five bin system will be covered in a future module.

Material Handling

Though often overlooked, material handling is a crucial part of the operation of the farm. Deliveries of bulk materials like compost, wood chips, or pallets of potting mix will be somewhat regular on a small farm. Figuring out how trucks will deliver this material to your property is essential. Large freight trucks may also drop off greenhouse materials or other larger items for various building projects.

In Josh's context, there is no way for large delivery trucks to access his backyard where the farm is located. Therefore, they must deliver their loads to the front yard, after which Josh has to manually move the piles to the farm in the backyard with carts and wheelbarrows. It's a labor-intensive task. If there is any way possible to remedy this issue when first designing your farm, it's well worth the effort on the front end.

Wash Station

When considering the location for your wash station, the first criteria would be somewhere that's out of the weather. There are a lot of days you'll need to be harvesting and washing vegetables when the weather is not ideal. Shade from the summer heat and protection from the rain and wind is beneficial when processing vegetables for multiple hours.

A climate-controlled indoor space is preferable. If you can keep the space heated or cooled to a comfortable level, you and your employees will be much happier and in turn, more productive. In order to accomplish that, you'll need to have accessible electricity, not only for heating and cooling but also for running equipment and refrigeration. You'll also need to have potable water for washing your vegetables and a system in place to drain the water.

Farm Store

If part of your business plan will be running a farm store or a farm stand, you need to consider where that will go on the property. Maybe you need to have a building there for it. If so, you're going to need electricity for refrigerators. Not only that, you'll have to consider parking for visiting customers. It needs to be easily accessible. When designing a farm store or farm stand, you have to think about creating an experience for the customers. This will require a lot more management of your property, ensuring it's well maintained and hospitable for visitors.

Conclusion

When it comes to finding land and designing your farm, take your time with all of these decisions. With all of the energy and money you will be investing in this property, time spent on these considerations will be well worth it.

Some big themes throughout this course will be efficiency, workflow, and productivity–all of which will be made possible by your farm design. Think through your plan. Talk to other people; perhaps some trusted friends, a consultant, or a nearby farmer. Get their opinions and perspectives on your plan. If possible, invite them out to look at your property. They will see things you don't, and it will all pay off in the end.