

Season 1 Episode 2 – Crop Irrigation

July 25, 2022

Speaker 1:

Welcome to the Farming Basics Podcast with Olivia Fuller. We'll have sustainable farming tips from growers across the state and extension specialists at Auburn University.

Olivia Fuller:

We're back. It's Olivia Fuller, your host with your co-host Jacob Kelly. And today we have our vegetable specialist, Andre de Silva, which we're super excited about to have here at Auburn University. Today, we're going to talk about irrigation and its importance for all kinds of growers, but especially vegetable growers.

Jacob Kelly:

Welcome, Andre. How you doing?

Andre de Silva:

I'm doing pretty good. Thank you very much for hosting me here, Jake and Olivia, and I'm excited to be part of your podcast.

Jacob Kelly:

Great. Thanks for coming. I guess our first question is, since we're going to be talking about irrigation, what are the benefits of irrigated crops versus dry land crops?

Andre de Silva:

When you are irrigating crops, you are basically providing the water that crop needs, and it will allow the crop to properly grow. If you don't irrigate it, your are count on the weather and rainfall events to provide the water. So there will be shortage of waters in periods of time that the plants doesn't need that shortage of water, while there might be some over irrigation or, I mean over rain feed, when you have too much rain like in the summer. So irrigating your crop will ensure that you have the right amount of water in the right time for the potential yield that you can achieve from that land.

Olivia Fuller:

What is irrigation scheduling and why is it important?

Andre de Silva:

So irrigation scheduling is basically the way how a grower will management the water that's being applied to his irrigation system. It can be to a drip irrigation system. It can be to a sprinkler irrigation with center pivot, or it can be the dancing of the rainfall that you just talk about, olivia. Why is it important? It's because when the grower is basically managing the irrigation events, it will apply the right amount of water in the right time and that's the main principle of an irrigation scheduling.

Jacob Kelly:

So how do we know we're putting the right amount of water out there at the right time? What's the recommended irrigation schedule for our area down here in Alabama.

Andre de Silva:

So it's good that you're talking about that because when you're doing irrigation scheduling, you basically has five ranks of irrigation scheduling. Those ranks are classified according to how we grow and manage the water, like I said before. So the first rank, although it's not in the rank, it's like we call rank zero, which is irrigate whenever. That means what most of the growers do if they have an irrigation system there. And it means they just go there, kick some soil, the dirt comes up and they say, "Oh, we need to apply water." That's irrigation whenever, where the irrigation is applied with no scheduling.

The second rank is basically like the view and appearance method from the USDA. It was developed back in the 1980s and it's basically the grower will apply irrigated based on a chart that the USDA created with different soils and different colors of the soil and that colors means how much moisture or soil have. So the grower will determine if the water is needed or not, based it on the color of the soil in comparison with that chart. Those are two irrigation scheduling methods that depending on the feeling of the grower, if it's right or not to apply water, they think that the water is needed. So we don't recommend that for Alabama.

The third method, or the second rank of irrigation scheduling we call systematic, where most of the growers that do irrigate have it, where they have a irrigation panel that's very common on drip and center

pivots, where the grower will program to apply the same volume of water or run the system for the same time every day. But that, as I said, every day does not account for weather. So if our whole [inaudible 00:04:02] do the rain dancing there, and it's rain, we are out of control of how much moisture we have there. So although it's okay to use it, we still don't recommend in Alabama.

What we do recommend is use the crop water demand method and the soil water status matters. Or you can go even beyond of the point where you're going to combine those two. Where you're just going to apply how much water your crop needs using the crop water demand method, or your soil water status matters, that you can apply water based on the soil moisture availability in your soil. So those are the one that we would recommend for Alabama.

Olivia Fuller:

There's a quality difference there for the fruit, right? Is it quality and yield increase when you schedule it, in that way?

Andre de Silva:

Yeah. When you do a proper irrigation scheduling, you can increase the productivity per area or your productivity in your field. That increasing production per area will be a consequence of the properly amount of water in the soil. So we have done some trials before with yellow squash, with zucchini, with bell peppers. We are actually currently doing this year, a trial with watermelon and tomatoes, where we are comparing the use of soil water status methods versus the crop water demand methods versus the systematic irrigation method which most of the growers use, to see what is the impact on the yield and the quality of the fruit. Up to now, what we saw is that when you do use the soil moisture status or the soil water status method, where it requires soil moisture sensors, you can have an increase of yield in zucchini and yellow squash by 26%, while in bell pepper, it was 14% of yield increase.

One particular thing that we saw for those growers who has pepper is that, if you properly manage your water, you're going to have lower number of fruits, but those fruits will be larger, so you have more price on your produce. While if you don't irrigate your crop, or don't properly irrigate your property, you can increase the number of fruits, but that is going to reduce the quality of your fruits. So you're going to have a lower price, per box, that you can harvest in your area.

Jacob Kelly:

Not to mention that, more picking with more fruit.

Andre de Silva:

Yeah.

Jacob Kelly:

The larger fruit are always easier to pick for your labor or however you're choosing to harvest your crop.

Andre de Silva:

Yeah, that's a good point because the other thing that you can do sometimes, if you do a proper irrigation you can even extend the time that you can do picking in your yellow squash and zucchini, where you do multiple pick or you pick your fruit every day. That's a very good point.

Olivia Fuller:

What are the tools available when using this irrigation?

Andre de Silva:

What I would recommend for most of the growers nowadays, not only for vegetables, for vegetables is important because it's a high value crop, but also for row crops. Row crops have been also using soil moisture sensors. So soil moisture sensor is a good tool for you to monitor the status of water in your soil. So then you can use our rank four of irrigation scheduling. And there are different types of soil moisture sensors available. You can go as cheap as a tensiometer that probably can cost you about \$50 a piece, but it can go as expensive as you have a TDR, which is the time domain reflectometer sensors or conductance sensors that can cost up to \$2,000 per sensor or per system. But that's going to depend how much technology grower wants in their field. A tensiometer at \$50, the grower need to walk in the field and read the tensiometer every day. With the \$2,000 one, you can probably receive a signal in your cell phone, say, "Hey, your field need water. So let's go irrigate."

Olivia Fuller:

Right, it almost pays for itself no matter what you end up purchasing.

Andre de Silva:

Yeah. And with the increasing yields and the ability of you to use over several years, you can pay it off quickly.

Jacob Kelly:

Right. So there's a system out there for not only our large growers that are growing large acreage of vegetables, but even the small guys who are growing an acre or two of squash or something like that.

Andre de Silva:

Yeah, there is a possibility for them, also. They just need to find what is the exactly tool that they need and how many do they need for the field? What we usually recommend is they going to need one per type of soil, at least, because even in one acre field or half an acre field, there is different in soil types. Different in soil types have different water requirements. So that's what we usually recommend for a grower. Know your soil, your soil properties, consequently you're going to how many sensors you're going to need. Or they can apply based on the weather. We have weather stations across the state that they can use the third method, that is the crop water demand. So they're going to use what we call the crop evapotranspiration to determine how much water was lost in the day before, to apply today.

Jacob Kelly:

So I'm a new grower, I've just gotten started. I want to put plants in the ground, I need to worry about irrigation and how I'm going to do that. Is there a program or a person or something that I should use to get started? What are my resources out there to get started with my irrigation to make sure I set it up in the most effective way possible for my operation?

Andre de Silva:

Yeah. Okay. That's a very good question. Actually, if you are a new grower and you are starting the business of vegetable, once you determine the crop that you are growing and how you're going to plant it, you need to determine, are you planting that in plastic or you going to do bare soil. If you're doing plastic, you're probably going to be doing drip irrigation. If you're doing bare soil you can do both, drip irrigation or sprinkler. So determine what is the irrigation system is the first step that you need to do. Drip systems are usually cheaper at the first instance, but you have that cost every year. While a sprinkler irrigation, they will be there year after year, if you will maintain it.

Olivia Fuller:

And for the drip irrigation, we just created a great video series and a fact sheet for growers to utilize on the ACES website.

Andre de Silva:

Yeah and that's going to be a good start for a new grower to do. I would strongly recommend drip irrigation for vegetable crops because drip irrigation, you have an efficiency of water application of 95%. What does it mean? It's 95% of the water that you pump in your drip is going to reach your root zone. Why if you're going to go with an overhead center pivot or a stationary sprinkler irrigation, it's about 80% to 85% of that water that will reach your root zone. So you have a loss there. So you need to account that when you're doing your irrigation schedule.

Olivia Fuller:

And you have the option to use fertigation as well.

Andre de Silva:

Exactly. That's another advantage of drip on top of a sprinkler. Although you can do fertigation through sprinkler, you have a higher loss of your water through wind, drifting, evaporation of the water during an application, and you're going to not apply water restricted in the root zone. You are covering the entire field with an overhead irrigation. With a drip irrigation, you are just applying on the root zone so that's why you have a more efficient. So once a grower determine their irrigation system, they're thinking about how we're going to manage that water and that's what irrigation scheduling is. And those ranks is how you going to need to determine. We have several series that we did for the vegetable school, where we are talking about irrigation,

we are talking about how to fertigate it that a grower in Alabama can use. And there you're going to have the step by step of how to determine an irrigation scheduling based on your irrigation system and your available tools or your available conditions of your farm and your budget.

Jacob Kelly:

Right. And not to mention that drip irrigation keeps that water off the leaves of your plants which is going to reduce the amount of disease that you potentially have in your planting, right?

Andre de Silva:

Irrigation is so important in a crop in agricultural system, because irrigation is ... High moisture can induce disease. Weak plants will be more susceptible for insects. And without talking about fertilization or soil nutrients, because irrigation or water management is linked with fertilizer application in a such way that when you change one, you are affecting the other because nutrients are uptake by plants with the water. So if you do a proper irrigation management or a proper water management, that's what we are talking today, consequently, you're going to be talking about how much nutrients your plants are being uptake with the water. So one is linking in a way that they need to be well managed together. So this is how you're going to maximize your yield or how we say achieve your potential yield.

Olivia Fuller:

This is such an important conversation. Thank you so much, Andre for coming in and going over that with the growers. I know that a lot of my growers in the area will ...this will be very useful for them because many of them are trying to still grow on dry ground and you can see the yields just plummet when it doesn't rain.

Andre de Silva:

Yeah. It's my pleasure to be here and what I would say is for any grower that need help, contact you guys, or even contact me. We are a team that is helping here to help the growers and they will learn that installing the irrigation system or manage irrigation scheduling is not as hard or not as difficult as they usually think. Sometimes they think, "Oh, I'm going to need to do all the calculations to know how much water to apply?" And it's not like that. You can do the feeling, but you can go beyond.

Olivia Fuller:

Right, right. Yeah, just reach out to us and we can get something set up for you. All right. Thank you so much, Andre, for coming in today. This was a great conversation, a super important one.

Jacob Kelly:

Thank you, Andre, for coming in today and talking with us.

Speaker 1:

This has been a production of Alabama Extension at Auburn University.