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**Development of a Web-Based Irrigation Scheduler That Uses Local Weather
Information**

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Objective

To develop a web-based tool that will provide farmers with information to help improve irrigation management and reduce risks associated with localized weather and climate.

Progress

We started this project by creating a system where a user could login securely from the internet to access and use the web-based irrigation tool. After logging in, the user is taken to a page that lists the names of their fields and some details about these fields. One of items that is shown is the state of the soil water balance of the selected fields. Based on a color-coded system, the user can easily see which fields require irrigation and which fields may need irrigation in the near future. If the user has not added any fields to the system, then they are automatically taken to the web page where they can add a field.

The page where the user can add a field is where our work has focused on until more recently. This web page contains a lot of detailed information. First, there are areas where the user can enter the details of a specific field. These details include, but are not limited to the name, irrigation system, location, flow rate, and area covered. Also included is a system where the user can select 1 to 3 crops that are planted on this field. For each crop, they can enter a percentage of the area covered. The system will automatically calculate the area covered for the second or third crops if left blank. At a later stage, we may expand the system to allow more than three crops, if needed. Another tool on this page allows the user to search for and select the closest weather station to their farm. Information such as precipitation amounts used to calculate the water balance would be used from this station. Besides being able to input information about their field, the user can also look at information. We provide a map of their field location and charts for the current and past water balance on this page. This same page is also used when the user wants to view or edit information about their fields.

In the last few months, most of our time has been used concentrating on a newly added feature to our irrigation scheduler. Since the main goal of the tool is to provide an easy to use aid for scheduling irrigation, we decided to create a calendar feature. On this page, the user will first notice a calendar set up in a monthly fashion. They are allowed to scroll through the months by clicking on a "next" or "previous" button. Each day of the calendar will be filled in with a green, yellow, or a red color. The colors represent the water balance for that particular day. A green color represents an adequate water balance and a red color represents an inadequate water balance. The user can see how the water balance

changes throughout the days. They can use this information to help decide when they should irrigate. If the current day is in red, they should clearly irrigate. They can see this from the calendar, but it is also indicated on a page when they first login. In addition, on this calendar page is a section where the user can see the precipitation, amount of irrigation applied if any, evapotranspiration, and water balance for the selected day. They can select a different day simply by clicking on the day from the calendar. The section is automatically updated to display the information for that day.

There is another tool on the calendar page that controls how the water balance is calculated for each day. The user can input a certain water balance threshold. This threshold is what is used to calculate the green, yellow, and red colors. The user will also input initial soil moisture. This value can be from any point where they know the exact soil moisture. They will also give the date for this initial soil moisture. Now the system can use this information to calculate the water balance for every day automatically beyond the initial date and up until the current date. Currently the system does not update daily to calculate the water balance for every field for each single day and this is feature that will be added in the near future.

Summary

Overall, we are trying to provide a system where a user can easily input each of their fields and the information about their fields. Using this information, we try to provide them with enough information for them to be able to make an intelligent decision about irrigation each day. The system will be able to automatically update at or around midnight so that it will be ready to use when the user accesses the system early in the morning. As of now, we have implemented most of what is needed to gain information from the user and also most of what is needed for us to be able to assist the user properly. More features are being added as we develop this dynamic irrigation tool. Our main goal is to ultimately make this system completely autonomous. This will allow for any number of users to be able to create any number of farms with little to no maintenance work required for the computer system that houses this web-based irrigation tool.