



Introduction

The Internet of Things (IoT) is transforming the agricultural industry and compared to conventional approaches, smart agriculture is highly efficient. The introduction of more modern approaches to control and management greatly influences the ultimate goals and results. With the creation of the Go Grow mobile application, LANACO offered an answer to the challenges present in the cultivation of organic plants whose primary goals were to ensure high yields and maximum product quality.



Challenges

The location of Bijelo brdo (Derventa) in Bosnia and Herzegovina is characterized by low hilly land, and about 1/3 of the land is completely unused. "Bosnia grows organic" recognized the potential of Bijelo Brdo as a suitable soil for organic cultivation of plants (nettle, marshmallow, incense, sage and pomegranate). In this area, the vegetation period lasts almost eight months, and among the numerous challenges were solving the inaccurate and tedious process of monitoring the situation in the field, daily manual monitoring of temperature and conditions in certain fields, indiscriminate watering and use of electricity.

In addition to measuring and controlling soil moisture and temperature, one of the tasks for the Go Grow solution was to influence the optimization of the entire production process (growing, irrigating, harvesting, chopping and drying plants) lack of human resources to perform all work tasks and labor productivity.



LOCATION BIJELO BRDO



1/3 OF THE LAND IS COMPLETELY UNUSED



THE VEGETATION PERIOD LASTS ALMOST 8 MONTHS



The solution

Due to the lack or weak signal of mobile internet, configuration and size of the terrain, and limited possibilities of electricity use the Go Grow IoT solution was made, and it consists of four different technologies: LoRaWAN® technology (data acquisition system from the field sensor), 3G / 4G networks, Wi-Fi technologies for local network access and Ethernet for camera binding.

On an area of 20 hectares, LANACO has installed seven surveillance cameras and five sensors (powered by batteries) on land with different field structures. This approach offered several responses to the challenges posed including measurement and control of soil moisture and temperature. With the installation of the LoRaWAN sensors all parameters important for the successful growth and development of plants were monitored every 20 minutes. A sensor that measures the inlet temperature, humidity and air pressure during the drying process is installed in the technical facility, as well as another that measures the same parameters in the drying chamber.

At the central location in the technical facility there is a communication hub with LoRaWAN® gateway with which the coverage of all processed fields is achieved, 3G/4G router with which the system is connected and local coverage with Wi-Fi signal achieved.



The solution

The local Wi-Fi network enabled the use of the Go Grow solution application on site as well as other applications and digital tools needed to manage and control the production and business process itself. With the gateway and sensors managed in the LANACO Cloud using the LoRaWAN® server infrastructure, which stores and processes the received data, all the data were also displayed on the Go Grow mobile application.

As a reliable digital assistant, Go Grow has enabled graphical, tabular and historical data and thus directly influenced all processes and actions. In the application, it was possible to mark individual parcels with crops, yields and exact sensor locations, and to enter and monitor the data of each individual drying. By setting the alarm, the application informed the user at the time when the parameters deviate or it is the ideal time to start or end one of the processes.



Influence

Based on the monitoring of field conditions and precise watering of precisely defined zones, by optimizing the use of the watering pump, the anticipated savings of water and electricity were achieved by more than 10% and plant yields increased by 15%. Obtaining accurate data when the drying process is nearing the end reduces the time of human supervision of the drying machine itself by 1h or 10% after drying the plants.

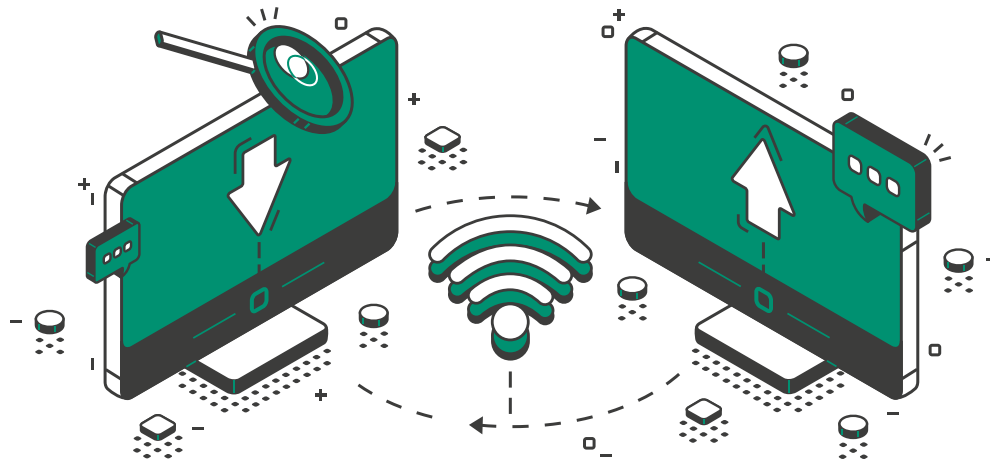
By providing access to data and analysis on the state of humidity and temperature at individual points in the fields and data and analysis on humidity and temperature in the drying process, the Go Grow project enabled "Bosnia grows organic" to proactively address challenges such as drought and plant drying.

Ivana Stjepanović, the director of "Bosnia grows organic: "We have developed an application that will help us measure the consumption of natural resources such as water and electricity consumption, so that we can react in the right way and measure how much water we gave to plants, and what effect it has. I am very happy and I am looking forward to further results of the application. "

The allocation of human resources in the process of watering and drying plants and video surveillance have made it easier to conduct detailed analysis of each individual work done in the field, as well as to conduct work remotely, especially during the COVID-19 pandemic.



Used technology



Wireless, Mobility & Networking



Physical Security