Business Analysis Document of the Greenhouse problem (week 4)

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# Situation:

Everlast Agro BV is a company with ten greenhouses in the Netherlands. They are successful for now but there are a lot of inefficiencies in their IT systems which is getting old. They want to reduce costs, fix inefficiencies, and expand their business. Sustainability is their number two priority so we must keep it mind as well.

# Problems:

Each greenhouse has its own system, none of them are centralized or accessible from outside the respective greenhouse. There is one manager per greenhouse as well as one team and they aren’t flexible which leads to inefficiencies since some teams can be extremely busy (e.g. harvesting) while others basically don’t work. There is also only one crop harvested per greenhouse which can lead to empty fields.

Finally, the sensors and IT equipment are decent but could be better. Networking is nonexistent and requires employees to physically visit every greenhouse daily and calculate the average of three sensors placed through the building. X10 There is a lot of travelling, unnecessary work, and waste of electricity since the greenhouse doors opening leads to a loss of temperature.

# Considerations: (stakeholders)

Management and Stakeholders: They desire efficiency, reduced costs and ideally a way to see the general data themselves. Management thinks there is a lot to optimize in the human employee’s department. Board members wish they had easy access to the essential information in an easy-to-read way such as records of the previous months in graph form. They are also planning to expand so accounting for an easy way to scale up later and thorough documentation would be a big plus.

Employees: IT guys of the company would appreciate more automation. E.g., by connecting all sensors in a network and storing the data in a server and calculating the average temperature of each greenhouse automatically. They would also like to be able to see this data from anywhere and maybe even some controls to increase temperature or humidity from home.

Most employees are not clear on the status of the greenhouses, and they would appreciate a way to see that information. A bit more than half would appreciate working from home when possible. Some are reluctant to change so by keeping a screen in each greenhouse they will not have to access the web or use an app, which is a plus. The idea of a subscription service was badly received.

Type of information: In a survey including employees, management, and stakeholders the information considered most important to be in the webpage/app was: Humidity, Sunshine per day, Water consumption, Energy consumption and Alerts in case of emergency. These were closely followed by: Soil fertility, Failures in sensors and a Historic/Analysis of previously collected data. Rainfall and Weather forecast were deemed unnecessary.

Some of the suggestions/opinions in the free answer type questions were “can’t we keep doing it the old way?” and an easy-to-use app/website with a dashboard.

# Plan:

Most importantly we will remake the IoT (Internet of Things) in each greenhouse. Probably from scratch since there is barely any documentation on the old system. Once all the sensors are up and can communicate between themselves, we will collect the data in real time and save it to a server off location. This can be a server maintained by the company or a cloud rented from a cloud provider like Amazon. The best choice would be a hybrid of the two so there is always a backup of the data in case of disaster. The cheaper option would be purely cloud.

Then we will develop a website and simple application connected to the server and data. At this point, the priority should still be on processing data and making graphs, calculating averages and automating + storing the most useful data into a database.

When that is done, we can develop the features of the app modularly, that is to say in modules that can function independently. This means we can make as many or as little modules as needed and allows for scalability in the future with minimal change to the main code. We can add more later, turn some off, create different user types with access to distinct types of information (e.g. IT profile and stakeholder profile) and gives the contractor better control over the price. Should we implement all the functions or should we exclude the less important ones? The answer can change to decrease the price without affecting the current progress.

Finally, if we have time and are paid, we can address the final details and smaller problems. A screen in each greenhouse to facilitate the life of employees working there as well as the technologically challenged. The different profile types with different modules in their dashboards. Thorough documentation. Debugging and testing the robustness of the system (fail safes and security). And finally sustainability upgrades such as automatically decreasing heat when there is a lot of sunshine to waste less energy.

For the long term we should offer bug fixing, updates and maintenance paid for yearly with the first couple of years at a discount.

As an optional service we could provide IT related advice/solutions that require both IT and construction such as building tanks to collect rainwater and feeding it into the system to be used automatically when it stops raining. Or rotating crops so the greenhouses are never empty and using sensor data to see the effect on the soil and plant growth in the long term. Or automated/ controllable devices that regulate humidity, temperature, irrigation, etc.

# References:

The “Greenhouse\_wk4.pdf” description of the situation, interviews and survey data explained the situation, problems and considerations of the parties involved while the solutions were provided by my brain and coffee.