

Successful application of

# Vertical Farming

## Data Management



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# Vertical Farming and Data Management

Vertical farming is a promising development. Many types of vertical farming applications are being researched or already applied commercially. The balance between the advantages and disadvantages at input and output level differs for each application, and is still developing. The benefits of vertical farming are being enhanced, while its disadvantages are being mitigated as much as possible. A proven successful application of, or better yet; combination with, vertical farming is data management.

## **WHAT IS DATA MANAGEMENT**

There are many forms of tools out there, distinguished roughly by their focus. You can use these tools to collect and control the data of your indoor farm. When we talk about tools, think about sensors, climate computers and ERP-systems. But that is not all.

There are also tools that focus on Digital Twinning, or on accessing performance data of equipment and machinery. But also tools that focus on multi- and hyperspectral image recognition software. And then there are tools that combine all of the above.



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# Data Management Added value

If you are striving for more autonomous growing, it is worthwhile to consider growing vertically with data. Your vision is clear: you want to grow as labour- and energy-saving as possible with an optimal and consistent quality of your crop. For that, you will need data. The benefits are evident: it promises less use of labour, better insights, and more control.

## CONSIDERATIONS

Think about what data you have and want, how much time you wish to spend on working with data, and of course, what you wish to achieve by using data.

## SUITED FOR

Using tools and platforms for data management is suitable for all production where climate and technique meet, especially in indoor farms or vertical farms.



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# Data Management Modules

For a successful implementation of smart growing using data, we offer a single solution with the scalable and futureproof POLARIKS platform. The platform foresees all focus areas. It unlocks, organises and displays the data, in four different modules. It can easily be scaled up or down, and new developments within the world of big data are added regularly.

## 1. DATA AND ANALYSES

Batched data related to, for example, labour registration, climate data retrieved from sensors and computers, adds of elements and phytosanitary treatments is transferred to commercial stock lines in ERP systems. The available data is then automatically unlocked in one BI-tool, making it possible to compare and analyse cause and effect relationships in one tool and in real-time. This is possible within companies, but also in between companies (benchmarking).

It is unique that we do this in near real-time (in 1 minute if necessary!) and that our platform works batch driven.

## 2. DIGITAL TWIN

Module 2 consists of a tool that trains generic growth models of crops location and offers grower specific growth instructions and climate computer settings. In time, this will lead to autonomously growing within an indoor

farm. Such a Digital Twin gives future predictions of settings and production outcome. This Module always goes together with Module 1.

The data are from inside the vertical farm as well as from other relevant sources. Production, climate and labour data is extracted and exported to the cloud. Weather forecasts and energy prices are imported via standardized interfaces, to make future cost predictions.

## 3. PREDICTIVE MAINTENANCE

The third module consists of the Predictive Maintenance and Performance Management tool. This module is particularly interesting for those that have a lot of technique within their vertical farm or indoor farm. This tool has access to and presents performance data of equipment and machineries. The predictive maintenance assures the functioning of all installations and a reduction of down-time.



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The performance management functionalities register the activities of installations:

- Overall overview of all the machinery
- Individual presentation of a machine
- Operation states of performance
- Alarms generated by installations

The user is able to pinpoint a specific machine to see all its available details. All parts can be labelled with relevant data, such as type, brand, batch, description, maximum use, maintenance data and manuals and accessed through an exploded view. It is even possible to narrow down to a specific moment when the crane was operating or in an alarm state.

POLARIKS registers the deterioration of rotating and moving parts. Maintenance is predicted by counting back a maximum duration in time, events, frequency and in movement. By using climate computer data to register movements, such as opening a window. By reading the data of sensors. And by increased energy consumption as registered by motors, as that is often a sign of deterioration. A guarantee duration can be attached to this system.

Using the heatmap functionality parts can be enlightened based on their maintenance necessity.

Click on a specific part, and it will show all the relevant maintenance data available. It is possible to analyse what situation took place and how to prevent it in the future. Besides the specific part selector, the user can also use the heatmap and view all parts that are turned yellow and red, to maintain in one go. This to reduce factory down-time by planned maintenance.

#### **4. HYPERSPECTRAL IMAGING**

The fourth module consists of Visual Hyperspectral Recognition. Following crop photosynthesis activity on a distance with the help of multi- and hyperspectral image recognition software distinguishes problematic areas in the vertical farm or on multiplication tables.

With special cameras and spectral imaging software, information can be derived from images taken in the vertical farm. Consultants can then identify, without any trouble, the inefficient plants or areas.



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# Data Management

# Proven success

## SUMMARY OF BENEFITS

- Maximum insights and control to create the ideal climate conditions for the specific crop
- The entire cultivation process is controllable and traceable
- High labour savings
- A high degree of planning
- Operate at the highest efficiency with performance management
- Minimise undesired downtime with predictive maintenance
- Hyperspectral imaging for corrective handling

## THE BOSMAN VAN ZAAL APPROACH

Based on the principles of crop production combined with maximum automation and robotisation in the most hygienic conditions, Bosman Van Zaal will propose and design a total technical solution. A solution that complies with the pre-defined requirements will then be manufactured by our production team. All the mechanical and control technology facets must be perfectly harmonised. We apply our years of experience to provide an integrated, full-service approach and offer turnkey solutions. This approach has already been successfully applied in various projects. One of these projects is highlighted below:

*View a  
business case*



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# Data Management for Vertical Farming

with Bosman Van Zaal

*Discover more  
here!*



*Our vertical  
farm experts!*

Looking to excel in vertical farming using  
**data management**? Contact us!

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