



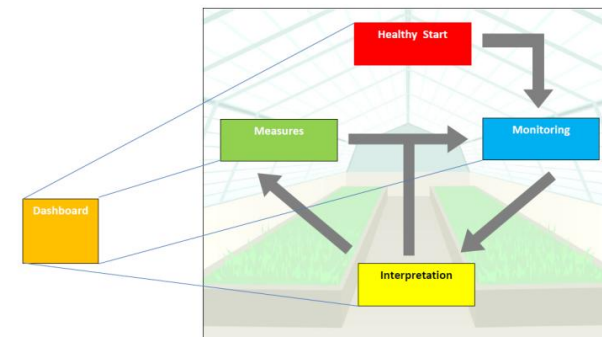
The Healthy Greenhouse 'Gezonde Kas'

Healthy for plants, humans & environment
Interreg 4A project

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Wageningen UR



GEZONDE KAS
GESUNDES GEWÄCHSHAUS



Overview

Why/what/aim of a Gezonde Kas system?

The project-partners

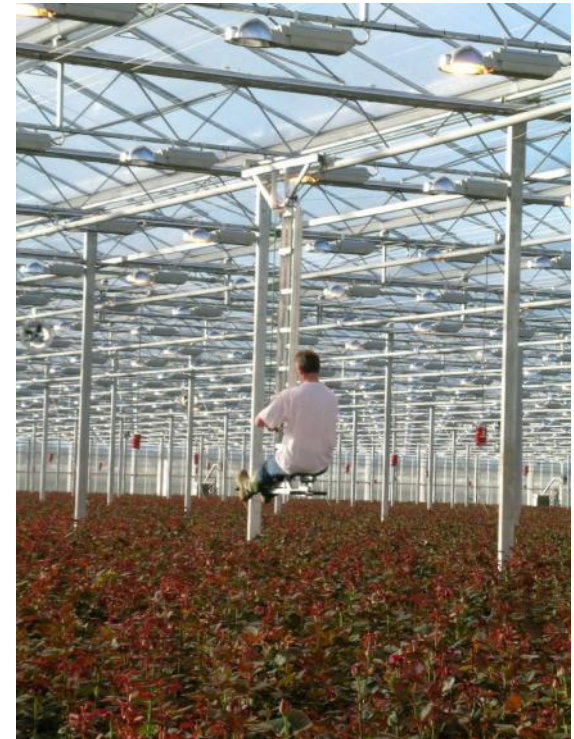
Steps of the Gezonde Kas system

Products/Results



Why a Gezonde Kas system?

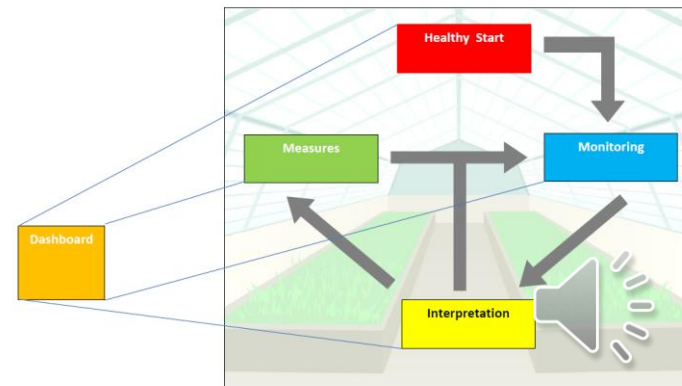
Developments in greenhouses : larger areas, plants are hard to reach, management and control of plant diseases more difficult



What is the Gezonde Kas system?

An innovative IPM crop protection system for greenhouses with:

- Healthy Start
- Notifies the presence of pests and diseases, even before symptoms are visible
- Supports decision taking
- Advices facilitate the application of necessary measures with a minimal usage of chemical control agents



Aim of the Gezonde Kas system

- Improved control of pests and diseases
- Higher yields of high quality products
- Lower input of chemical control agents
- Higher economic yield
- A better environment



Gezonde Kas – Inerreg IV A

Multidisciplinary PP-consortium

Consortium:

10 research organisations

- Universities (Bonn, Hannover, Wageningen)
- Hochschule Osnabrück
- Research institutes (WUR, Versuchszentrum Straelen, ZEPP, Forschungszentrum Jülich)
- Landwirtschaftskammer (NRW, Niedersachsen)

22 companies:

- Providers of crop protection agents
- Providers of greenhouse technology
- Producers of sensors
- Test laboratories
- Producers of substrate
- Software-developers





...and Gezonde Kas: funders

UNTERSTÜTZT DURCH / MEDE MOGELIJK GEMAAKT DOOR



Ministerie van Economische Zaken



Niedersächsisches Ministerium
für Wirtschaft, Arbeit und Verkehr

Ministerium für Wirtschaft, Energie,
Bauen, Wohnen und Verkehr
des Landes Nordrhein-Westfalen



provincie Drenthe

provincie limburg



provincie
Gelderland

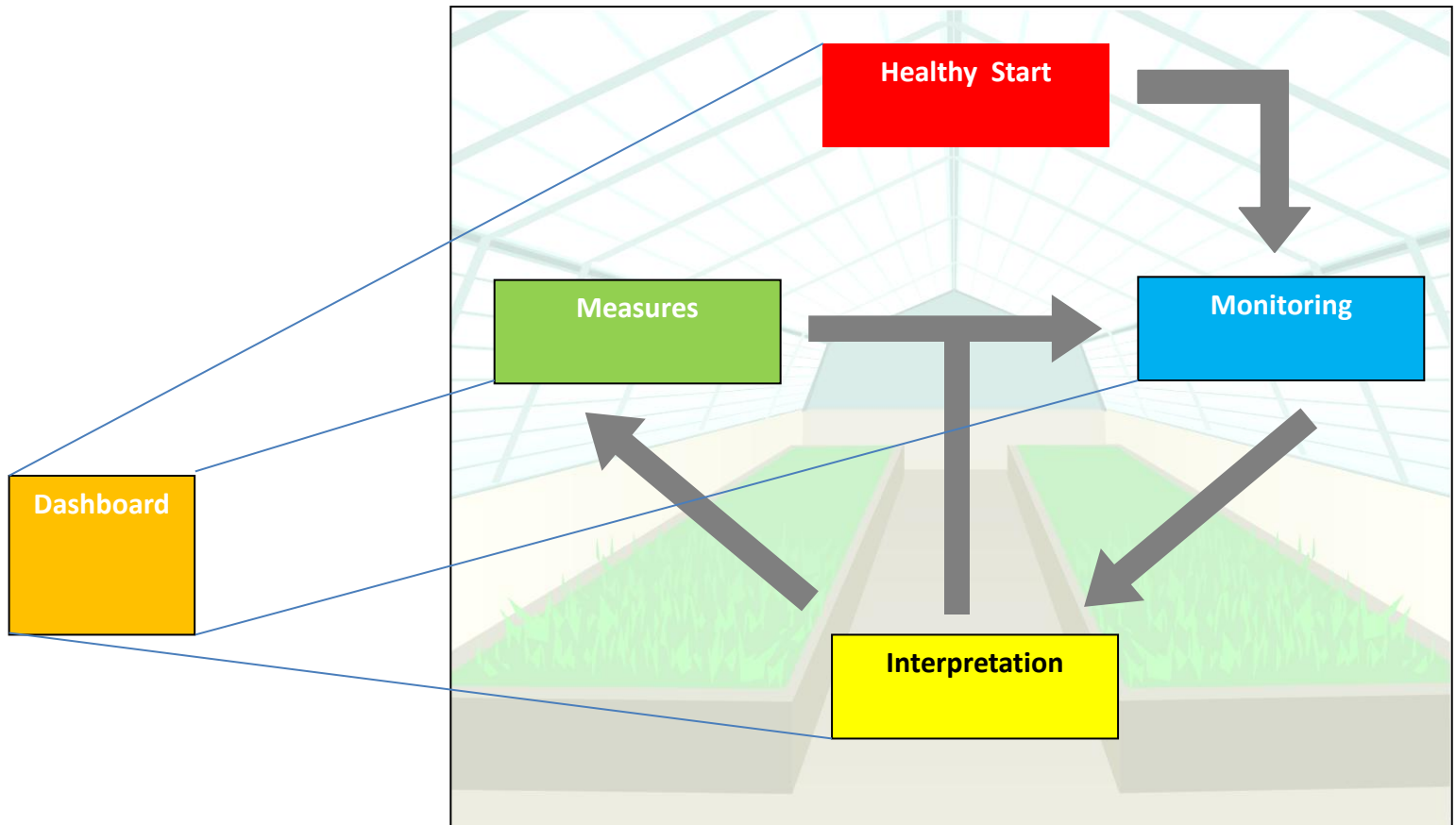


Budget : 10 mE
Time: 2011 - 2014

www.deutschland-nederland.eu

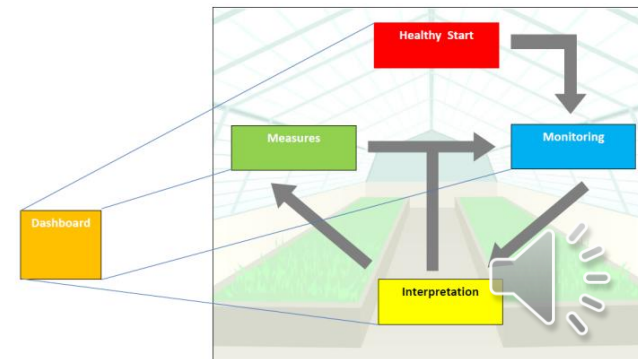


IPM: “Gezonde Kas” System



Products of step **healthy start**

- Luminex Multiplex detection test for verification that starting material and greenhouse environment are free of pests and diseases before growing a crop



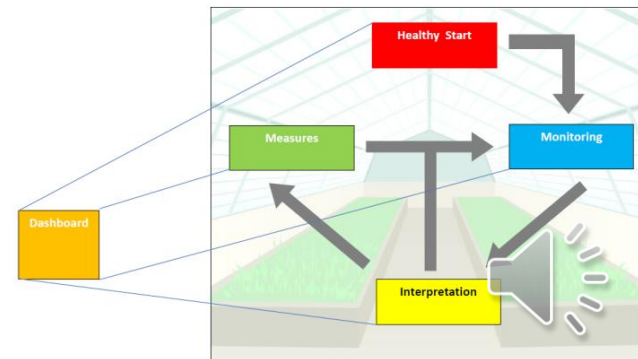
Products of step **healthy start**

Products for preventive suppression of pests:

- Top layers (that improve the settlement of predatory mites that control Thrips)



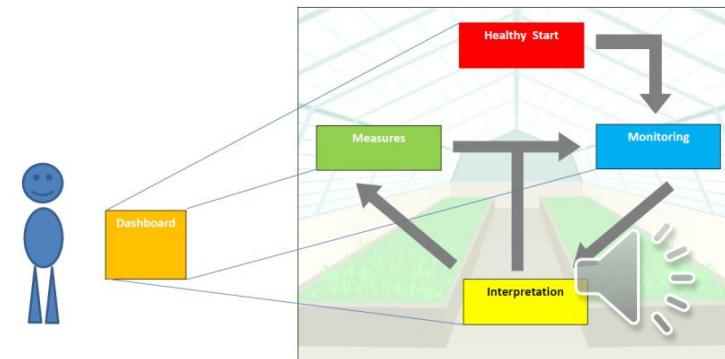
- Substrate that suppresses the occurrence of sciarids



Products of step monitoring

During the growth the whole greenhouse is monitored for the presence of:

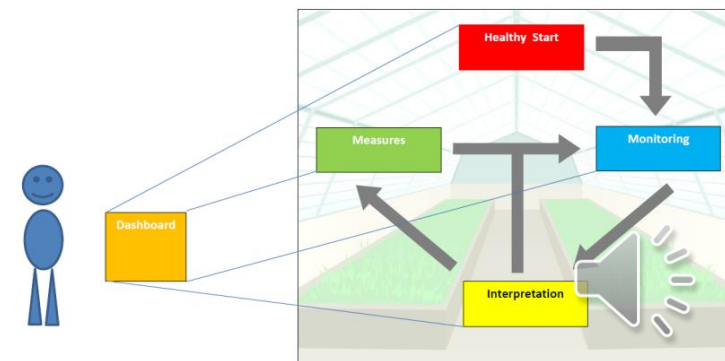
- Pests and diseases
- Disease indicators ('stress')
- Environment factors that influence the development of pests and diseases



Products of step monitoring

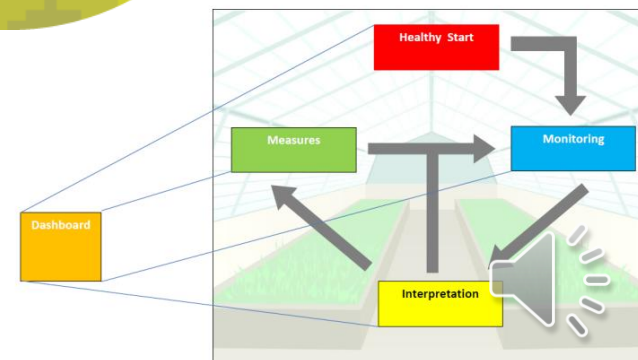
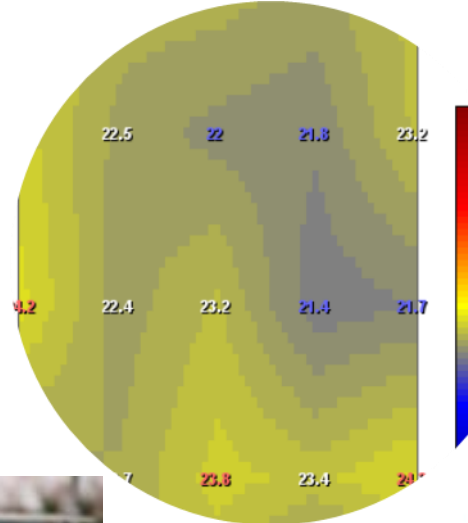
Monitoring for diseases is done in a 2 step manner:

1. **Macro-scale** monitoring: the whole crop is monitored (for disease indicators) until a spot is identified that requires special attention
2. **Micro-scale** monitoring: (parts of) plants of the identified spot are analysed more intensively



Products of step macro-monitoring

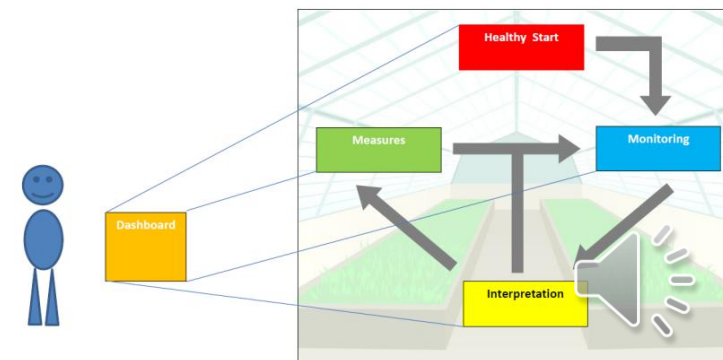
Wireless sensor networks for monitoring for environment factors that influence the development of pests and diseases



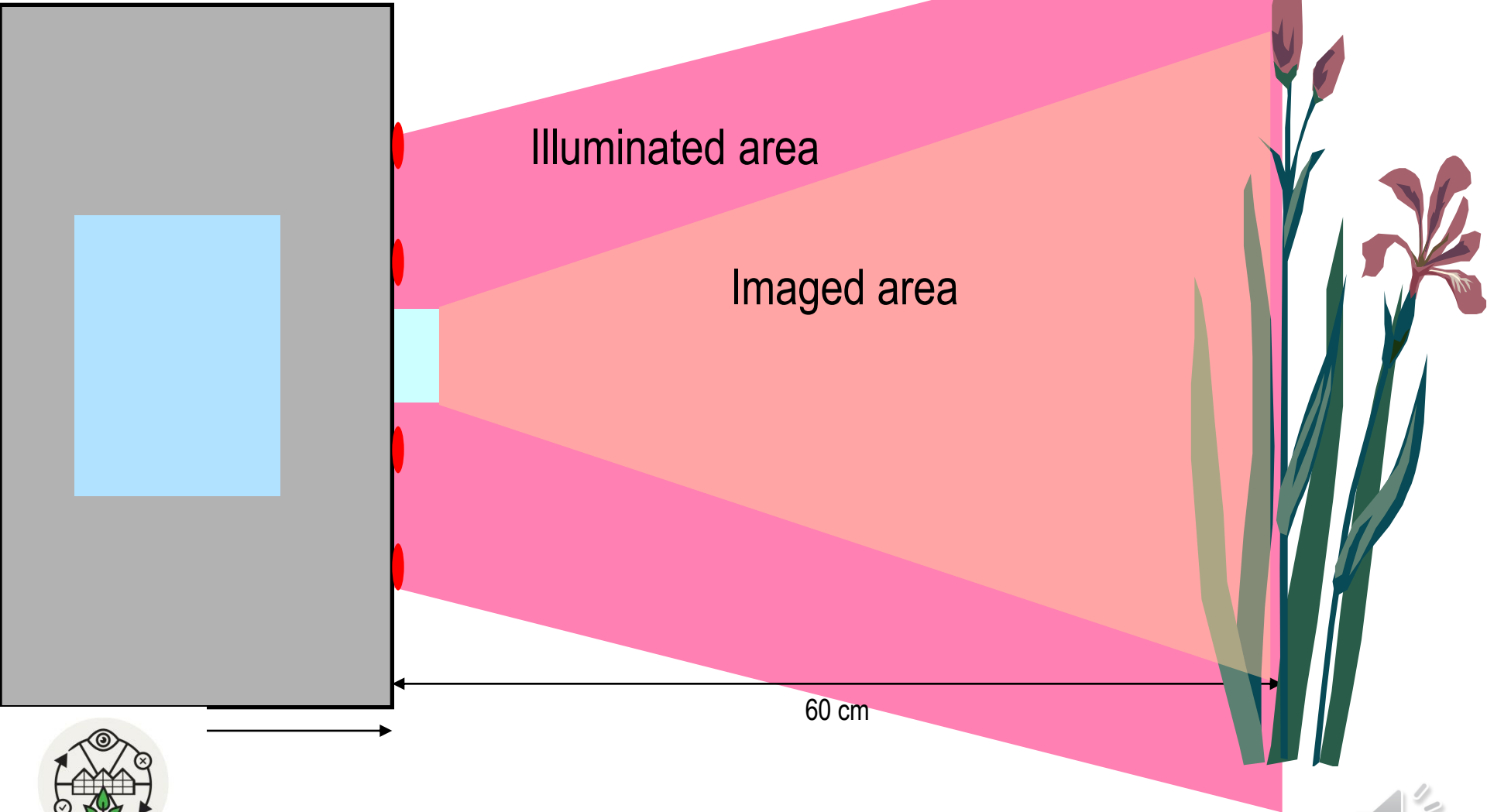
Products of step macro-monitoring

Products for macro-scale monitoring:

- CF camera
- Multispectral imaging sensor
- Spore collector
- (Electronic nose)



Specifications



M

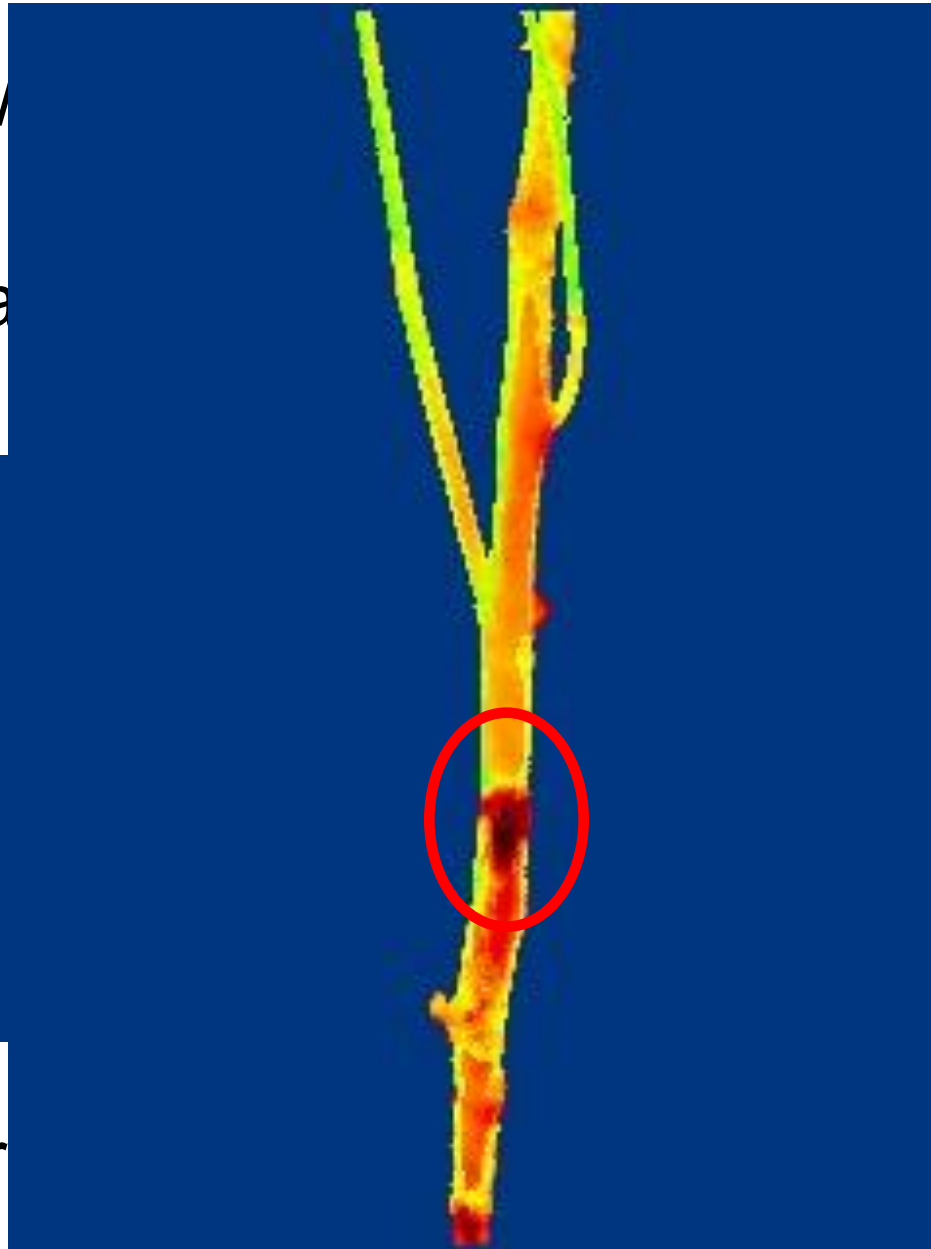
em

Recorded image

n Botrytis

Fluorescence

Photosynthesis



Botr

Botrytis



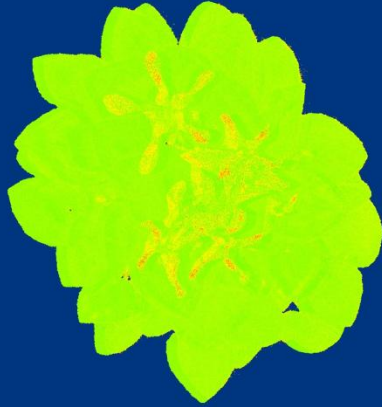


Side crop viewer

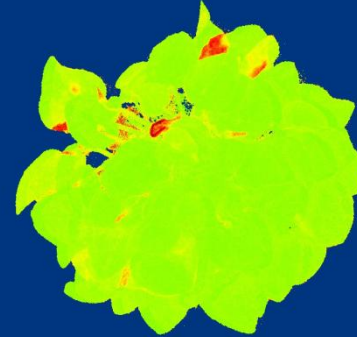


Results: CF test with Cyclamen plants

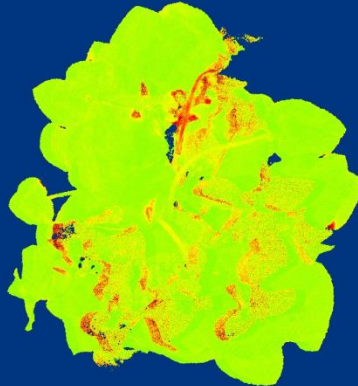
Healthy



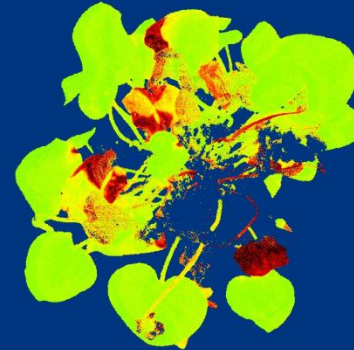
Infected



Diseased



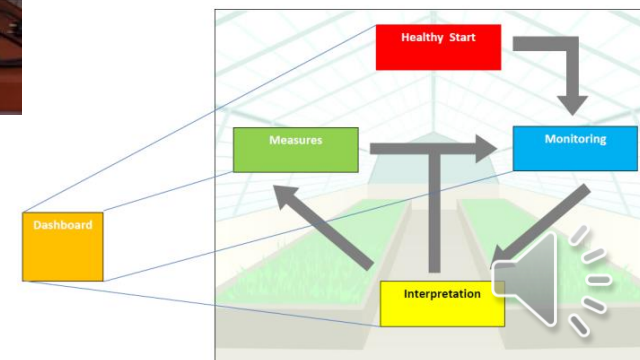
Heavily diseased



Products of step micro-monitoring

Products for micro-scale monitoring:

- Nsure plant vitality test
- Luminex detection tests

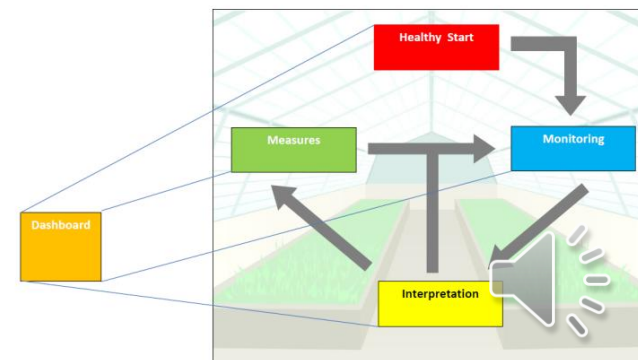
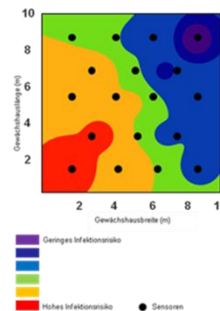
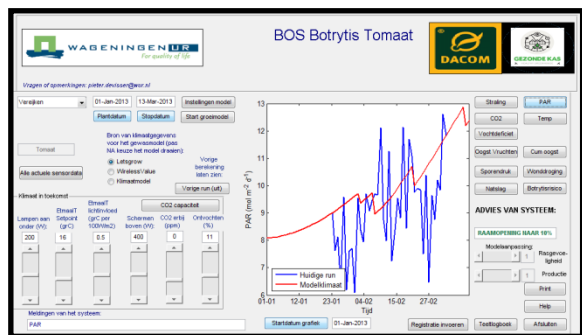


Products of step interpretation

The obtained data for monitoring will be processed and analysed resulting in an advice for crop management for the grower.

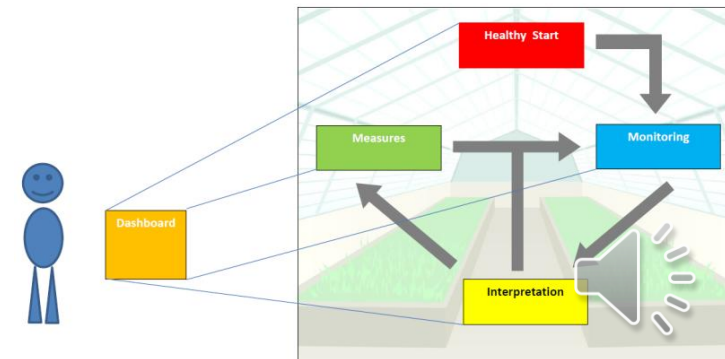
Products are:

- DSS for prevention of Botrytis in tomato/cyclamen
- DSS for prevention of pests
- Notify me!
 - Program that can predict the development of a crop based on database with crop specifications
- Climate Vitalizer
 - Program that generates practical advices for creating a better climate in the greenhouse. Based on data generated by the wireless sensor network and climate computer



Products of step measures

Preferentially biological or other alternative measures will be applied. When chemical products do need to be used these will be applied using precision spraying techniques.



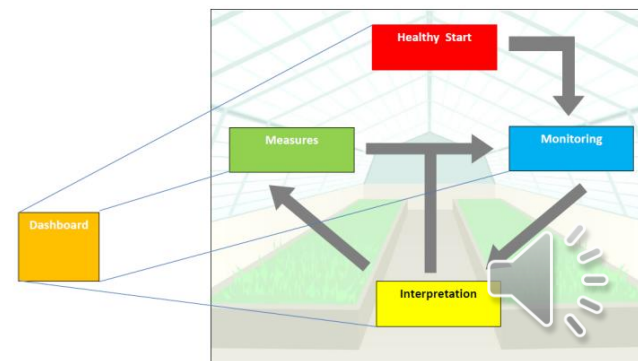
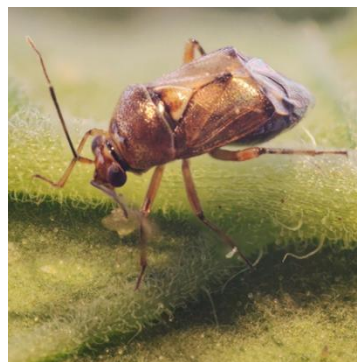
Products of step measures

- Combination of endophytes and predatory insects for optimal control

Spores of endophytes are available in tablet form.

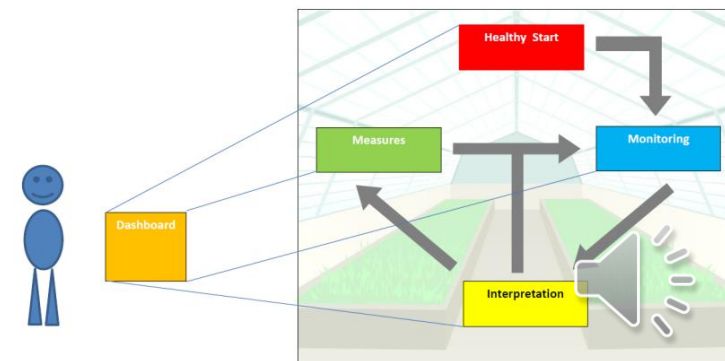
Predatory insects are commercially available.

When used together on the plant the predatory insects will feed more on the pest than on the plant.



Products of step measures

- Crop Adapted Spraying system for cyclamen



Dashboard

All data generated within the Gezonde Kas system, such as data and advices, come together in the dashboard: a SCOT database for data containment, data exchange and notifications. The dashboard shows notifications for the grower in a traffic light manner.



GEZONDE KAS

GESUNDES GEWÄCHSHAUS

English GB

HOME

NOTIFICATIONS

DATA

UPLOAD

CHARTS

CONTACT

MOST RECENT VALUES

01/09/2014 06:15

next: 50sec

name

00 Zentr 10000 Außentemperatur - oC 10



00 Zentr 40000 Außenhelligkeit - klx 0



00 Zentr 40001 Lichtsumme/- Vortag - klxh 143.4



00 Zentr 90000 Windgeschwindigkeit/Richtung - m/s 1.2



00 Zentr 90000 Windgeschwindigkeit/Richtung - N 6



00 Zentr 90050 Niederschlag/Schnee - nein 0



00 Zentr 90050 Niederschlag/Schnee - nein 0



NOTIFICATIONS

Start trigger was reached in 2 containers

2014-08-31T16:09:53 - AEP

greenhouse whitefly detected in Himstedt

Threshold was reached in 1 containers

2014-08-31T16:09:52 - AEP

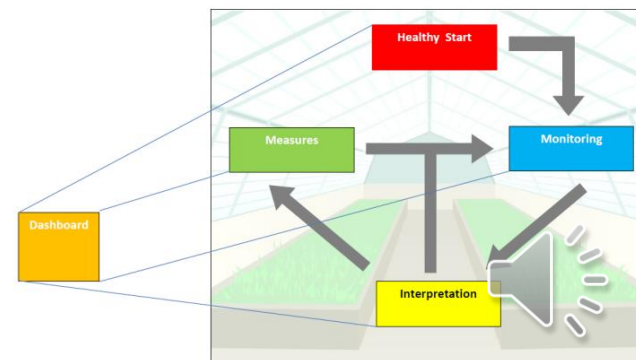
greenhouse whitefly detected in Himstedt

Start trigger was reached in 1 containers

2014-08-31T07:00:00 - Product 15

Straelen HS58: Botrytis risk is low

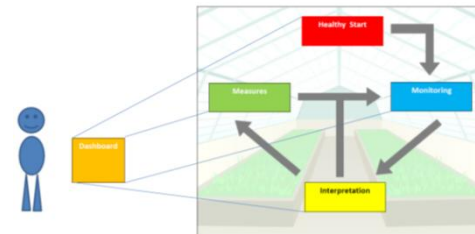
Botrytis Webservice computed a low infection risk



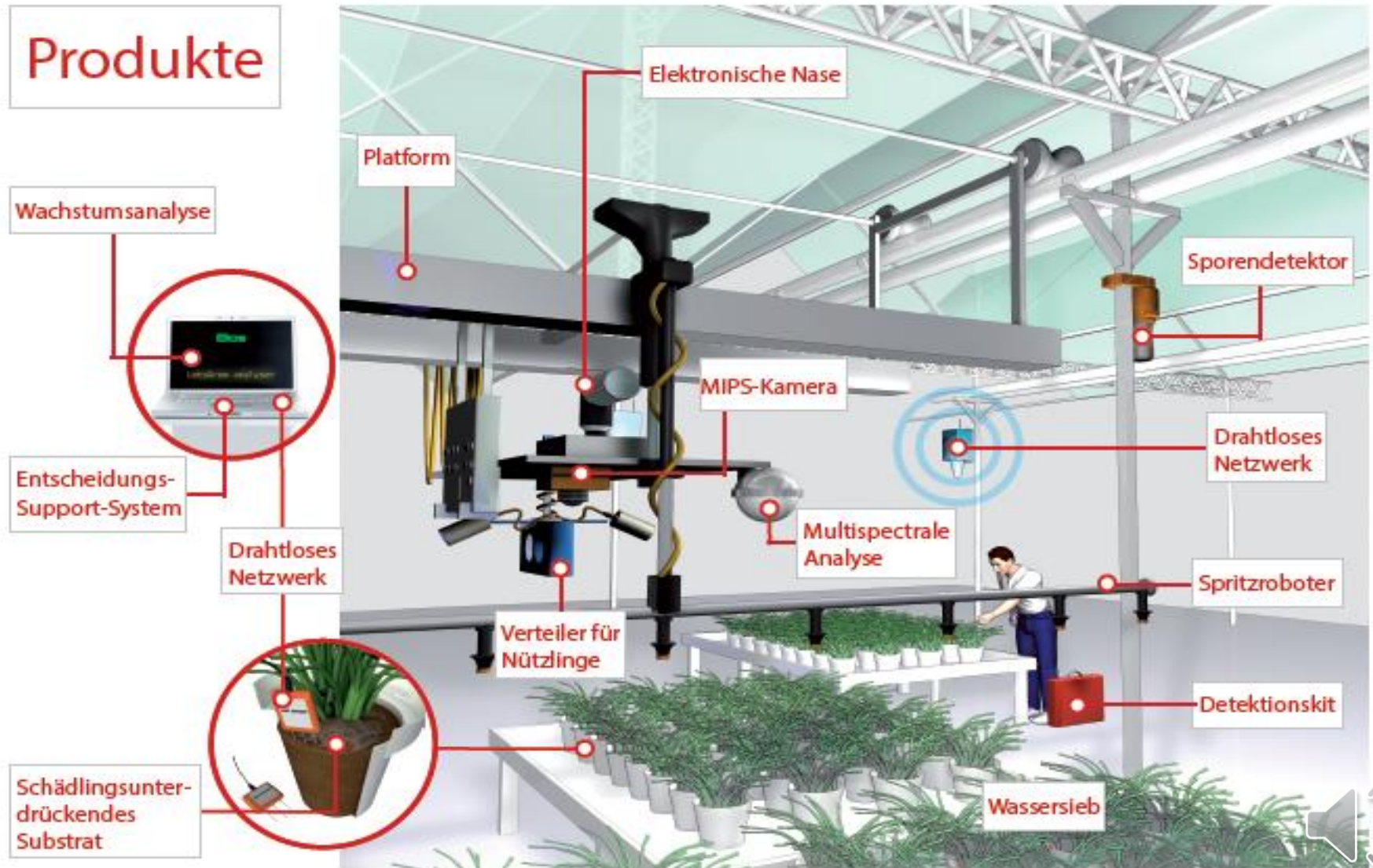
GEZONDE KAS
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Gezonde Kas – IPM-Results

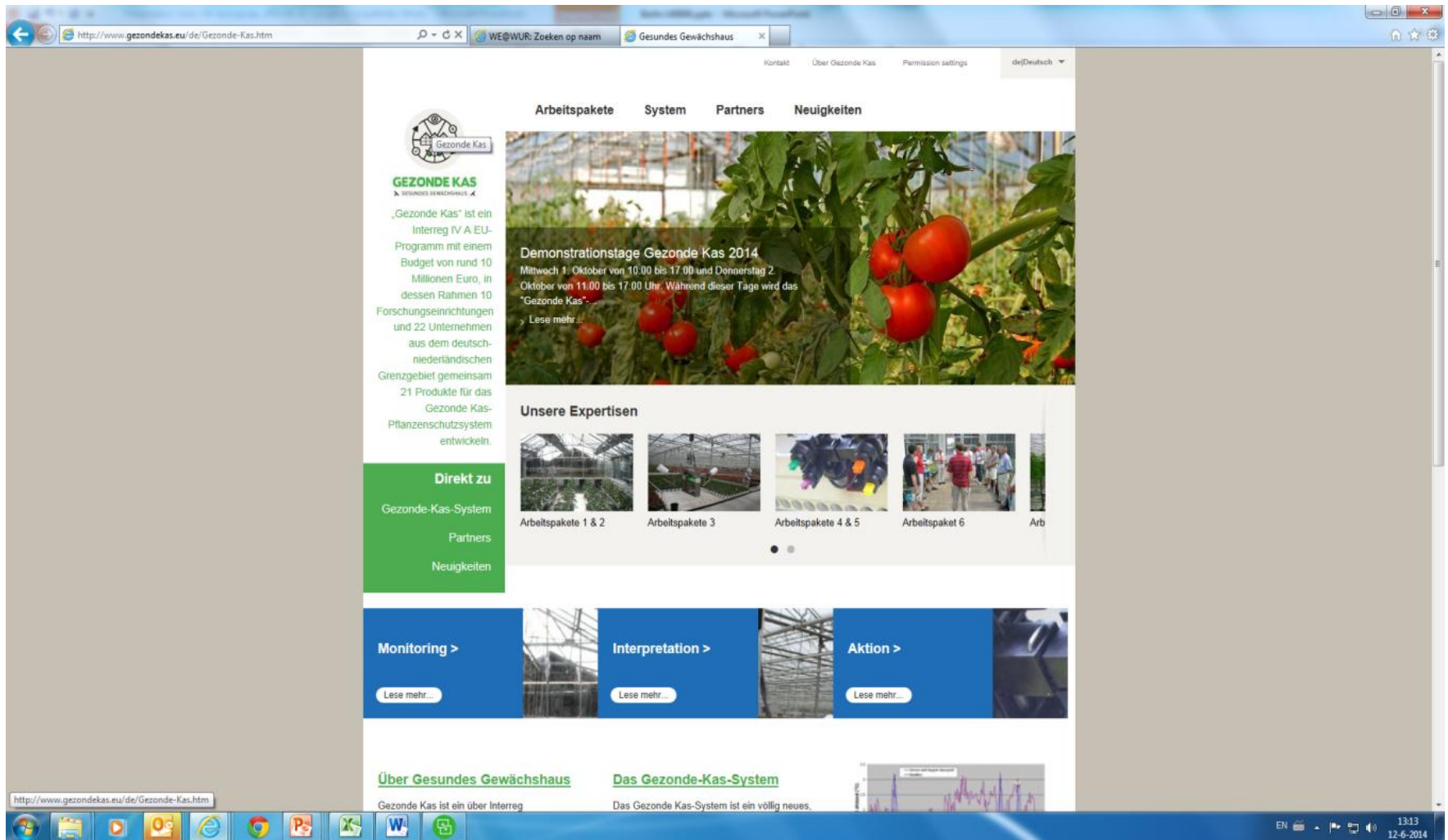
- Healthy start prevents pests/diseases
- Two steps monitoring enables the identification of diseases before symptoms are visible
- Because of the early detection biological or other alternative measures can be applied effectively whereas this is not always the case when disease development is in a later stage
- In case chemical control agents need to be applied this can be done using crop adapted spraying resulting in a 30-55% usage reduction



Artistic impression of 'Gezonde kas'



Website: www.gezondekas.eu



Thank you for your attention

