# The **Green**House

**European Project Semester**
Insituto Superior de Engenharia do Porto
2017

# TEAM 4



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AP | ARTESIS PLANTIJN
HOGESCHOOL ANTWERPEN

ESIReims
(ESIEC)

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# SUMMARY

# 3. PROBLEMS

Eating **healthy** & **good quality** food is a big demand nowadays

Global supermarkets can't **supply** food **fresh** enough

OPTIONS?

**Buying in bio or local markets**

Very high prices

Not enough for everybody

Few spots of availability

**Growing fresh food at home**

Active and busy lives

No time to cultivate fresh food

No space to allocate the pots

# 4. GOAL

*"A sustainable solution to grow aromatic plants in small houses"*

# 5. REQUIREMENTS

State of the Art

Ethics

Sustainability

Marketing

●● Domestic use

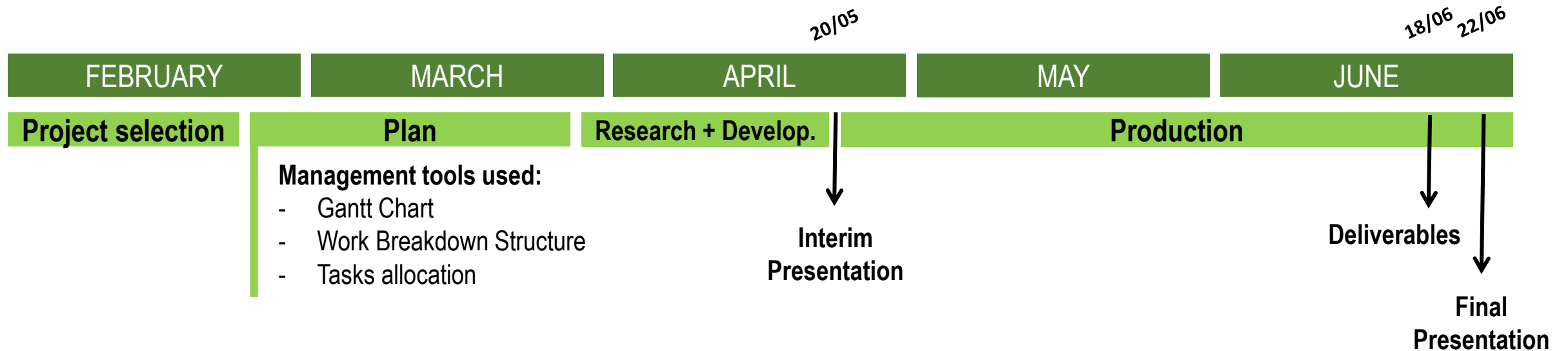●● Semi automatic

●● Outside allocation

●●● Natural resources

●●● Rainwater collector

●●●● Safe structure, long life

● Feedback system

# 6. PROJECT MANAGEMENT (I)

**Timeline**

| FEBRUARY | MARCH | APRIL | MAY | JUNE |
|---|---|---|---|---|

20/05

18/06  22/06

**Project selection** | **Plan** | **Research + Develop.** | **Production**

**Management tools used:**
- Gantt Chart
- Work Breakdown Structure
- Tasks allocation

**Interim Presentation**

**Deliverables**

**Final Presentation**

# 6. PROJECT MANAGEMENT (II)

## Major tasks

| | |
|---|---|
| **Report** | All the team members |
| **Wiki maintenance** | Alisson, Christophe |
| **Presentation** | All the team members, Cristina |
| **Build the prototype** | All the team members |
| **Paper** | Christophe |
| **Leaflet** | Alisson |
| **Poster** | Cristina |
| **Video** | Mathias |
| **Manual** | Antonio, Alisson, Mathias |
| **Website** | Alisson |

## Risks

1. Wrong material

2. Missing team member

3. Budget not respected

**General architecture**

6 to 8 pots

Wood frame and panels

Cork for isolation

For balconies
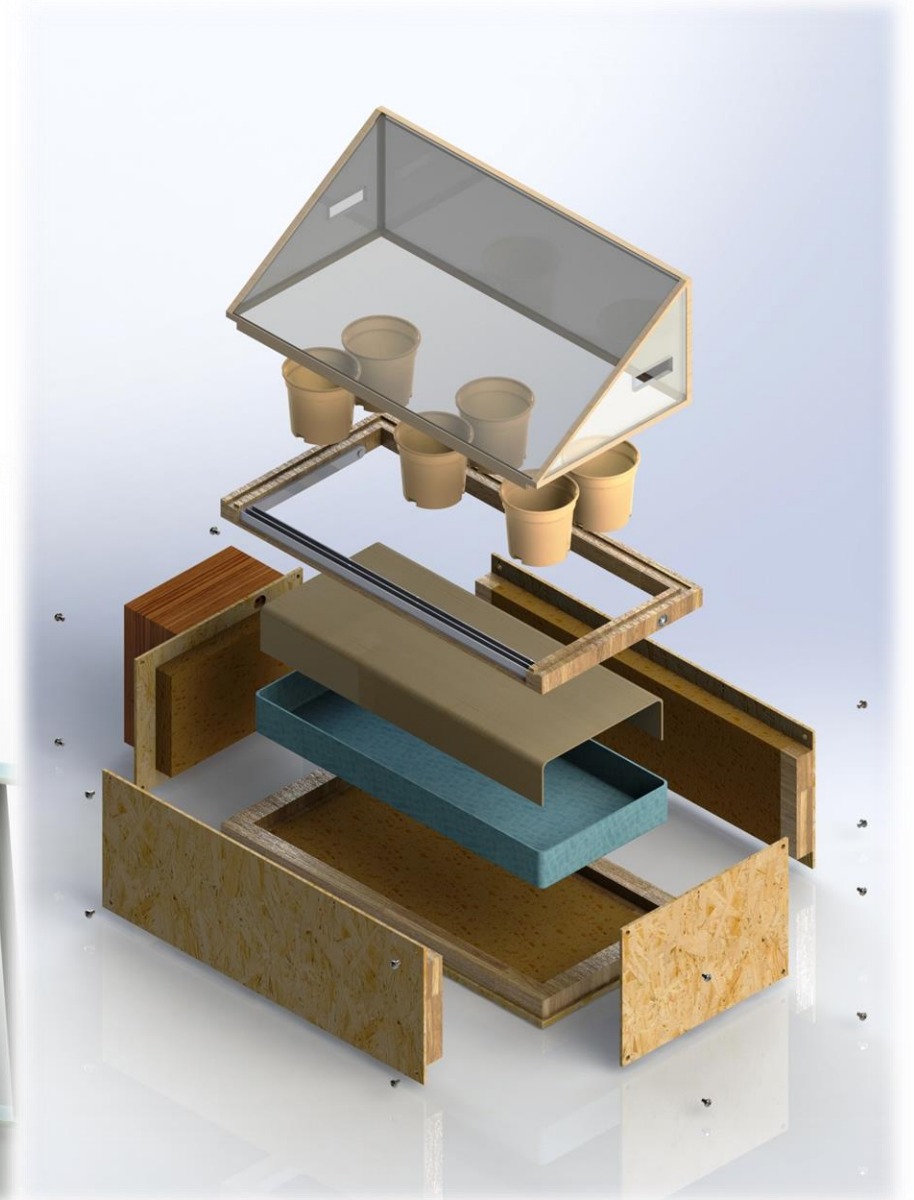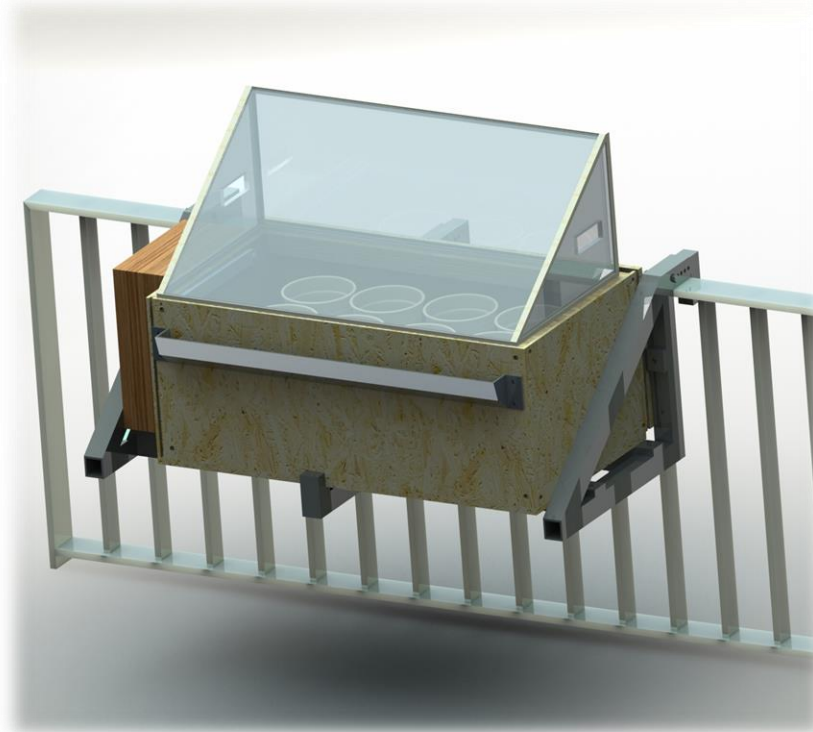
# 7. DESIGN & FUNCTION (II)
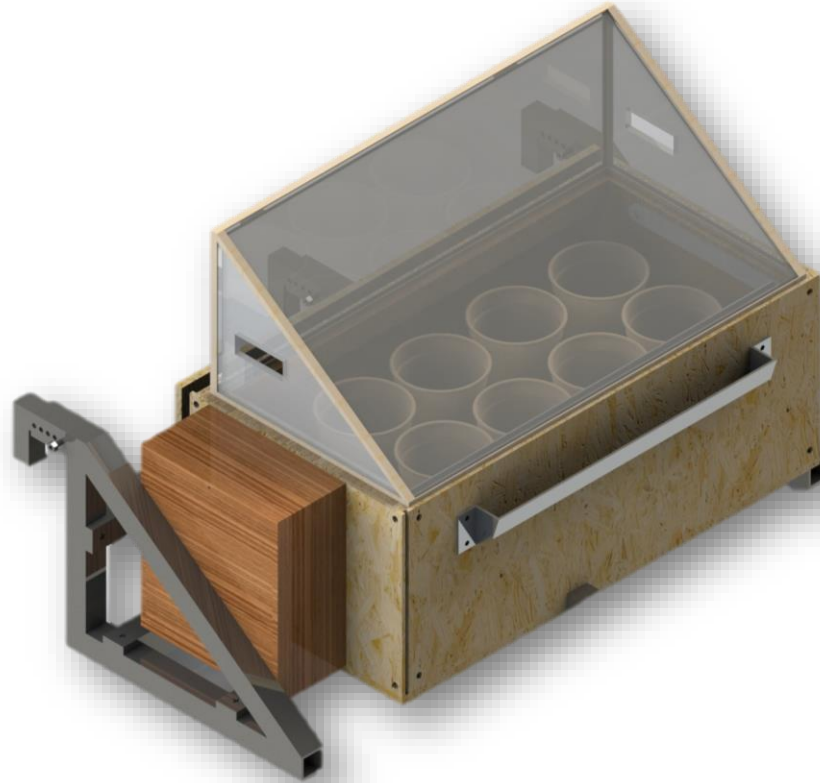
**Winter cover**

Rigid, manual and removable

Foldable

Wood frame and transparent foil

90 degrees triangle shape

Greenhouse function

Low temperature warning system

# 7. DESIGN & FUNCTION (III)

**Summer cover**

Fixed automatic awning
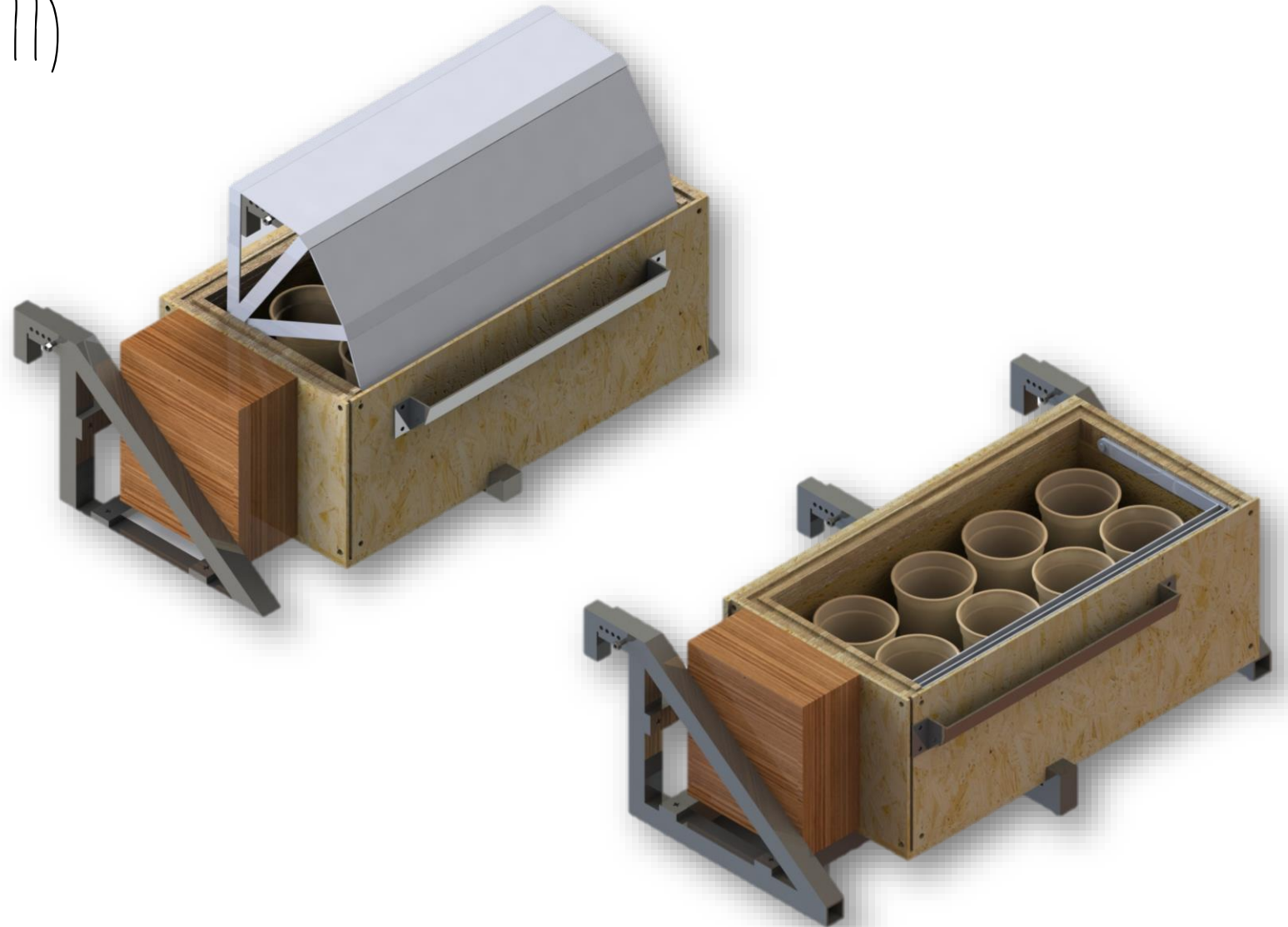
Breathing space

Aluminum frames and reflective foil

Double protection

Shade house function

Rotational motor

Heavy rain system

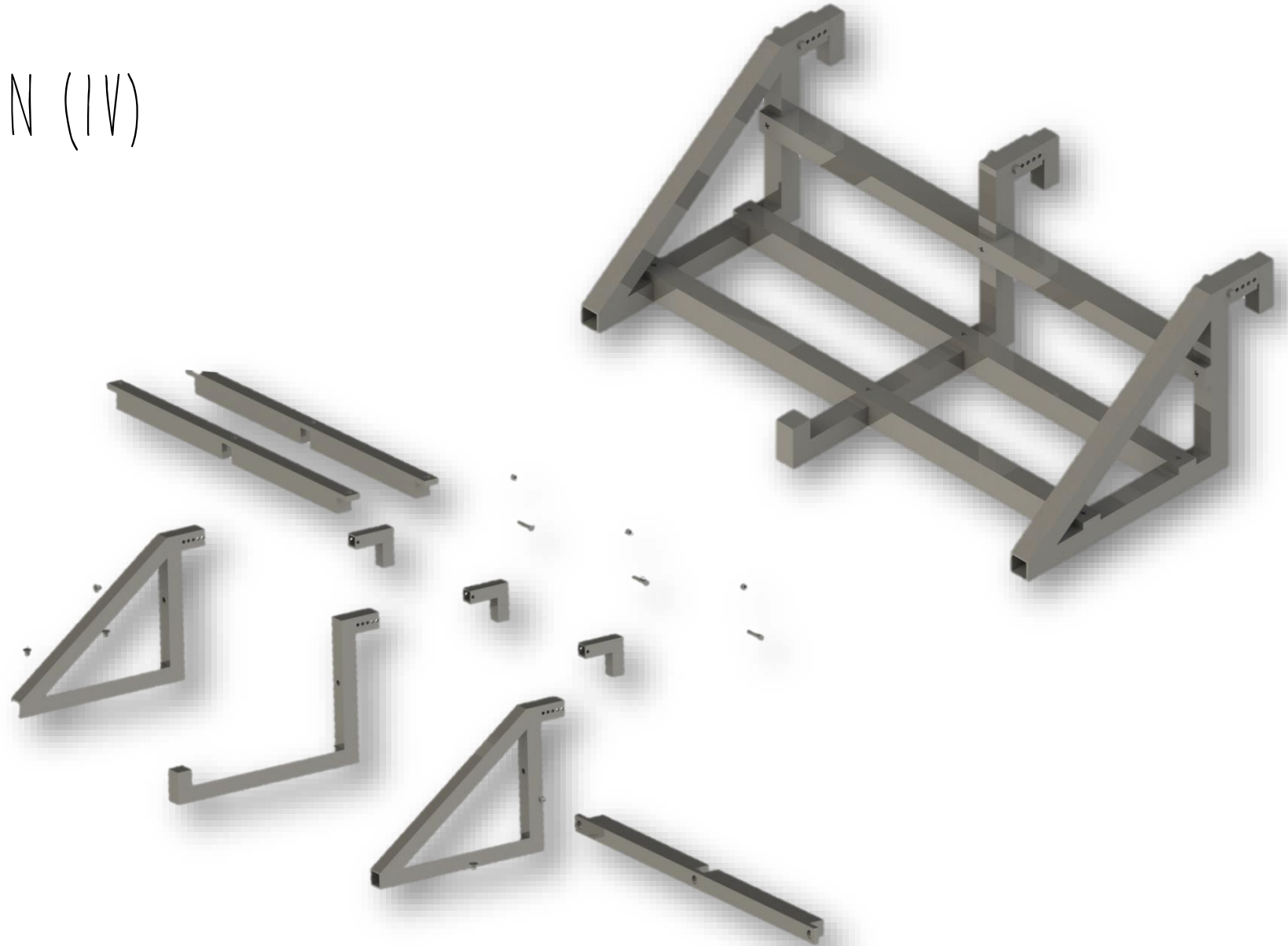High temperature system

# 7. DESIGN & FUNCTION (IV)

**Support**

Square steel tubes assembly

Two types of screws

Holding the product

Adjustable to fences

It holds up to 15 kg

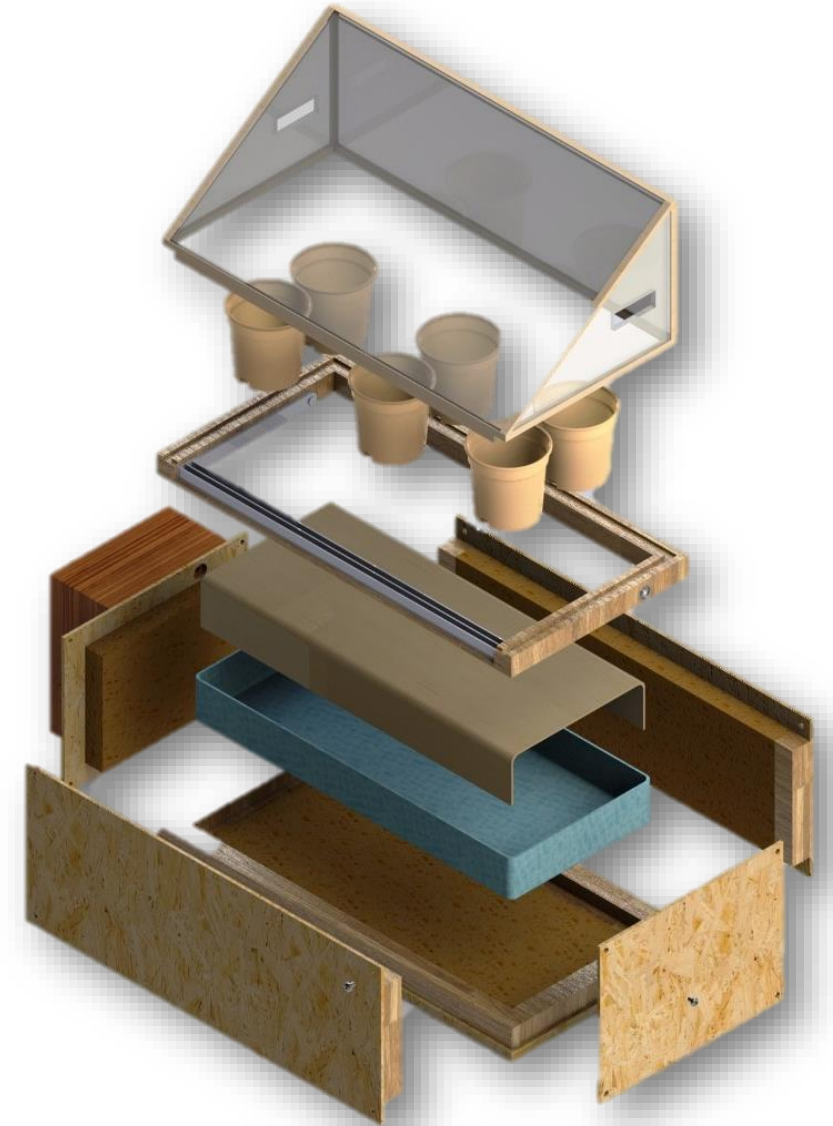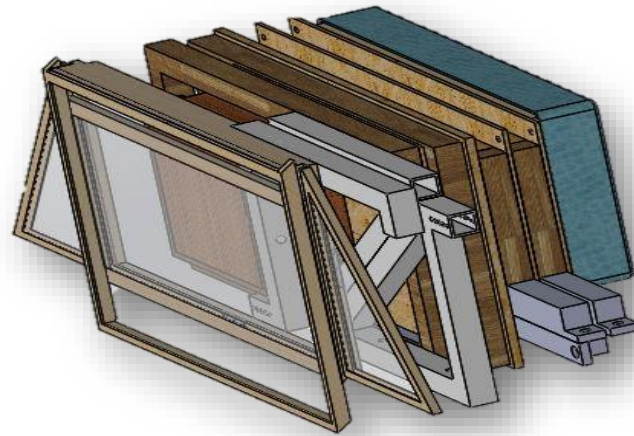# 7. DESIGN & FUNCTION (V)

**Kit**

Components and necessary tools

Easy assembly in 30 minutes

Assembled with screws

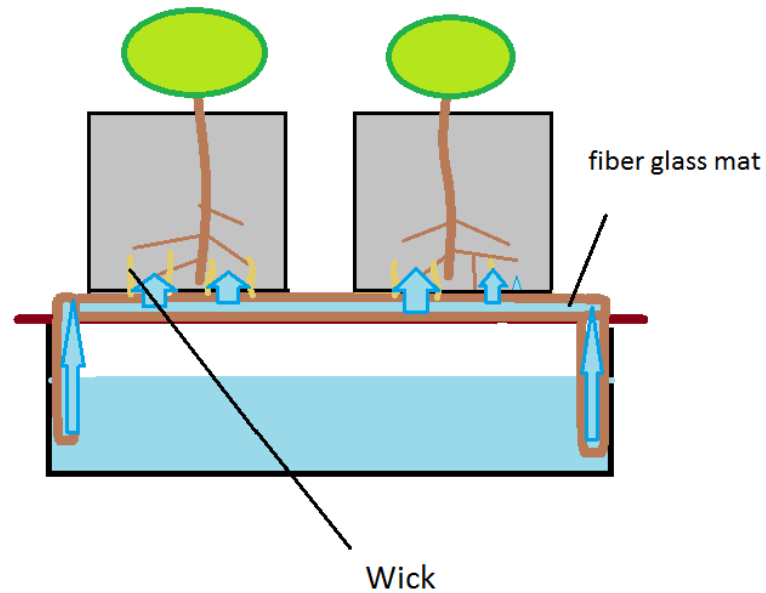Optimal storage for packaging

Modular components

Long live product

# 7. DESIGN & FUNCTION (VI)

## Irrigation system

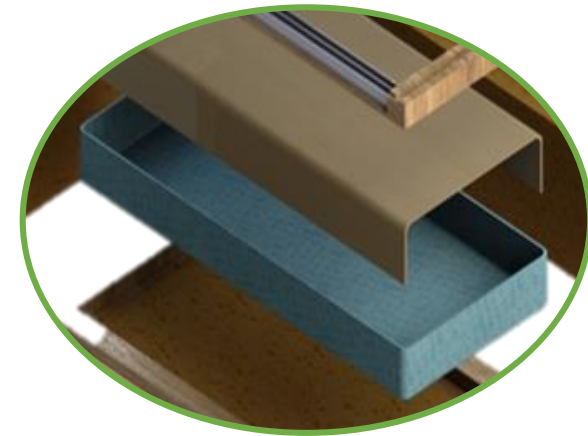Automatic, no power needed

Glass fibre mat and wicks

Capillary effect



## Water tank

7.7 liter

Polyester and glass fibre
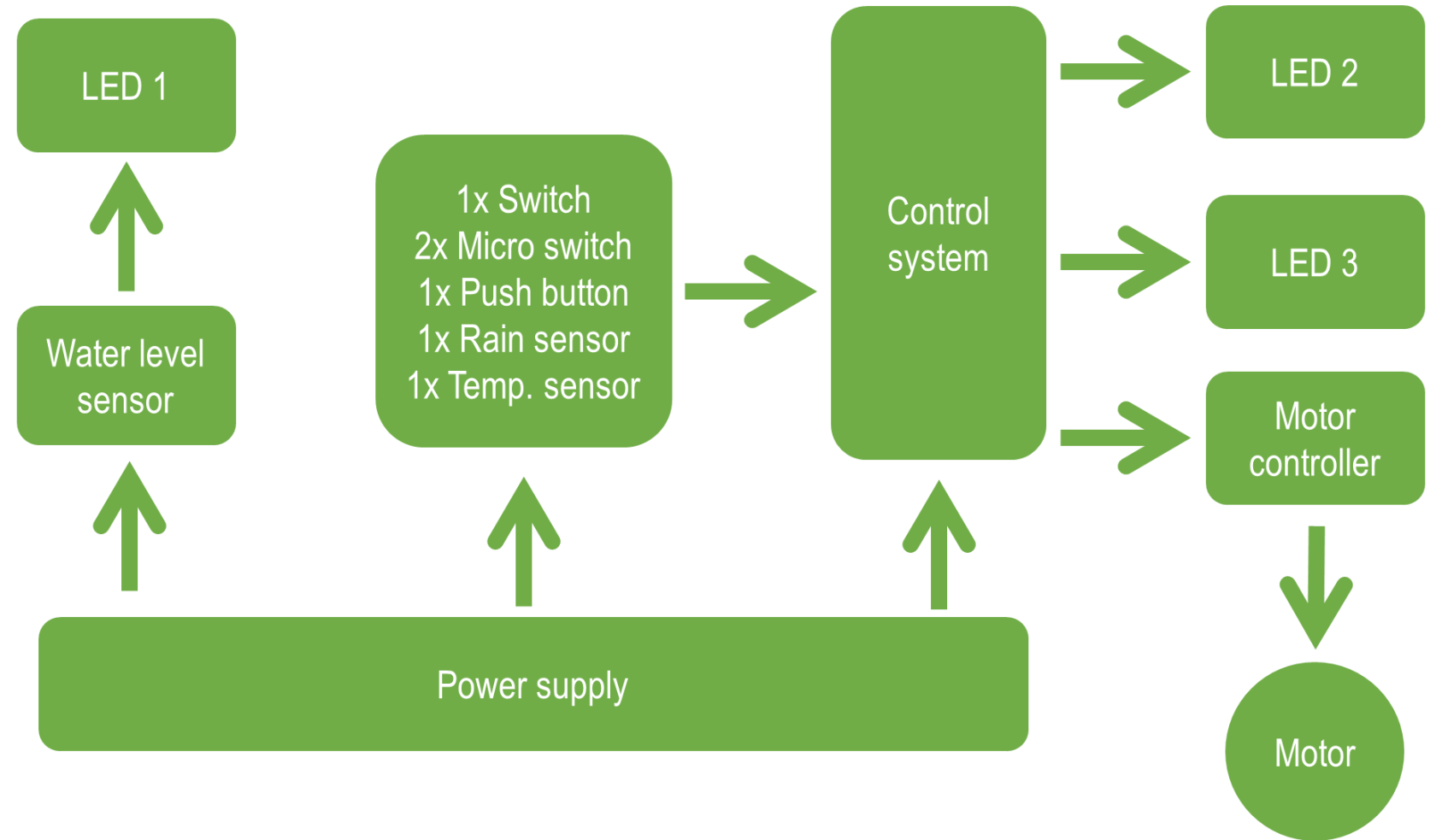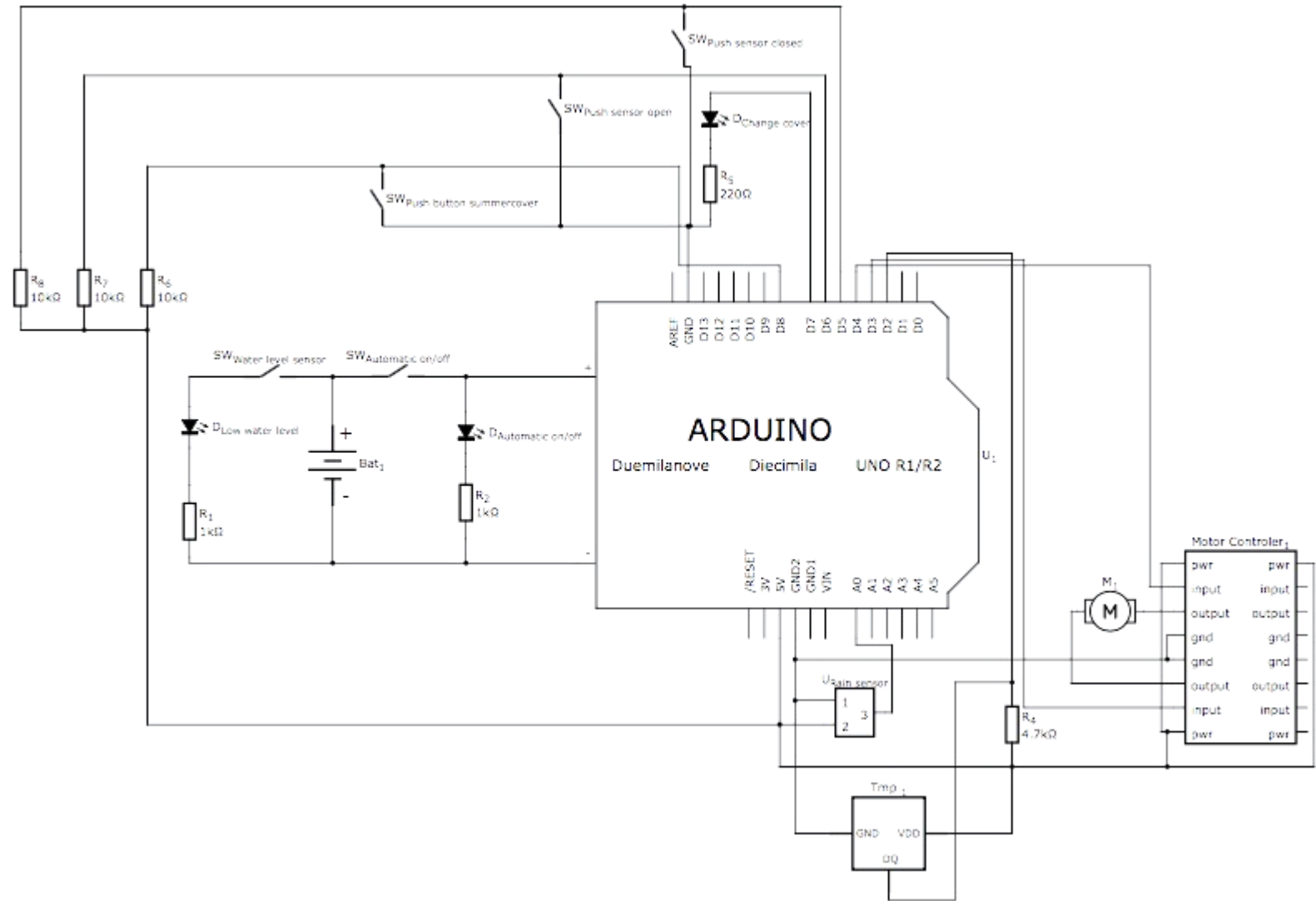
Water level warning system

Overflow system

# 8. CONTROL(I)

**Black Box Diagram**

# 8. CONTROL(II)

**System Schematics**

# 8. CONTROL(III)

**Arduino Code**

Status of temperature and rain sensors

Average of readings

Hysterisis

Summer cover closes for rain

Temperature > 5 °C

```
Status temperature sensor = 27'C
Status rain sensor = 721 (Not Raining)
Summer cover open or closed
Winter cover not needed

Status temperature sensor = 27'C
Status rain sensor = 650 (Not Raining)
Summer cover open or closed
Winter cover not needed

Status temperature sensor = 27'C
Status rain sensor = 579 (Not Raining)
Summer cover open or closed
Winter cover not needed

Status temperature sensor = 27'C
Status rain sensor = 510 (Raining)
Summer cover closing because of rain
Winter cover not needed

Status temperature sensor = 27'C
Status rain sensor = 440 (Raining)
Summer cover closing because of rain
Winter cover not needed
```
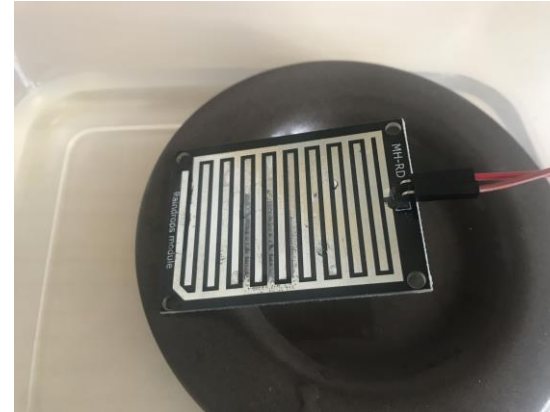
# 9. TESTS (1)

## Temperature sensor



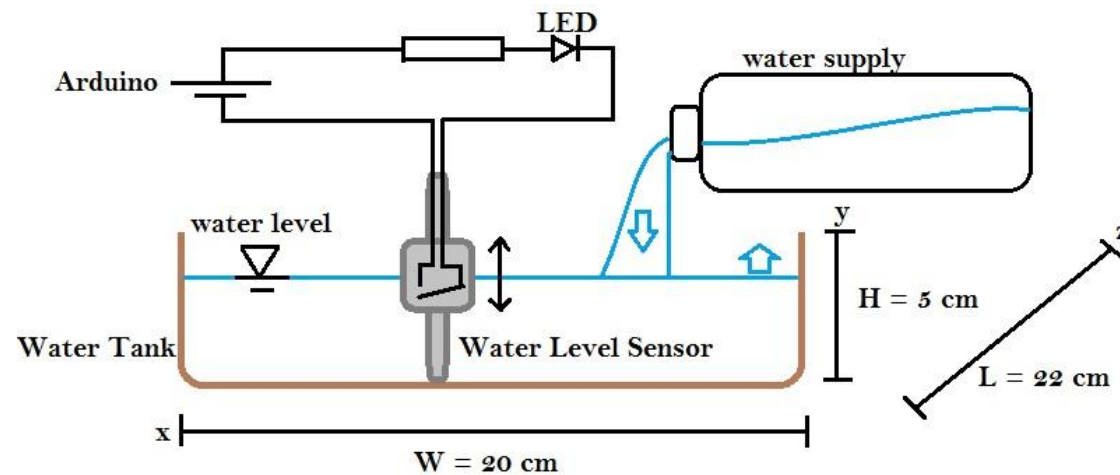| | Room temperature | Ice box | Hairdryer |
|---|---|---|---|
| Thermometer | 26 °C | 0 °C | 45 °C |
| Temperature sensor | 27°C | 2 °C | 46 °C |
| Difference | + 1°C | + 2°C | + 1 °C |

## Rain sensor



Rain simulation

Sensor at 45 °

Activating amount of rain: 5 ml / s (medium rain)

# 9. TESTS (II)

## Water level sensor

Water volume, which triggers the sensor: 0.9 l

Real product is bigger



## Irrigation system



0.5 liter transportation per day

# 10. IDENTITY & PACKAGING

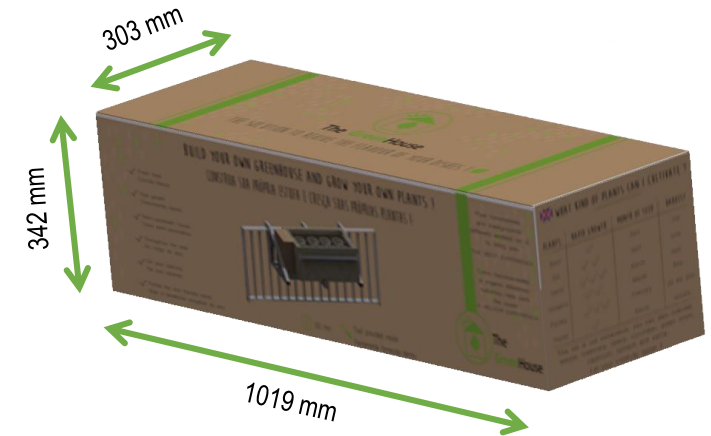## The graphic identity

Formal logo.

Graphic referencing of the brand.

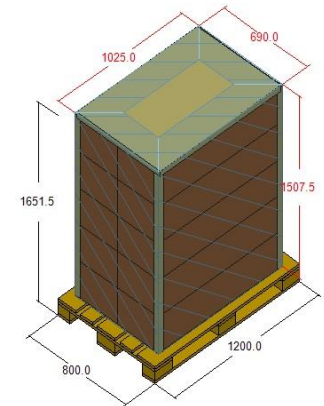Application of the graphic identity.

## Packaging

## Palletization

10 boxes per pallet
- Film
- Cap
- Corner piece

# 11. CONCLUSIONS

People who want fresh and healthy food

No time and no space

Innovative solutions

Sustainable

Future improvements

Research is basis for future ideas

# 12. VIDEO

THANK YOU
FOR YOUR ATTENTION!