# Hortivoltaics in Latvia

**Edgars Rubauskis**,
Dr.agr. head of unit of Agronomic Research and Variety Testing,
Institute of Horticulture (LatHort)

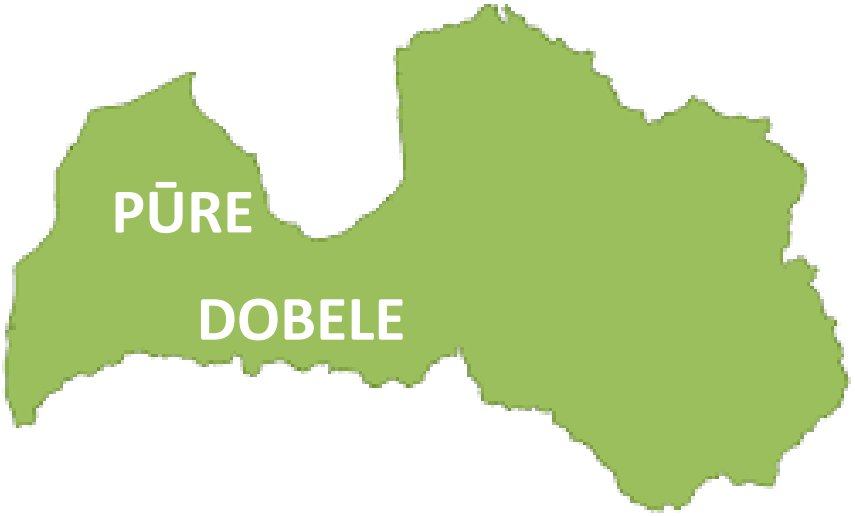
INSTITUTE OF HORTICULTURE

https://www.darzkopibasinstituts.lv/en

INSTITUTE OF HORTICULTURE

## Institute is the leading horticultural research institution in Latvia

Institute has **international cooperation with more than 30** universities and research institutes of **European countries and USA**.
Member of international horticultural organizations – **ISHS, ECPGR, EUCARPIA, EUFRIN, EUVRIN,** etc.




The Institute has **18 patents registered in Latvia,** including 6 developed in cooperation with other institutions. **54** fruit and lilac cultivars are registered in Latvia, including **8** registered also in Sweden, Lithuania and Belgium.

# Institute of Horticulture (LatHort) – basis for research and breeding of horticultural crops



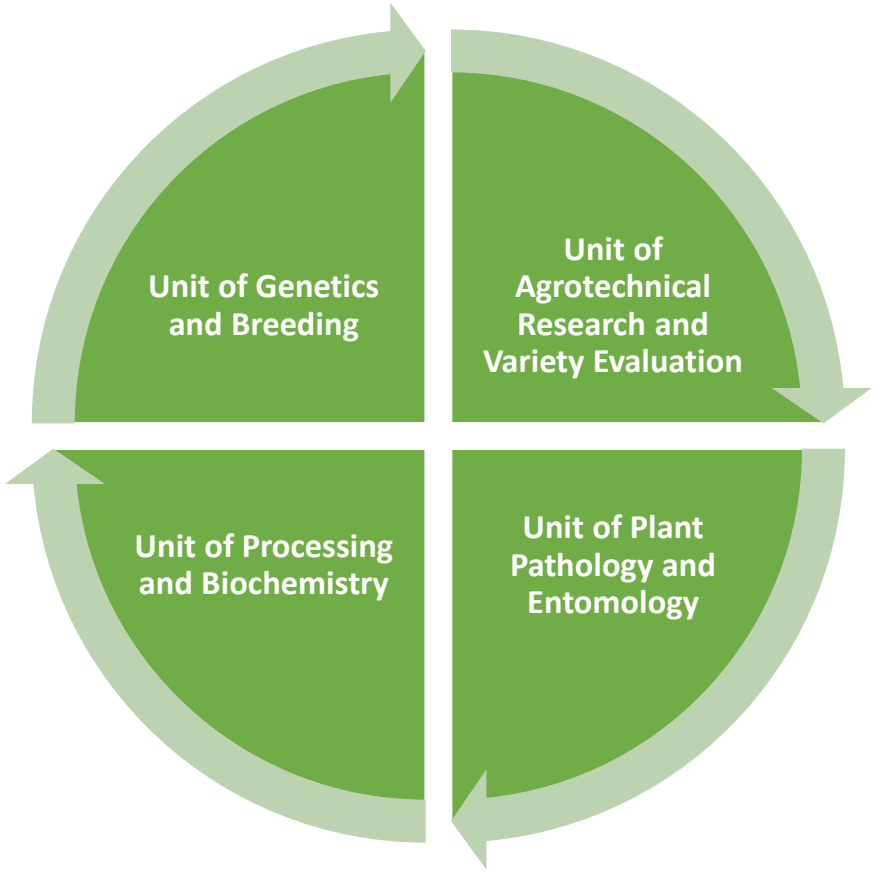

Dobele Research Center of the Latvian Institute of Horticulture (main campus)

Pūre Research Center of the Latvian Institute of Horticulture

INSTITUTE OF HORTICULTURE

# LatHort - Latvian Institute of Horticulture

**Research units:**




**Strategic priorities:**

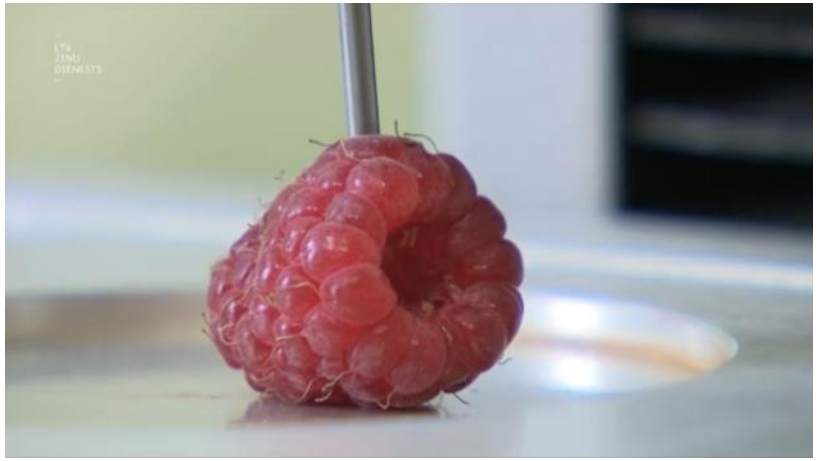
- Biological diversity
- Smart and environmentally friendly horticulture
- Plant and public health
- Development of horticulture industry and creation of knowledge for public welfare

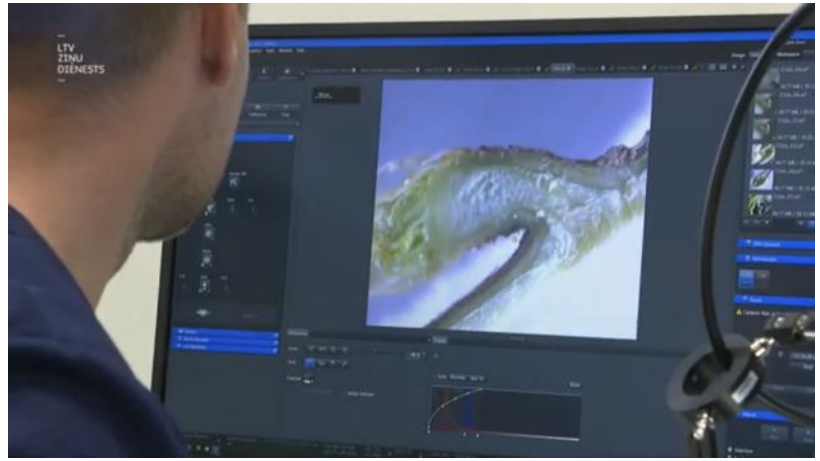
# Rapidly developing internationally excellent research environment and infrastructure consisting of 3 modules

Horticultural Technology Research and Breeding Base

Plant Biochemical Analysis and Processing Technology Laboratories

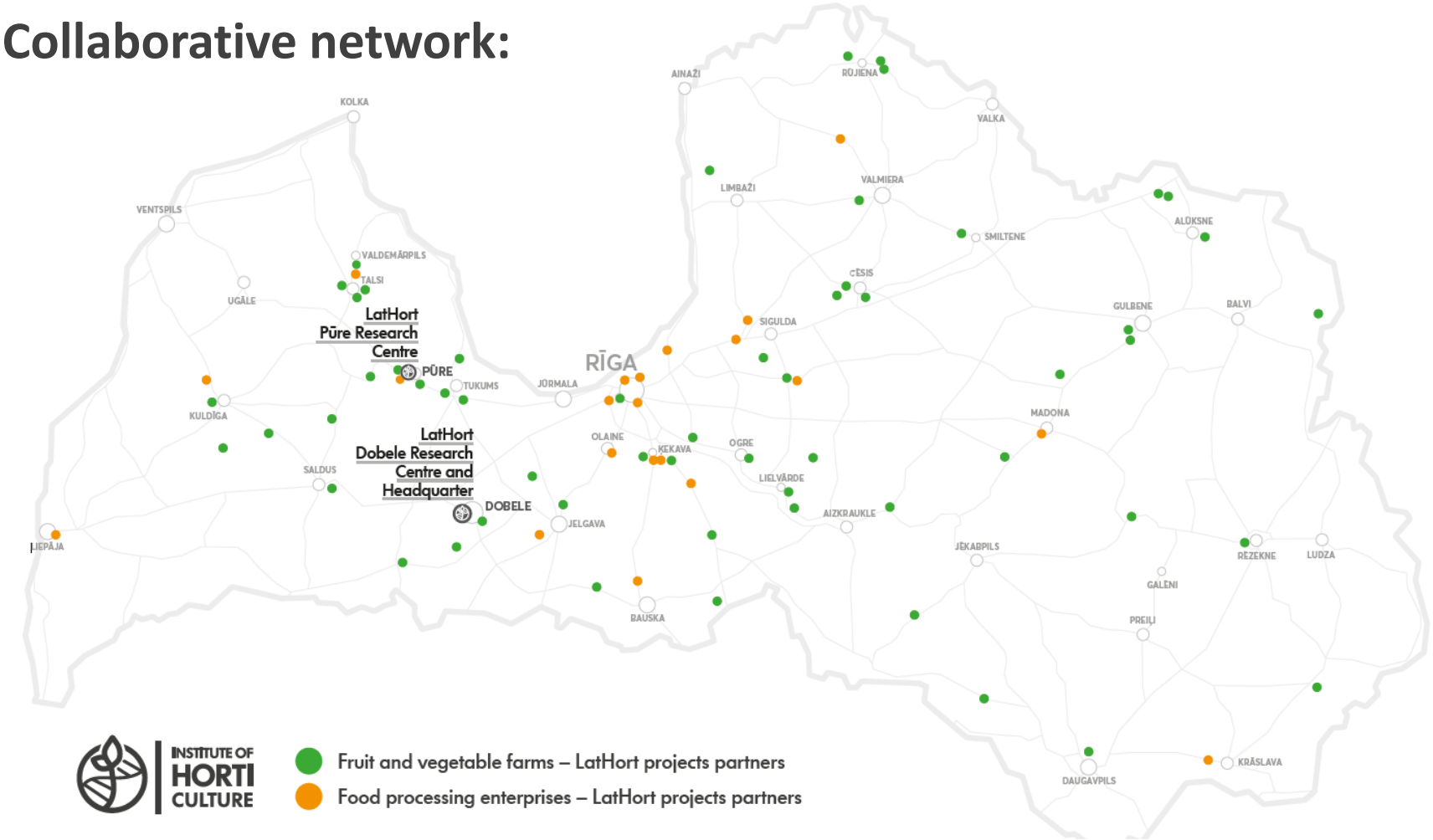
Plant Pathology, Entomology, and Genetics Research Laboratory and Greenhouse Complex

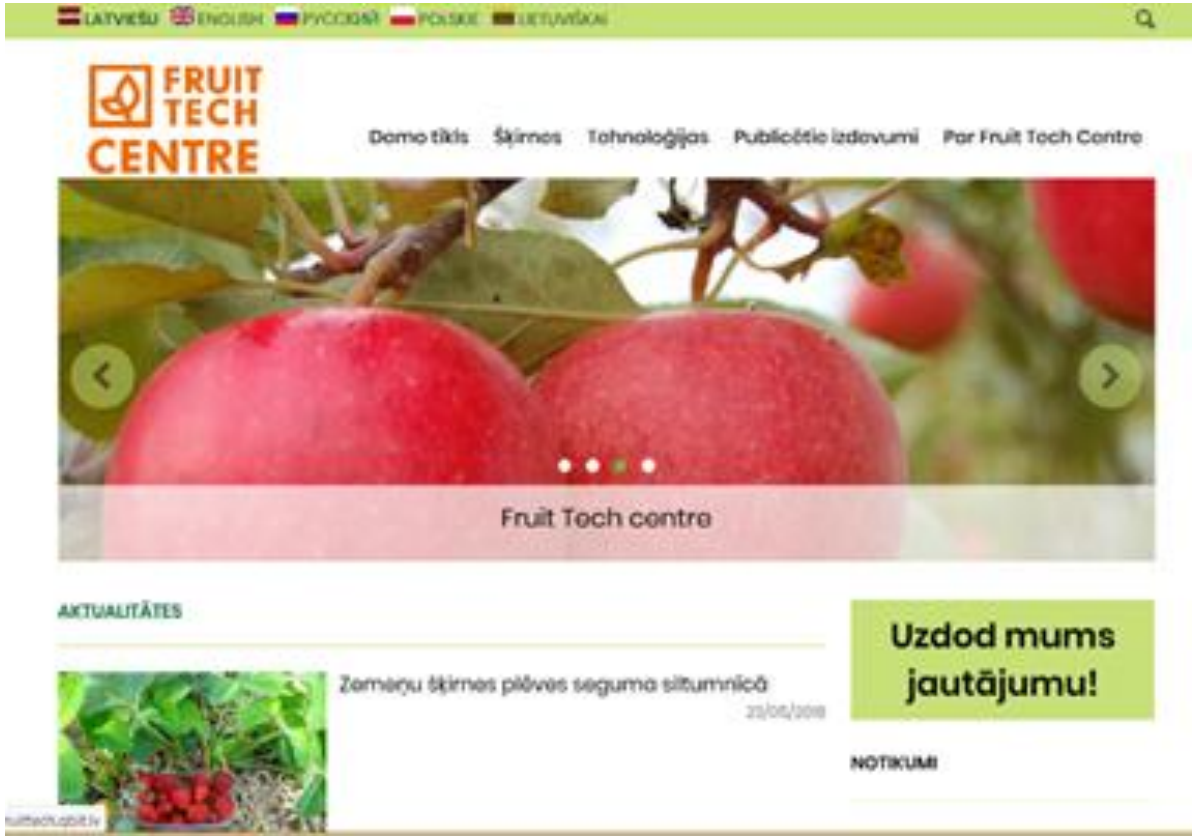


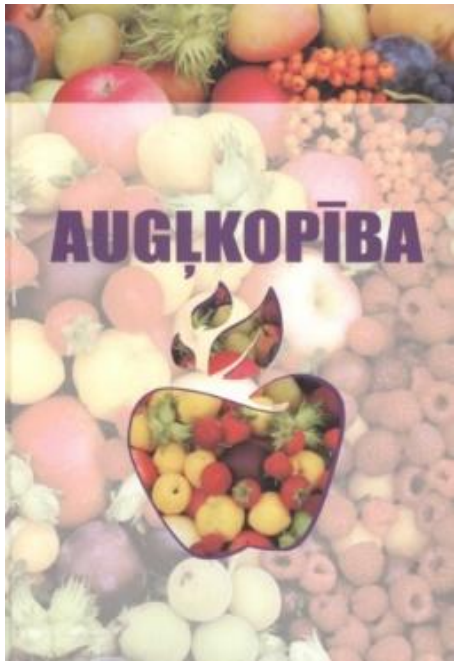
# Development of Horticulture Industry and Creation of Knowledge for Public Welfare

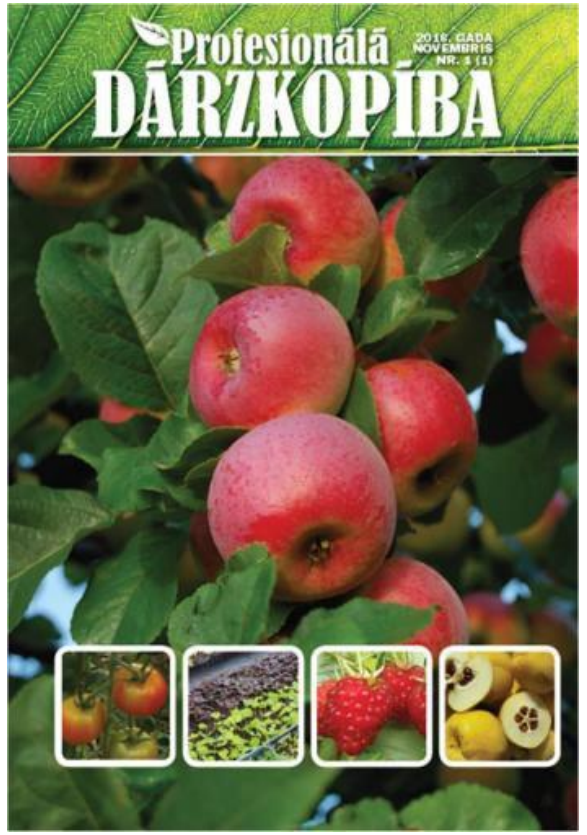
## Collaborative network:




# Science communication




www.fruittechcentre.eu
www.darzkopibasinstituts.lv

LatHort is involved in the implementation of two projects related to the Hortivoltaics:

- Integrating agrivoltaics practices in fruit orchards: a multidisciplinary study on soil carbon turnover, greenhouse gas fluxes and climate change mitigation potential (FruitPower);

FLPP
FUNDAMENTAL AND APPLIED RESEARCH PROJECTS

- Research and Innovation Based Solutions to Support the Peat Sector's Transition to a Climate Neutral Economy, Promoting the Sustainable Use of Latvia's Natural Resources (PeatTransform).

PEAT TRANSFORM

Līdzfinansē Eiropas Savienība

2027 Nacionālais attīstības plāns

# Integrating agrivoltaics practices in fruit orchards: a multidisciplinary study on soil carbon turnover, greenhouse gas fluxes and climate change mitigation potential

## FruitPower

**Key research questions:**

- How does the integration of agrivoltaic systems influence carbon turnover and GHG emissions in fruit orchards?
- What is the effect of solar panel-induced microclimatic changes on soil parameters, crop productivity, and biomass dynamics?
- To what extent can on-site solar energy production offset fossil fuel-based energy use in orchard management and processing operations?
- What are the economic trade-offs and benefits of adopting agrivoltaic systems in fruit-growing enterprises?
- How can the results support policy instruments such as the National Energy and Climate Plan (NECP) and voluntary carbon markets?

**Project Leading Partner**: Latvian State Forest Research Institute “Silava”

FLPP
FUNDAMENTAL AND APPLIED RESEARCH PROJECTS

https://www.darzkopibasinstituts.lv/en/projects/integrating-agrivoltaics-practices-in-fruit-orchards-a-multidisciplinary-study-on-soil

PEAT TRANSFORM

Līdzfinansē Eiropas Savienība

2027 Nacionālais attīstības plāns

Pētniecībā un inovācijās balstīti risinājumi kūdras nozares virzībai uz klimatneitrālu ekonomiku, veicinot Latvijas dabas resursu ilgtspējīgu izmantošanu

# Research and Innovation Based Solutions to Support the Peat Sector's Transition to a Climate Neutral Economy, Promoting the Sustainable Use of Latvia's Natural Resources

**Main objective:** The establishment of a research platform and a centre of excellence to strengthen research capacity and expertise, promote knowledge and technology transfer to the Latvian peat sector and related industries, as well as to foster international cooperation in research on the sustainable use of natural resources.
PeatTransform information centre: www.kudrajupetijumi.lv

**Partners**: Latvian State Forest Research Institute Silava, University of Latvia, Riga Technical University, Latvia University of Life Sciences and Technologies, Institute for Environmental Solutions, Institute of Horticulture (LatHort), and Institute of Agricultural Resources and Economics.

SILAVA

LATVIJAS UNIVERSITĀTE

Latvijas Biozinātņu un tehnoloģiju universitāte

1862 RĪGAS TEHNISKĀ UNIVERSITĀTE

Vides Risinājumu Institūts

DĀRZ KOPĪBAS INSTITŪTS

AREI

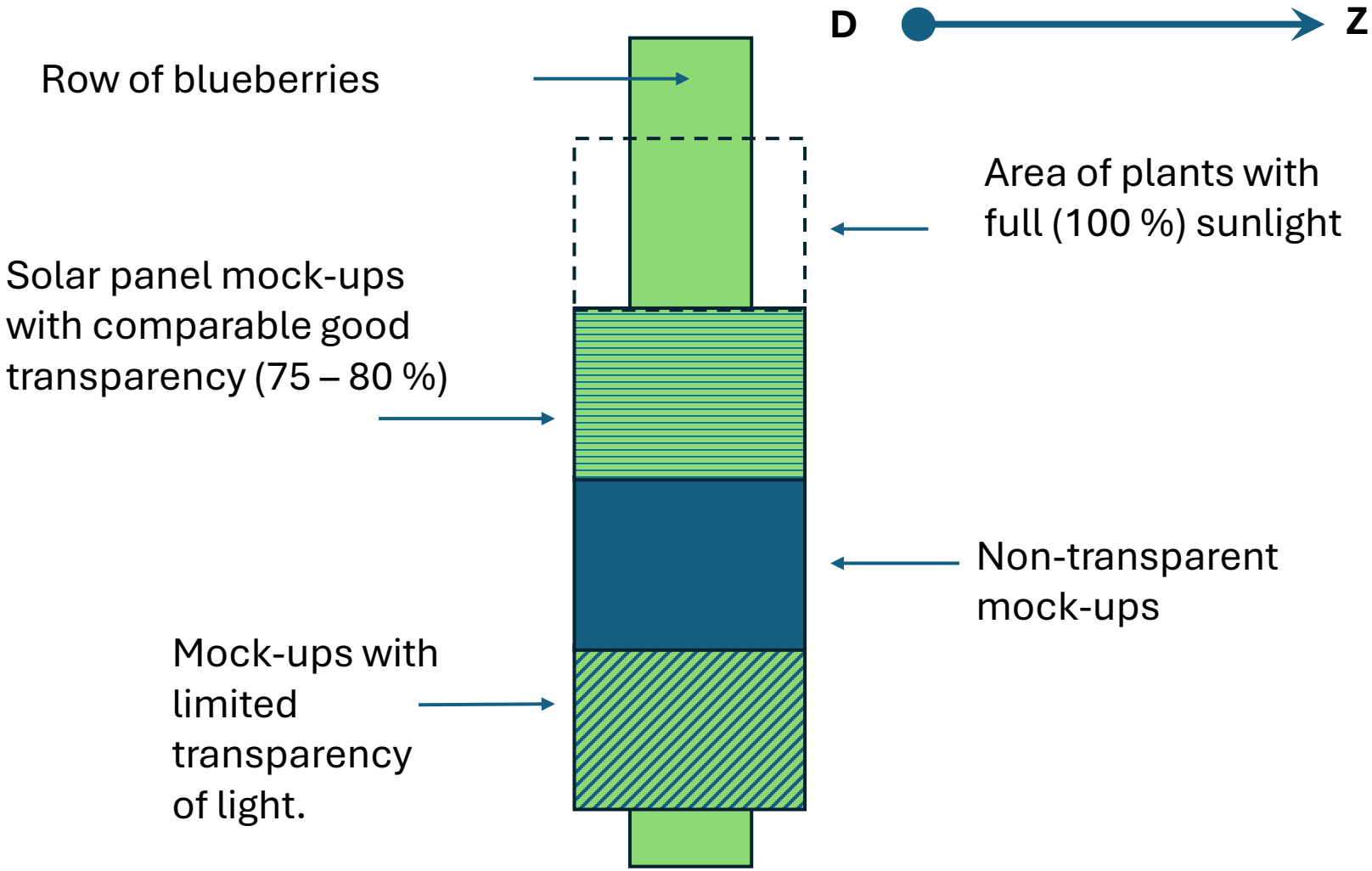
www.kudrajupetijumi.lv

Direct involvement of the Institute of Horticulture (LatHort) in activities related to:

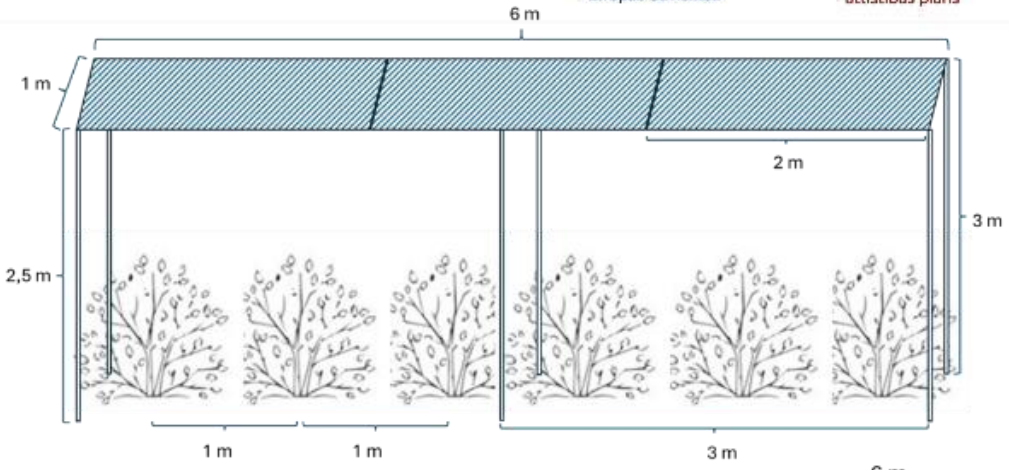
1) New and innovative solutions for the restoration activities of degraded bogs, historical peat extraction sites and adjacent affected territories, including **pilot projects and demonstration projects (Hortivoltaics solutions)**, development of methodologies for predicting and monitoring the effects of peat extraction field restoration projects, as well as development of audit mechanisms for instrumental measurements of GHG emissions;

2) New technologies and products to promote climate neutrality in the peat sector, aimed at reducing greenhouse gas (GHG) emissions and creating innovative and alternative solutions focused on carbon capture and promoting their wider use, including research into new types of peat and other substrates.

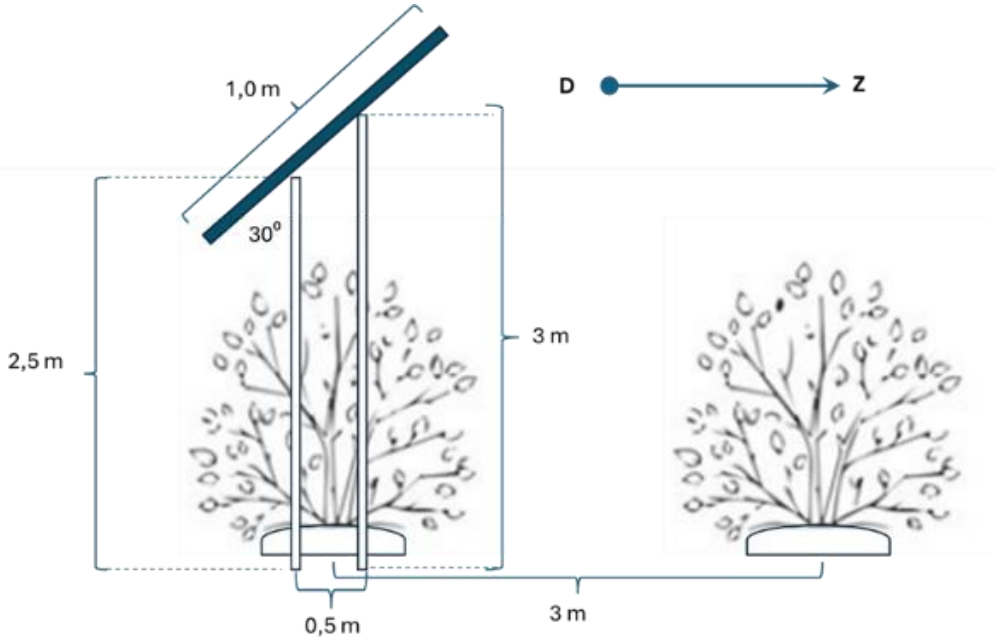
## Theoretical and ideal plan of installations



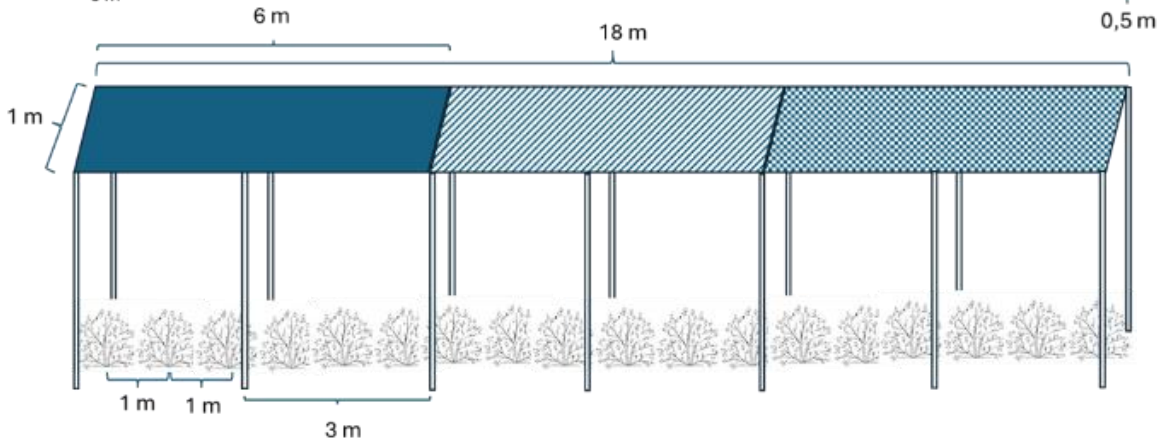
PEAT TRANSFORM
Līdzfinansē Eiropas Savienība
2027 Nacionālais attīstības plāns




Side view of a 6 m long solar panel mock-up section




View from the end of the blueberry rows




Single replicate 18 m (3 × 6 m) plot for structures only without control area

Schematic figures of the demonstration block for solar panel mock-ups with a panel plane gradient 30º to the south in a blueberry plantation

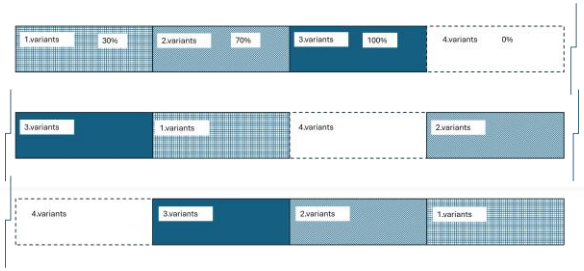
# Solar panel mock-ups above blueberries.

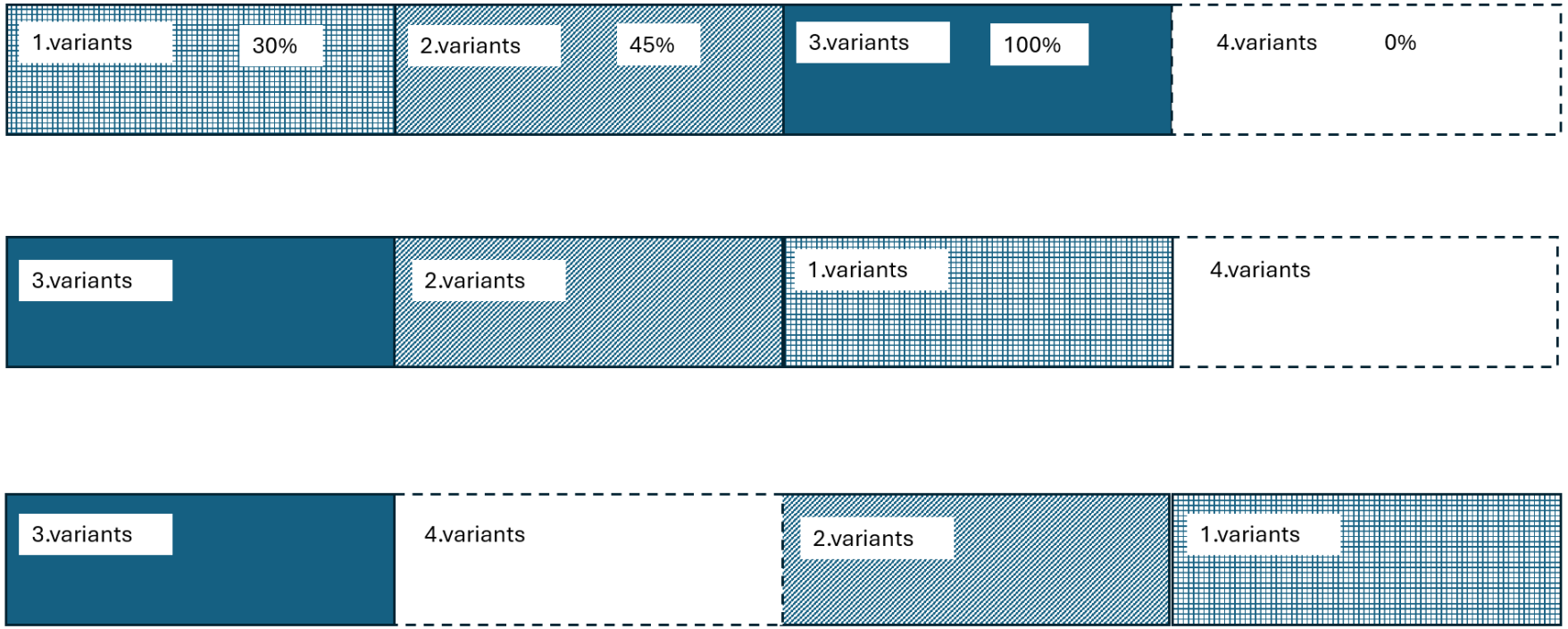
PEAT TRANSFORM

Līdzfinansē Eiropas Savienība

2027 Nacionālais attīstības plāns

Plan of demonstration trial




1.variant: film & shade net (30%);

2.variant: film & shade net (45%);

3.variant: (100%) with black film

4.variant: (0%) – no sunlight restriction

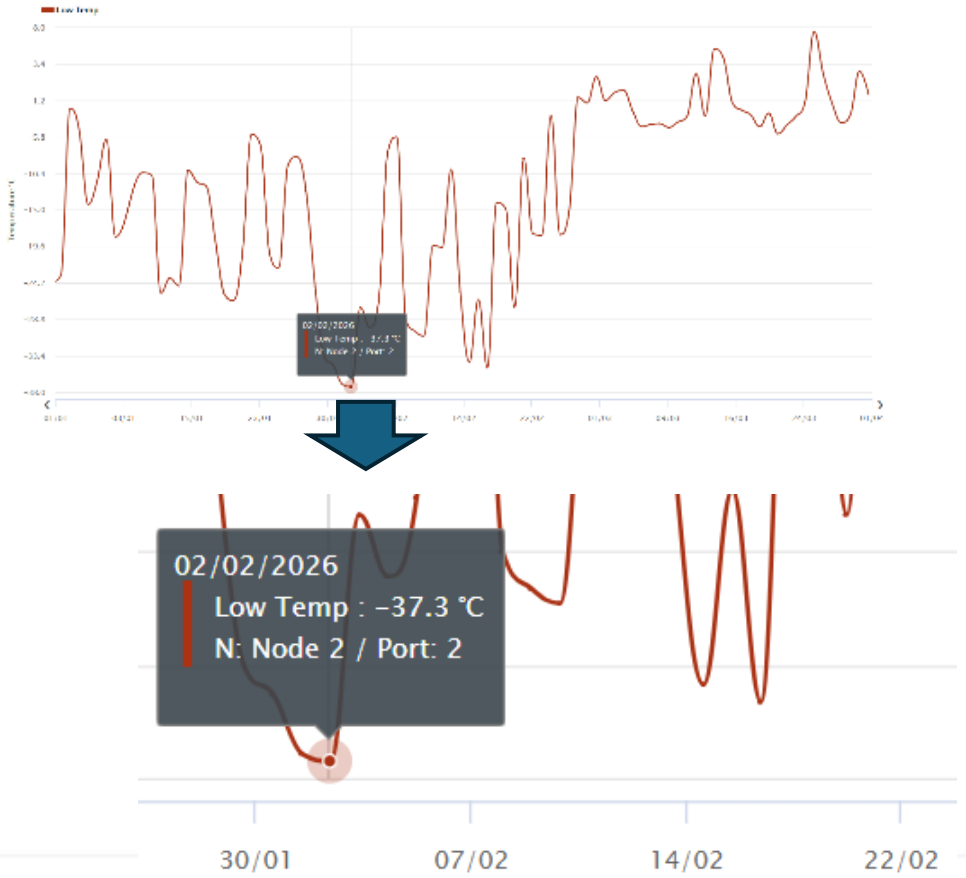
**Actual layout** of agrovoltage demonstrations - trial variants in the blueberry orchard of Ltd «Arosa-R» for the cultivar ‘Patriot’

PEAT TRANSFORM

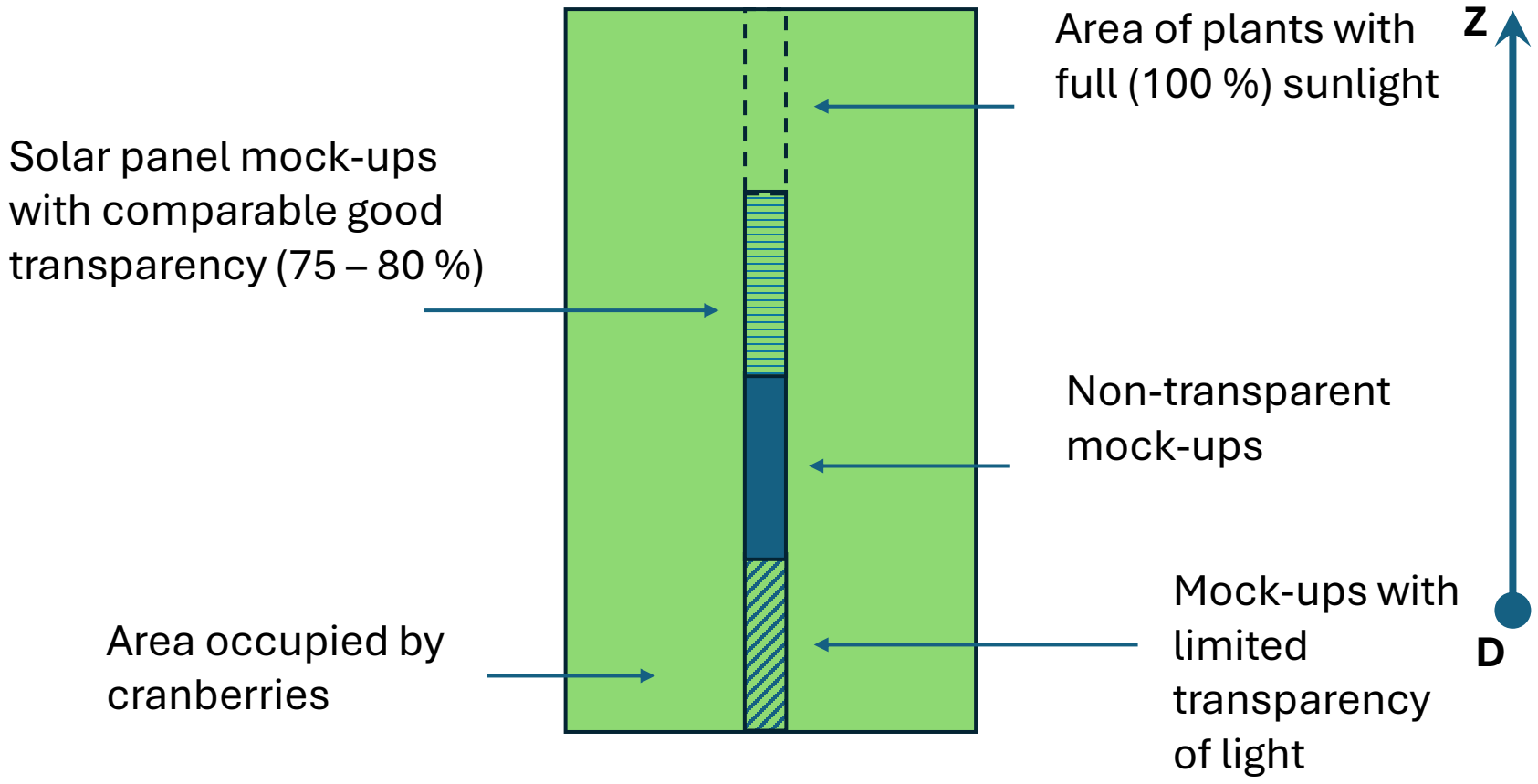
Līdzfinansē Eiropas Savienība

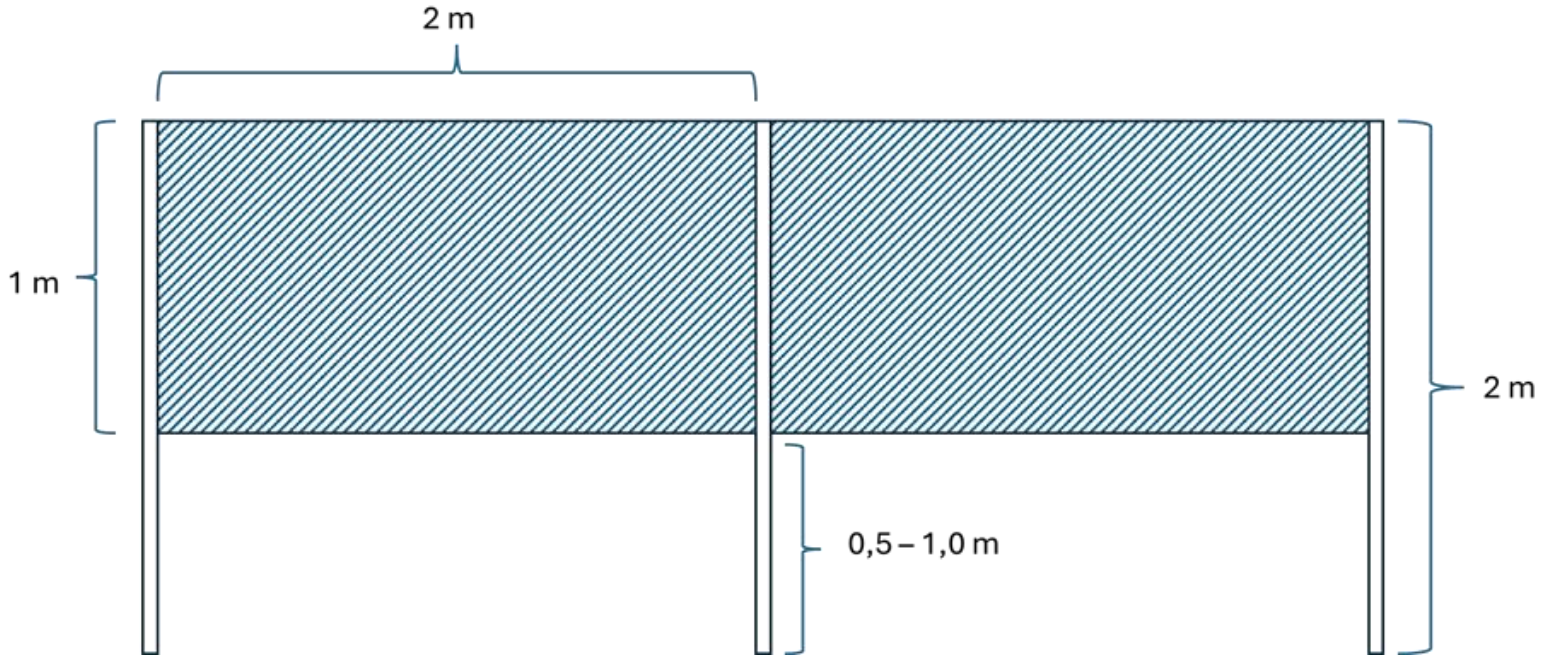
2027 Nacionālais attīstības plāns

# Blueberry status on June 3 after the 2025/2026 winter

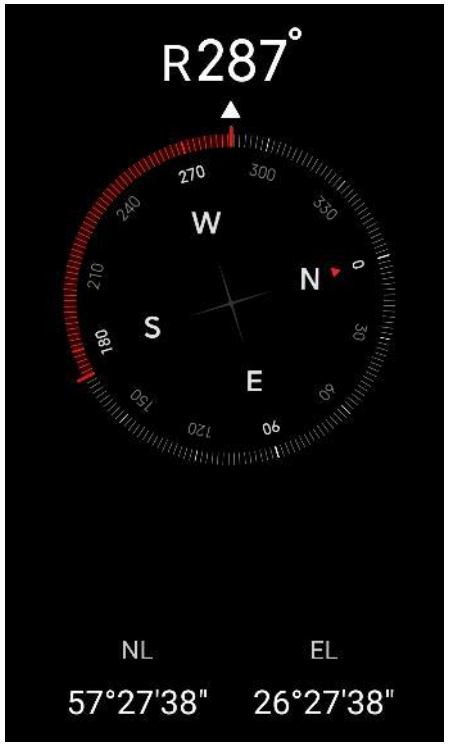


# Theoretical plan for cranberries






Schematic of a part of the Hortivoltaics (two solar panels) prototype demonstration unit for vertical placement of solar panel mock-ups in a cranberry plantation (front view)




The process of mock-up installation in the plantation of cranberries

Actual mock-up installation in the plantation of cranberries of cultivar ‘Bergman’ (bog «Kalna purvs», Ltd. «Very Berry» (https://veryberry.lv/ )

Some aspects of planning and installing solar panels in the recultivated bog area, and management of them and management of horticulture crops:

- Orchard (plantation) first, and then installations (complicated to establish a plantation and mechanization of the processes if actions are taken in reverse order);
- Installation causes damage to the plant cover (cranberries) during the installation;
- Shade of panels could influence the taste and biochemical properties of blueberries, reduce the yields;
- Solar panels could influence the moisture regime in the substrate, temperature, and evapotranspiration;
- Irrigation will be necessary to provide;
- Sunlight for cranberries is needed to induce the flower bud development

To be investigated during the PeatTransform project implementation

The impacts of hortivoltaics on the recultivated bog area (negative, neutral, and positive) are the subject of discussion and investigation.

# Thank you for your attention!

Midsummer is the time when cranberries are flowering