

NATURE-POSITIVE CROP PRODUCTION IN THE NETHERLANDS

Current world development trends can be characterized as unsustainable. Ecological problems at local, regional and global levels lead economies of the world to a non-equilibrium state. New models of economic activities should be implemented in order to avoid these negative trends. Such new models are parts of the sustainable development paradigm which can be regarded as a global goal in the 21 millennium.

Nowadays there are plenty of sustainable practices in crop production. They can be divided into some groups due to their basic principles:

- nature-positive biology based practices in agriculture and food production;
- decrease of non-renewable resources used in agriculture and food production;
- access to the indigenous knowledge of local farmers;
- different skilled people collaboration.

This article studies the sustainable practice of crop production in Netherlands based on the first and second principles as far as these practices are nature-positive and biology based they also decrease the amount of non-renewable resources used in agriculture and food production.

The technology of led-lighted fields is used in Netherlands in order to increase crop production yield. So called «GROW Project» was inspired by photobiology and light science technologies, which indicate that certain combinations of blue, red and ultraviolet (UV) light can enhance plant growth and may reduce the use of pesticides by up to 50%. The idea of building this conception of sustainable practice belongs to Dutch artist and innovator Daan Roosegaard [2].

Field of led-lighted plants has double effect. First it can be regarded as an art-object due to its esthetical appearance. Second this is nature-positive food production field. A 20,000-square-metre artwork which colored lights appear to dance over a field at night also encourages crop growth and is highlighting the importance of innovation in creating sustainable agriculture.

Following benefits of this new technology are:

- 20,000-square-metre light installation in the Netherlands is contributing to sustainable agriculture;
- vertically placed LEDs in a field of leek are said to increase crop growth;
- UV light reduces the use of pesticides by up to 50%, according to Daan Roosegaarde, the designer behind the project;
- sustainable agriculture is key to ensuring food security for everyone.

«GROW Project» was developed by partners Wageningen University and Rabobank, is situated at Lelystad in the Netherlands. The country is one of the world's largest agricultural producers, exporting €65 billion (\$78.8 billion) of fruit, flowers, vegetables, meat and dairy products each year.

Specialized LEDs are commonly used to grow crops in greenhouses and are increasingly seen in ‘vertical farms’ in cities. However, scientists believe there may also be potential for using LEDs in more traditional and rural activities.

The solar-powered LEDs augment the light plants normally receive during the day. Roosegaarde’s project is also investigating whether brief exposure to some wavelengths of UV light could reduce the need for pesticides. Pesticides are widely used in agriculture that to nature-negative effects such as in violation of natural microbiocenoses of soil and water.

«A specific ultraviolet light activates the defence system of plants» Roosegaarde told Dezeen. «And what is interesting is that it works on all crops. So we can reduce the use of pesticides». Roosegaarde’s eventual goal is to take the artwork on tour to 40 different countries, with each featuring a local or national crop and tailored light recipe.

Sustainable food and agriculture is the key to meeting all four pillars of food security – availability, access, utilization and stability, according to the Food and Agricultural Organization of the United Nations (FAO).

The FAO has highlighted 20 actions countries and stakeholders need to take immediately to combat global food insecurity, including connecting smallholders to markets, protecting water supplies, empowering people and fighting inequality [1].

In the end, we are to say, what «GROW Project» Dutch artist and innovator Daan Roosegaard is an example of technology and agriculture diffusion. Using «GROW Project» let receive a huge amount crop yield’s agricultural products almost without using pesticides. Netherland’s experience of sustainable nature-positive agriculture and food production results in the decrease of non-renewable resources, reduces pesticide impact on microbiocenoses of soil and water and corresponds with the global goal of sustainable development.

REFERENCES:

1. This illuminated field isn't just pretty – it’s helping to grow crops [Electronic resource]. – Mode of access: <https://www.weforum.org/agenda/2021/01/light-led-crops-pesticides-sustainable-agriculture>. – Date of access: 24.01.2021.
2. Daan Roosegaarde [Electronic resource]. – Mode of access: https://en.wikipedia.org/wiki/Daan_Roosegaarde. – Date of access: 24.01.2021.

Alexandra Kudelka, Alina Panchik
Science tutor *M. Zotova*
BSEU (Minsk)

THE FUTURE WITH ONLINE SHOPPING

In 2021 no modern person can imagine a day without a gadget that has Internet access. The online industry is developing at a tremendous speed, having a great impact on all areas of our lives, from paying for utilities to making purchases on various web