



**CLIMATE RESPONSIBLE  
AGRICULTURE  
FOR LATVIA**

**LAYMAN'S REPORT**

“CLIMATE RESPONSIBLE AGRICULTURE FOR LATVIA”  
NR. LIFE16 CCM/LV/000083



Vides  
Risinājumu  
Institūts



**Project title:** LIFE CRAFT: Climate Responsible Agriculture for Latvia

**Project number:** LIFE16 CCM/LV/000083

**Project duration:** April 1, 2018 - April 30, 2024

**Project partners:** Latvian Fund for Nature / [www.ldf.lv](http://www.ldf.lv)  
Institute for Environmental Solutions / [www.vri.lv](http://www.vri.lv)  
Latvian Rural Advisory and Training Center / [www.llkc.lv](http://www.llkc.lv)  
Czech Center for Science and Society / [www.ccss.cz](http://www.ccss.cz)

**Project budget:** **1 987 764 EUR**, Incl. LIFE Programme funding: **1 177 696 EUR**; Administration of the Latvian Environmental Protection Fund (administered by the State Regional Development Agency): **463 770 EUR**; Society Integration Foundation: **63 106 EUR**; Municipal Agency “Cesis Culture and Tourism Center” **3000 EUR**; Project Partners’ Funds: **280 192 EUR**.

THE PROJECT OVERVIEW HAS BEEN PREPARED WITH THE FINANCIAL SUPPORT OF THE LIFE PROGRAMME OF THE EUROPEAN COMMISSION AND THE STATE REGIONAL DEVELOPMENT AGENCY WITHIN THE PROJECT “LIFE CRAFT: CLIMATE RESPONSIBLE AGRICULTURE IN LATVIA” LIFE16 CCM/LV/000083. THE INFORMATION CONTAINED THEREIN IS THE RESPONSIBILITY OF THE PROJECT PARTNERS AND DOES NOT REFLECT THE OPINION OF EITHER THE EUROPEAN COMMISSION OR THE EXECUTIVE AGENCY FOR SMALL AND MEDIUM-SIZED ENTERPRISES OF THE EUROPEAN COMMISSION.

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**CLIMATE CHANGE**  
IS A CRITICAL ISSUE FACING  
THE WORLD TODAY, AND STOPPING IT  
**REQUIRES CHANGES IN ALL AREAS**  
**OF HUMAN ACTIVITY.**

IN LATVIA, ONE OF THE MAIN SOURCES  
OF GREENHOUSE GASES (GHG) IS  
AGRICULTURE, WHICH PRODUCES MORE THAN  
20% OF ALL NATIONAL GHG EMISSIONS.

THE GOAL OF THE **CRAFT**  
LIFE PROJECT IS

TO TEST AND PRACTICALLY DEMONSTRATE AGRICULTURAL PRACTICES  
THAT REDUCE GHG EMISSIONS IN LATVIA, WHICH AT THE SAME TIME  
ALLOW FARMERS TO MAINTAIN ECONOMIC STABILITY AND PROMOTE  
THE COMPETITIVENESS OF CLIMATE-RESPONSIBLE AGRICULTURE IN THE MARKET.

**THE PROJECT TESTED THREE METHODS THAT HAVE NOT BEEN USED IN LATVIA SO FAR,  
WHICH ALLOWS THE REDUCTION OF CO<sub>2</sub> AND OTHER GHG EMISSIONS:**

**1**

**NO-TILL  
FARMING**

**2**

**BIOCHAR INCORPORATION  
INTO THE SOIL**

**3**

**CONTROLLED  
DRAINAGE**



## NO-TILL FARMING

As part of the LIFE CRAFT project, the Latvian Rural Advisory and Training Center in cooperation with eight farms in Latvia tested no-till farming.

When working with this method, the only tillage operation is the cutting of the seed tube into the soil. In this way, the soil remains virtually untouched, and plant remains remain on it, which in turn protects the soil from the harmful effects of the weather, limits the development of annual weeds, and also serves as a food base for various organisms living in the soil. As a result, the microbiological activity of the soil, its structure, water and air circulation, fertility, the content of organic matter increases, as well as the resistance of plants to diseases. When working with the no-till farming method, the amount of CO<sub>2</sub> released from the soil decreases and the soil, through the plants and microorganisms growing in it, successfully attracts carbon from the air in the long term, thus constantly increasing the content of organic matter in the soil.

### THE RESULTS OBTAINED FROM THE PROJECT SHOW THAT IN THE CASE OF NO-TILL FARMING:

- 1 2,689 kg less C is emitted from each hectare per year than in the case of traditional technology;
- 2 seeding is 157 EUR/ha cheaper than sowing conventionally;
- 3 the amount of harvest does not significantly differ from that obtained from conventional technology;
- 4 soil compaction does not occur in the long term and the content of the soil's organic matter improves;
- 5 the soil is revived, and its microbiological activity improves.





## INCORPORATING BIOCHAR INTO THE SOIL

The Latvian Fund for Nature, together with three organic farms, assessed how CO<sub>2</sub> emissions are reduced by applying biochar to the soil and how this approach affects productivity. Biochar incorporation is considered as promising technology for carbon sequestration and reduction of GHG emissions in agriculture, while improving soil structure, texture, porosity, soil particle distribution and soil density.

In the context of climate change mitigation and adaptation, biochar has high potential as a soil carbon sequestration tool. However, its application, based only on market principles, is hampered by high costs. The implementation of such an instrument would require additional support mechanisms.

In small farms where biochar production is possible using their own labor and biomass, the use of biochar has a greater potential to become economically justified. Especially if it is used together with other environmentally friendly practices (permaculture, agroforestry, agroecological farming or similar).

**THE MONITORING CARRIED OUT WITHIN THE FRAMEWORK OF THE PROJECT SHOWED THAT THE APPLICATION OF BIOCHAR HAD A POSITIVE EFFECT ON SOIL PROPERTIES SUCH AS ORGANIC MATTER CONTENT, TOTAL CARBON CONTENT IN THE SOIL, SOIL PH AND OTHER INDICATORS. HOWEVER, WE COULD ONLY DETECT A POSITIVE EFFECT ON YIELD GROWTH IN SOME CASES, SO SUCH RESEARCH SHOULD BE CONTINUED IN THE FUTURE.**





## CONTROLLED DRAINAGE

As part of the project, the Institute for Environmental Solutions tested the suitability of controlled drainage in fields as one of the potential climate change mitigation practices in agriculture in the Smiltene and Meņģele parishes, in two pilot territories.

Controlled drainage differs from a traditional or conventional drainage system by the structure built into the melioration system, which is located at the control points of the drains or at the outlets of the drain collectors. This structure is an adjustable dam and with its help the groundwater level in the reclaimed areas can be controlled.

**THE MONITORING DATA OBTAINED IN THE LIFE CRAFT PROJECT CONFIRMS THAT CONTROLLED DRAINAGE HELPS RETAIN WATER IN THE SOIL. THEREFORE, THIS METHOD CAN BE RECOMMENDED TO REDUCE THE RISK OF DROUGHT AND THE REMOVAL OF NUTRIENTS. THIS CAN BRING BENEFITS TO FARMERS FOR THE APPLICATION OF LOWER DOSES OF FERTILIZERS AND MORE STABLE HARVESTS, BUT FOR THE SURROUNDING ENVIRONMENT, ESPECIALLY WATER ECOSYSTEMS, REDUCE THE UNDESIRABLE EFFECTS OF EUTROPHICATION.**

**GHG MONITORING DATA DID NOT PROVIDE UNEQUIVOCAL RESULTS ABOUT THE EFFECT OF CONTROLLED DRAINAGE IN REDUCING GHG EMISSIONS, THIS REQUIRES LONG-TERM AND WIDER STUDIES. HOWEVER, THE OBTAINED DATA SHOW A TENDENCY TO INCREASE THE CAPTURE OF N<sub>2</sub>O EMISSIONS IN THE MINERAL SOILS OF FIELDS WITH CONTROLLED DRAINAGE.**

**THE PROJECT'S PARTNER, THE CZECH CENTER FOR SCIENCE AND SOCIETY, WAS INVOLVED IN THE MONITORING OF THE CONTROLLED DRAINAGE. THE PROJECT IMPLEMENTED THE ADAPTATION OF REMOTE SENSING MONITORING TOOLS FOR THE ASSESSMENT OF METEOROLOGICAL DATA AND GROUNDWATER LEVEL CHANGES.**



# AGRICULTURAL



## PRACTICES TO MITIGATE CLIMATE CHANGE

GUIDE FOR FARMERS

As part of the project, a **practical guide** has been developed on the various methods that help reduce the impact of agriculture on the climate. The manual examines methods related to soil that contribute to increasing soil carbon stocks and are valid specifically for Latvia and the Baltic Sea region.







## CONTEMPORARY ART EXHIBITION “FIELD STUDIES”

Institute for Environmental Solutions involved 8 artists and their teams, which created Contemporary Art Exhibition “Field Studies”, which was on display at the Cēsis Science and Art Centre “Brūzis” for two summer months in 2021. The exhibition, together with the media campaign dedicated to it, exceeded the expected number of attendees – more than 5,000 interested parties attended, for whom the exhibition and the campaign dedicated to it, creatively heralded the role of agriculture in global climate change.