GROWING FUTURE

ENGAGING YOUTH IN AGRICULTURE THROUGH STEM

TOOLBOX

A practical guide for youth workers on how to implement projects and workshops that aim to promote agriculture to children and youth

POZITIVA SAMOBOR
Udruga za održivi razvoj

AGENCIJA ZA MOBILNOST I PROGRAME EU

Co-funded by the Erasmus+ Programme of the European Union

ABOUT

GREEN ENTREPRENEURS: YOUTH ECO-INNOVATORS INITIATIVE

This toolbox is a material result of a project "Green entrepreneurs: Youth Eco-innovators innitiative" funded by the Erasmus+ program within accreditation in the field of youth carried by Association for sustainable development Pozitiva Samobor.

Main aim of this project is to empower young people to become environmentally conscious and socially responsible entrepreneurs. The project aims to provide participants with the necessary knowledge, skills, and tools to create sustainable and innovative businesses that contribute to solving environmental challenges.

WHERE TRADITION MEETS INNOVATION

Training course **"Where tradition meets innovation"** was implemented within the above noted Erasmus+ project in Orebić, Croatia from 09. until 15.05.2023.

The training gathered 16 youth workers from North Macedonia, Croatia, Greece, Bosnia and Herzegovina and Italy with the aim to explore the use of STEM tools in youth work related to topics of ecology and agriculture. Participants designed their own agro-stem lessons for young people, which are integrated in this toolbox.

This project is co-funded by the European Commission within Erasmus+ program of the European Union.

Who is it for?

This toolbox is designed to be used by **youth workers and educators** for purposes of **promoting agriculture to children and young people through STEM.** Project ideas and workshops integrated in this publication are designed to be applicable both in national and international context and are adapted to **children and young people** as the main target groups.

Inspiring children and youth to become passionate about agriculture.

By combining their knowledge of agriculture and STEM with effective tools, methods and engagement strategies, youth workers can inspire young people to become passionate about agriculture and help shape the future of our planet.

Involving youth in agriculture is essential for the **sustainability and prosperity** of the sector. The statistics related to youth in agriculture in the EU indicate the urgency of taking action to attract and retain young people in the field.

STEM education can be an effective tool for achieving this goal by providing young people with the **knowledge, skills, and experience** needed to succeed in the sector.

Introduction

Agriculture is a **vital sector** of the European Union's economy, contributing significantly to **employment and growth**. However, the average age of farmers in Europe is **increasing**, and there is a need to **involve more young people in agriculture.**

The involvement of youth in agriculture is crucial for the **sustainability** of the sector. Young people bring **fresh ideas, innovation, and energy** to the field. They also ensure the **continuity** of farming practices and contribute to **food security.**

However, many **challenges** hinder their participation, including:

- lack of interest
- inadequate education and training
- limited access to resources.

Youth in agriculture in the EU

According to Eurostat, the percentage of young farmers (under 35 years old) in the EU has been steadily **decreasing** over the past decade. In 2010, they represented 12% of all farmers, while in 2020, they accounted for only 9%. This trend is **alarming** as it indicates **a lack of interest** among young people in agriculture.

Moreover, the number of students enrolled in agricultural studies has been **declining**, and the proportion of women in agriculture remains low. These statistics highlight the need for **urgent action to attract more young people, especially women, to the sector.**

Involving youth in agriculture

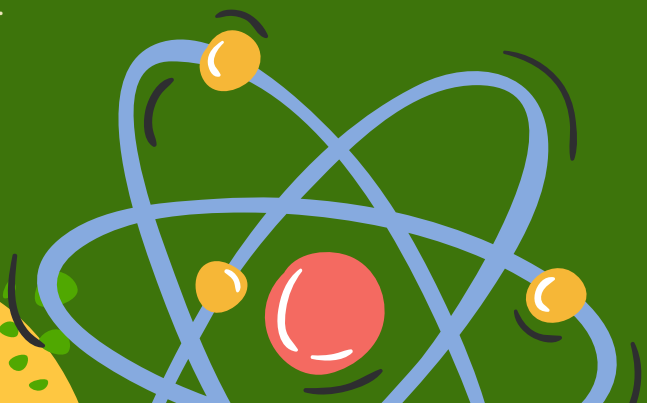
Involving youth in agriculture has numerous benefits, both for the individuals and the sector as a whole. For young people, it provides opportunities for **personal and professional development, entrepreneurship, and social engagement**. It also offers a chance to contribute to **sustainable development** and address global challenges such as **climate change and food security.**

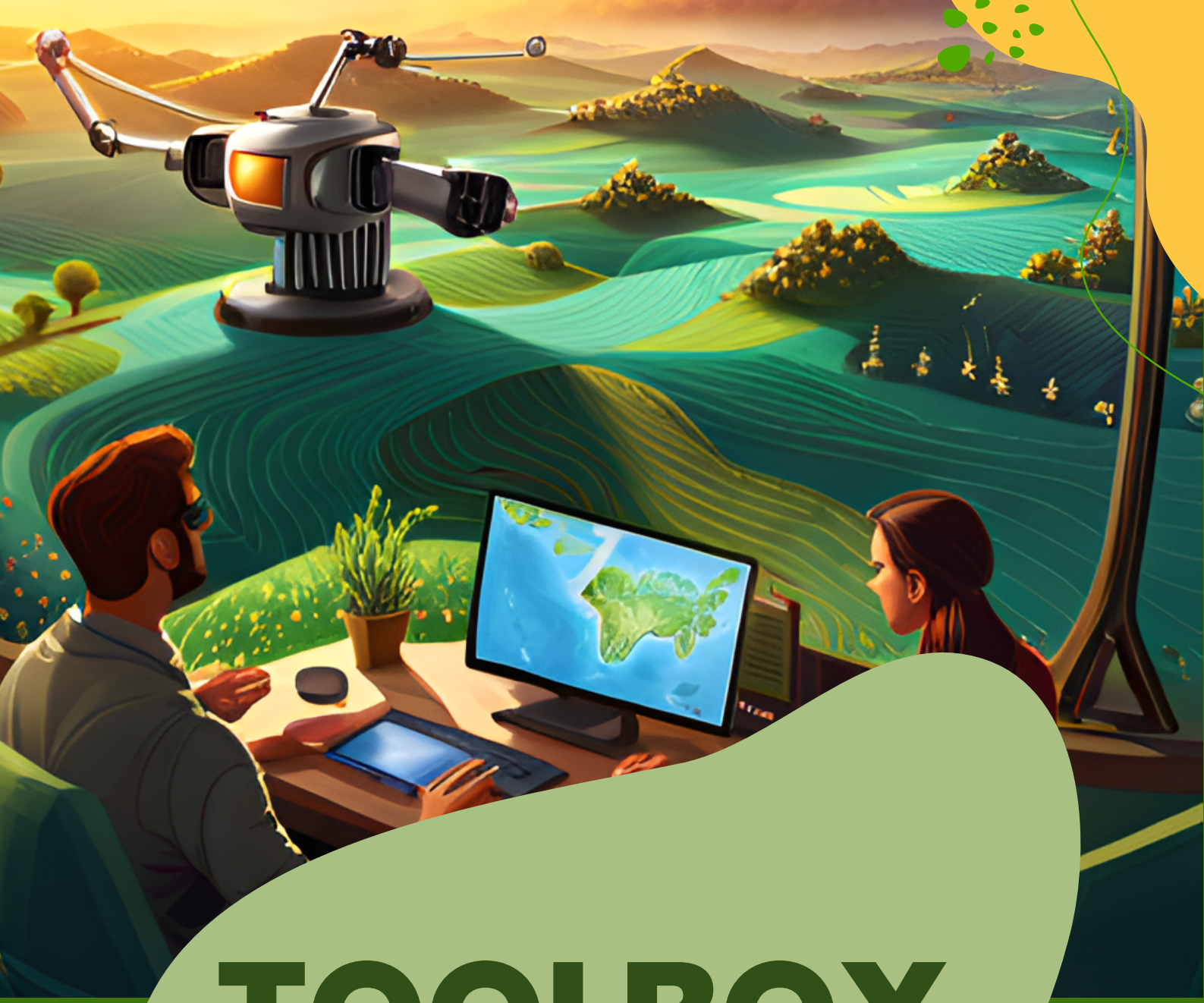
For the agriculture sector, involving youth ensures its **continuity**, promotes **innovation and modernization**, and enhances **competitiveness**. Additionally, it contributes to **rural development** and the **preservation of cultural heritage.**

THE POWER OF STEM EDUCATION

STEM education (science, technology, engineering, and mathematics) can play a crucial role in **attracting** and **retaining** young people in agriculture. It offers a **multidisciplinary approach** that combines **theoretical knowledge** with **practical skills** and **hands-on experience**. This approach can help young people understand the complexity of the sector and its potential for innovation and sustainability.

STEM education can also provide opportunities for **digitalization** and **automation**, which are essential for the modernization of agriculture. It can help young people develop **critical thinking, problem-solving, and decision-making skills**, which are necessary for **entrepreneurship** and **leadership**. Furthermore, it can promote **collaboration and networking** among young people and stakeholders in the sector.





TOOLBOX

FOR YOUTH WORKERS AND EDUCATORS

1. LIVE LOCALLY - THINK GLOBALLY

Live locally - think globally is a national level long term youth exchange for young people from urban and rural areas.

Main **aim** and **objectives** of the project are:

- Improving agriculture through STEM
- Promoting rural life
- Including young people in activity and decision making
- Distribution of population of the city to the rural area
- The kids from rural area come in touch with STEM and new technology and to feel more integrated.
- The kids that come from urban areas understanding the many benefits of nature as well as rural importance for every day life.
- Reducing the prejudice between both groups of kids (rural-urban and vice versa)
- Making agriculture attractive, by proving to the young that agriculture is not just physical labor that is also scientific and healthy, for the mind and the body.

LEARNING OUTCOMES FOR PARTICIPANTS

- How to use STEM and new technology in agriculture
- Problems can be resolved more creatively
- Important social skills (team-working, stress management, problem solving, proactive thinking)
- General knowledge about agriculture (plants, animals...)
- Become more adaptive and get out of the comfort zone

TARGET GROUP

Middle school students from 13-15 years old (urban and rural areas)

LIVE LOCALLY -
THINK GLOBALLY

Project flow

1st - 3rd month
Preparation and communication with 2 schools, one from the rural and one from the urban area. Making a website where we give the schools opportunities to register their students for the exchange.ž

4th month
Making the right student matches (from the right area).
Organizing 3 online workshops for introduction of STEM to students, where they would get to know each other, and start to create their personal projects.

5th month
Sending the kids from the urban area to live together with their rural area peers, where they will learn about traditional agriculture from the people around them.

6th month
Taking both of the kids back in the urban area, where they will get to develop their problem solving ideas with a mentor/educator that can guide them further.

7th month
Find solution in order to apply new technologies in agriculture.

8th - 11th month
Testing and improving their solutions in the rural area, alongside the community and the educator.

12th month
Evaluation of the scientific work.

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: Introduction to STEAMand Entepreneurship in Agriculture

Duration: 1hour(Presentation of the project to school)/4hours (1 school day)/ 1 week to develop the project/ 2hours(presentation)

Size of the group: 60 kids/per school(for the Presentation)/20-40 total

Materials needed: Projector/Laptop/Flyers/website/stickers(badges)

Methodology used: STEAM methods/project based learning/non-formal education

Competences that are going to be developed: Team work, Problem solving, Creativity , Mathematical/engineering thinking, Management, Coordination, Public speaking, Presentation skills

Detailed description of the activity, with instructions for the trainers/facilitators:

1.1hour(Presentation of the project to school).
General presentation of the project to the students. It will be split in 4 parts. The first part will be agriculture, the second part will be STEAM in agriculture, third part will be enterprenuership presentation and the last will be general information about the exchange project. The students that are interested, they have one week to assign to the project.
2.4hours (1 school day) Intoduction to the Project.
The students that chose to participate will meet altogether in a classroom where they will follow a workshop that goes deeper into the topics of the Steam in Agriculture and Entrepreneurship in Agriculture. In the end of the workshop they have to choose a project to work for the next week and find a solution.
3. 1 week to develop the project
4. 2hours(presentation)

Questions for reflection:

1.Did you find this useful?
2.Do you think it will help you for the upcoming projects?
3.Are you satisfied with the activities and facilitators?
4.What you would do diferently?

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: Urban goes to Rural

Duration: 2 weeks

Size of the group: 2 kids in every place(20-30 total)

Materials needed: Laptop/stickers(badges)/smartphone-camera/working clothes

Methodology used: STEAM methods/project based learning/non-formal education

Competences that are going to be developed: Team work, Problem solving, Creativity , Mathematical/engineering thinking, Management, Coordination, Public speaking, Presentation skills, Physical work in fields/mountains etc., Learning about new way of living, Getting out from the comfort zone

Detailed description of the activity, with instructions for the trainers/facilitators:

First week (visiting more business that works with agriculture, learning about the process start to finish)
Second week (implementing the accumulated knowledge in the fields or montains, depending on the business and what they produce).

Questions for reflection:

1. Did you find this useful?
2. Do you think it will help you for the upcoming projects?
3. Are you satisfied with the activities and facilitators?
4. What you would do diferently?

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: Rural goes to urban

Duration: 2 weeks

Size of the group: 2 kids in every place(20-30 total)

Materials needed: Laptop/stickers(badges)/smartphone-camera/

Methodology used: STEAM methods/project based learning/non-formal education

Competences that are going to be developed: Team work, Problem solving, Creativity , Mathematical/engineering thinking, Management, Coordination, Public speaking, Presentation skills, Physical work in fields/mountains etc., Learning about new way of living, Getting out from the comfort zone

Detailed description of the activity, with instructions for the trainers/facilitators:

First week (visiting univerity, labs, STEAM businesses, reserches facilities and working to developing solution with an educator).
Second week (testing the solutions in labs or in the fields if that can't be tasted in the lab).

Questions for reflection:

1.Did you find this useful?
2.Do you think it will help you for the upcoming projects?
3.Are you satisfied with the activities and facilitators?
4.What you would do diferently?

2. AGRICOOLTURE

LAgriCoolture is a revolutionary STE(A)M business that merges **agriculture** and **technology** to create a sustainable and efficient way of farming. The organization owns a vast plot of land that is divided into various sections, each with a specific role and produce.

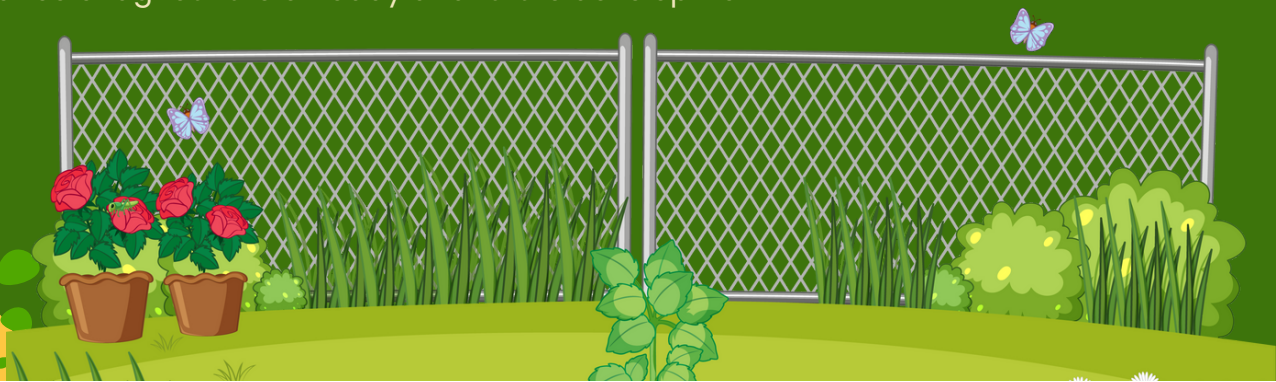
These sections are managed by different groups of people who use online software to design and plan their land use. Additionally, the land is equipped with **Farmbot**, a robot that helps with the cultivation and harvesting of crops.

At AgriCoolture, we are passionate about teaching kids and young adults the skills and knowledge of farming so that they can grow **their own healthy food**. We believe that by educating the younger generation, we can create a sustainable future for our community.

In addition to teaching, we also want to raise awareness of the benefits of **eating fresh and nutritious food** for our well-being and the environment. Our goal is to encourage people to make **healthier food choices** and reduce their carbon footprint. To achieve this, we collaborate with local schools and local public to provide them with our produce and invite them to visit our farm and learn from our experience.

LEARNING OUTCOMES FOR PARTICIPANTS

- How to start and maintain a farm with basic skills and tools
- Why growing healthy food is good for the environment and the community
- What are the essential nutrients and how to get them from different food groups
- How to use modern technology in agriculture to increase productivity and efficiency
- How to adapt to the changing climate and market demands with innovative solutions
- Importance of agriculture of today and future development



FARMBOT:
THE FUTURE OF FARMING

One of AgriCoolture's most innovative tools is **Farmbot**, a robot that helps with the cultivation and harvesting of crops. Farmbot is equipped with advanced sensors and cameras that allow it to detect and respond to changes in the environment, such as weather patterns and soil moisture levels.

Farmbot can plant seeds, water plants, and even harvest crops without any human intervention. This not only saves time and labor costs but also ensures precision and accuracy in farming operations.

TARGET GROUPS

Schools and Faculties

At AgriCoolture, we believe that sustainable agriculture is not just about producing food but also educating people about the importance of it. That's why we have initiated an outreach program to reach out to schools and faculties who are interested in learning about sustainable agriculture and combining traditional tools with modern technology.

Local Public

We also want to involve the local public and government in our initiative. The local public can order fresh produce from our web app and visit our farm to see how we grow our crops. The local government can support us by providing land and equipment for our project. Together, we can create a sustainable future for our community.

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: Farmbot - Funbot

Duration: 120 minutes

Size of the group: 20 students of primary school

Materials needed: Farmbot, computer, hoe, seeds, watering can, fertilizer.

Methodology used: Pratical learning of the conventional way of farming, Learning about farmbot and how to use it

Competences that are going to be developed: Personal, social and learning to learn competence; Entrepreneurship competence; Digital competence; Mathematical competence and competence in science, technology and engineering

Detailed description of the activity, with instructions for the trainers/facilitators:

1-Pratical learning of the conventional way of farming

- What is farming
- Conventional way of farming
- How to use tools
- Why you use tools
- Planting the seeds
- Sharing what we learned

2-Learning about farmbot and how to use it

- What is farmbot
- Why we use farmbot
- How to use farmbot
- Watching the farmbot in action
- Sharing what we learned

Questions for reflection:
Did you enjoy the experience?
What did you learn?
Have you acquired new skills?
Did you find farming fun?

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: From Design to Farmbot

Duration: 4 hours

Size of the group: 16 students of highschool

Materials needed: Farmbot, computer, paper and markers, flipcharts.

Methodology used: Team building, Designing process, STEAM techniques

Competences that are going to be developed: Personal, social and learning to learn competence; Entrepreneurship competence; Digital competence; Mathematical competence and competence in science, technology and engineering

Detailed description of the activity, with instructions for the trainers/facilitators:

1-Designing the management of the land

- General introduction of farmbot and STEAM technologies in agriculture
- Deciding how the land would be used
- Planning the start of the production and the maintaining

2-Farmbot in action

- Explaining how the farmbot works
- Learning how to programm the farmbot
- Watching the farmbot in action

Questions for reflection:

What did we learn today?
Did you find farming with farmbot entertainig?
Did you gain new skills?
Would you like to work more with STEAM techniques in agriculture?
Additional remarks

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: The workshop for workshops

Duration: 60 minutes

Size of the group: 20 people

Materials needed: Computer,farmbot, projector or tv.

Methodology used: Sharing the project aims, Showing the farmbot in action

Competences that are going to be developed: Personal, social and learning to learn competence; Entrepreneurship competence; Digital competence; Mathematical competence and competence in science, technology and engineering

Detailed description of the activity, with instructions for the trainers/facilitators:

1-Detailed analysis of the previous workshops with the students

- Presentation of the first and second projects
- Goals and aims achieved in those workshops

2-Basic introduction of STEAM technologies

- What types of technologies are being used in agriculture
- What is farmbot and what is used for
- Presentation of farmbot in action
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Questions for reflection:

Are you satisfied with this project?
Do you think it helps in integrating young people in agriculture?
Do you have any suggestions to improve this projects?

3. NO ROOTS NO FRUITS

The project concept is designed as Erasmus+ youth exchange.

The participants will gain knowledge about **traditional ways of farming** and importance of it throughout the series of workshops and activities. The aim of the project is to enrich the knowledge about farming techniques and implementing the technology as a farming method to develop new ecosystems in their environment(countries). Being part of this project the youngsters will understand the difference of benefits of traditional and modernistic ways of farming and find solutions to combine them to get the best of each world.

LEARNING OUTCOMES FOR PARTICIPANTS

- to raise awareness about traditional ways of farming, tools and the traditional ways of processing products gained from the self-sustainable farms
- to provide information about how to build a self-sustaining farm implementing the STE(A)M (using FarmBot, robotics, research and different scientific kits.

TARGET GROUP

Young people from 18 to 30 years old.

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: GardenBotics

Duration: 1.5hrs

Size of the group: 20 divided in four teams

Materials needed: Projector, laptop, FarmBot, papers, pens, coloured pens, internet connection

Methodology used: Presentation and creative tasks

Competences that are going to be developed: Gaining information about FarmBot, designing the garden, learning the benefits of using FarmBot

Detailed description of the activity, with instructions for the trainers/facilitators:

The workshop is split into two parts:
First part is 20 minutes of information about the FarmBot itself
Second part is 1.1hrs, it will be divided into creative tasks of designing the garden, presentation of the designs and this can be based on each teams preferences(digital or on paper) and in the end we will finish with the reflection.

Questions for reflection:

Debrief on personal or group experiences
-How did you feel working in teams?
-What did you enjoy the most?
-Would you suggest some changes?
-Did you gain some new skills?

LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: Farmathlon

Duration: 1.5hrs

Size of the group: 20 people divided in 4 teams of 5 people

Materials needed: Scissors, shovels, rakes, wheelbarrels, buckets, pickaxes, gloves, boots, saplings, seeds, water, honey, cheese, eggs, potatoes

Methodology used: Outdoor activities in groups

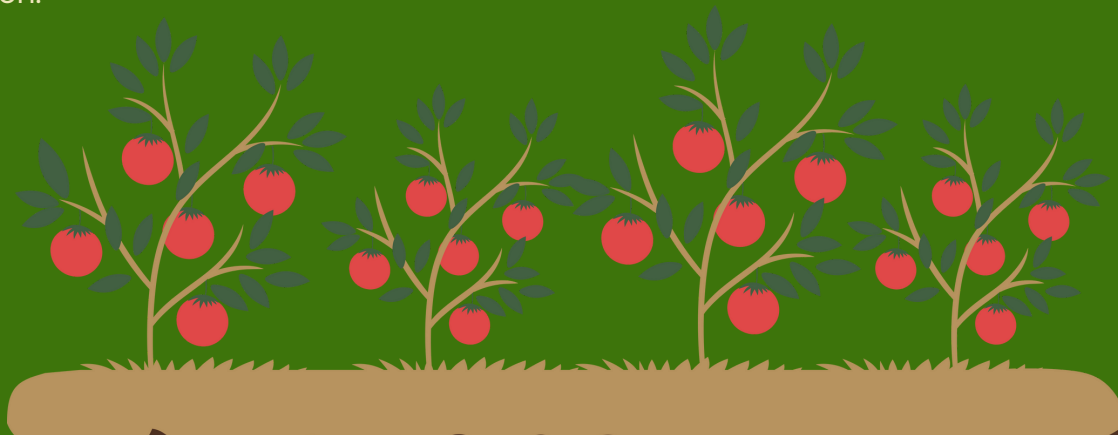
Competences that are going to be developed: Learn how to use specific tools working outdoor, gaining or improving agricultural knowledge and skills

Detailed description of the activity, with instructions for the trainers/facilitators:

We are organizing triathlon where the participants will compete in a set of farm activities. The disciplines are: speed haircut, planting(digging up holes and planting various seeds), watering the plants using buckets or watering cans, cleaning up the farm or as we like to call it; Farm & Furious.
In the end there will be prizes based on participant's scores. The score is going from 4 to 1 point in the order of finishing the tasks. The one who finishes first gained 4 points and the one who finishes last gains 1.

Questions for reflection:
Each team shall be interviewed like in the BBC News style sport competitions. Questions like: How did you feel during the competition?
Do you consider yourselves doing a good job?
Would you consider trying your luck again next year in another FARMATHLON?
How did you train for this extreme event?

Additional remarks: We are using the tools that can be sharp, dangerous and should be dealt with caution.



LIVE LOCALLY -
THINK GLOBALLY

WORKSHOPS

Name of the activity: Just Plant It!

Duration: 1.5hrs

Size of the group: 20 divided in four teams

Materials needed: Laptop, internet connection, projectors, pens, paper, coloured pens

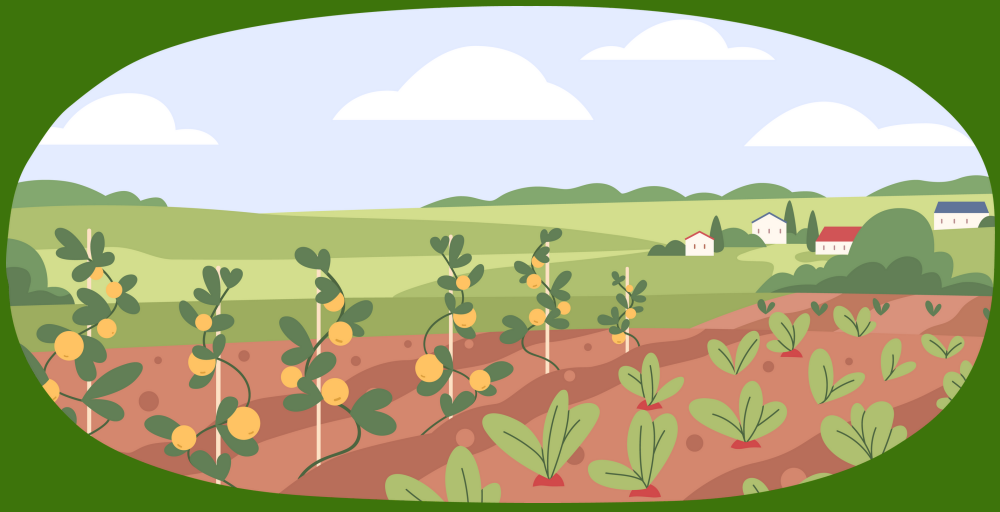
Methodology used: Presentation and creative tasks

Competences that are going to be developed: Implementing modern technology, gaining knowledge about greenhouses, gaining knowledge about perfecting the climate for certain types of plants with specific origins.

Detailed description of the activity, with instructions for the trainers/facilitators:

The workshop is split into two parts:
First part is 20 minutes of information about the greenhouses.
Second part is 1.1hrs, it will be divided into creative tasks of designing the greenhouses, presentation of the designs and this can be based on each teams preferences(digital or on paper) and in the end we will finish with the reflection.

Questions for reflection:
Debrief on personal or group experiences
-How did you feel working in teams?
-What did you enjoy the most?
-Would you suggest some changes?
Did you gain some new skills?
Additional remarks



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About us

The Association for Sustainable Development Pozitiva Samobor is a non-governmental organization based in Samobor, Croatia. It was founded in 2012 with the mission of **promoting sustainable development in the local area through community-based projects and initiatives.** Pozitiva Samobor works to create a better future for the citizens of Samobor and its surroundings by inspiring and engaging young people to take action on issues such as **active citizenship, employment and entrepreneurship, ecology and sustainable development as well as healthy lifestyle.**

The projects of Pozitiva Samobor are a valuable resource for the citizens of Samobor and its surroundings. Through our initiatives and projects, we are actively working to promote sustainable development in the area. Pozitiva Samobor is strongly committed to **protecting the environment and promoting sustainable development** in the region by taking a proactive approach and bringing together the local community to tackle the issues they face.

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