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THE GREEN CIRCLE

2022-2-IT01-KA210-VET-000094268





EUROPEAN NETWORK CIRCULAR FARMERS

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Action Type: Small-scale partnerships in vocational education and training

Countries covered: 3

WEBSITE: <https://www.piattaformaprogetti.eu/european-circular-farmers-network/>



Objectives

The fundamental objective of the project is to create an open European network, formed by young aspiring farmers, for the promotion of circular agriculture, through cooperation with local institutions, media, associations and training centers; the will is also to keep this network active even after the end of the project activities, thanks to targeted fundraising campaigns and crowdsourcing platforms on the web.

Activities

The activities consist of 4 phases: 1) planning and preparation activities; 2) implementation of local activities and transnational mobility (within which there will be 3 mobility to be held in Lublin, Drama and Rome); 3) implementation of measures to ensure the management, effectiveness and quality of the project; 4) activities to evaluate and share the final results of the project.

Impact

The expected results are: A) a manual of good practices for aspiring circular farmers called "The Green Circle" to be made available as an open educational resource; B) creation of a motivational story video on the web to spread the principles of circular agriculture and encourage young people to undertake this profession, through a collection of short video tutorials, demonstrative of some sustainable agricultural practices, entitled "How to be a circular farmer".



INTRODUCTION

Global food production and consumption contribute significantly to greenhouse gas emissions, land use change, and biodiversity decline, posing serious threats to both food security and environmental sustainability. Additionally, reliance on finite resources such as phosphate and fossil fuels exacerbates these challenges. To address these issues, there's a growing call for alternative approaches to food production and consumption that are less polluting and resource-intensive. **Circular agriculture** emerges as one such **alternative**, aiming to transform the way we produce and consume food.

Circular agriculture, as defined by the principles of a circular bioeconomy, **involves producing and consuming food in a way that protects agroecosystems, minimises waste, and maximises resource efficiency.** This approach aligns with the European Union's Farm-to-Fork strategy, which emphasizes reducing nutrient losses and promoting circular practices in farming.

Various circular agriculture initiatives are emerging worldwide. However, it's crucial to ensure that these initiatives go beyond merely optimising the current agricultural system and instead drive fundamental transformation.

The **aims** of the Green Circle manual is to:

- Enhance the social and environmental role of farmers, emphasizing civic engagement, and the preservation of land and farming culture.
- Facilitate the establishment of extensive networks involving various stakeholders within local communities, ensuring project sustainability beyond EU funding.
- Raise awareness about the significance of sustainable agriculture and the circular economy to minimize environmental impact.
- Promote understanding of the necessity to reduce water and soil consumption in agricultural practices.
- Foster positive attitudes towards recycling and reusing agricultural residues and treated wastewater within the agricultural sector.



WHAT IS CIRCULAR AGRICULTURE?

Circular agriculture is a revolutionary change in how we approach farming, much like other innovative models emerging in the realm of circular economy. As we face pressing challenges in global development, such as sustainability and resource efficiency, circular agriculture presents a new outlook on food production. This is because agriculture, nature, and food are intrinsically linked, and circular agriculture understands and embraces this interconnectedness. By transitioning to a regenerative and resource-efficient model, circular agriculture aims to secure the future of our food supply. This is achieved by implementing recycling practices throughout the entire food system.

Circular agriculture has several critical **objectives**:

- **Transforming agricultural food waste into a valuable resource** is a key objective of circular agriculture. Rather than tossing aside these by-products, circular agriculture strives to repurpose them within the food system. Adopting cutting-edge techniques like composting, anaerobic digestion, and bioconversion allows for the conversion of agricultural food waste into useful commodities such as organic fertilizers, animal feed, and bioenergy, resulting in a self-contained loop.
- Through implementing circular agriculture, **farmers can significantly decrease their reliance on external inputs** by harnessing resources that are produced within the system. By repurposing agricultural by-products and incorporating sustainable techniques such as crop rotation, cover cropping, and agroforestry, they are able to reduce their need for synthetic fertilizers, pesticides, and other outside aids. This not only increases the efficiency of resources, but also contributes to the preservation of soil quality and biodiversity.
- Adopting circular agriculture, we can significantly **reduce the creation of harmful waste and pollutants in the agricultural process**. By actively closing the loop on waste streams and implementing eco-friendly methods like nutrient cycling and integrated pest management, circular agriculture plays a crucial role in decreasing environmental pollution and promoting the strength and sustainability of our ecosystems.



PRINCIPLES OF CIRCULAR AGRICULTURE

Circular agriculture is a comprehensive approach to food production that places great value on **maximising land** and **resource usage**. It prioritises **sustainability** and **resilience** and calls for us to delve deeper into each of its principles.

- When it comes to land and resource usage, circular agriculture stresses the need to optimise productivity while minimising inputs like water, fertilisers, and pesticides. This requires thorough planning and strategic management to ensure that food demands are met without harming the environment or depleting resources.
- The principle of cultivating priority food crops in the same fields where production takes place is crucial for efficient and sustainable agriculture. This practice not only considers the local environmental conditions but also recognizes market demand, resulting in optimal yields and reduced transportation costs and carbon emissions during food distribution.
- Through successive cropping, farmers strategically plant and cycle multiple crops throughout the year, effectively utilising the land and resources at their disposal. By alternating crops with varying nutrient demands and growth patterns, soil health is enhanced, threats from pests and diseases are minimised, and productive harvests can be sustained all year round."
- By incorporating mixed products, such as cover crops, legumes, and perennial plants, into crop rotations, diversity can be enhanced. This not only benefits soil health and ecosystem resilience, but also promotes biodiversity. In addition, the use of mixed cropping systems offers numerous advantages, such as nitrogen fixation, weed suppression, and the creation of habitats for beneficial insects and wildlife.
- Utilising crop residues as a biofertilizer for the soil, by foraging for livestock in these fields, is a key aspect of circular agriculture. It cleverly integrates both livestock and crop production systems to optimize resource usage and minimize excess. By allowing livestock to graze on crop residues and cover crops, valuable plant biomass is converted into nutrient-rich protein. Furthermore, composting livestock manure and using it as a biofertilizer is an effective way to boost soil fertility and enhance crop yields.



INTEGRATION OF CIRCULAR AGRICULTURE

In order to successfully promote circular agriculture, a movement must demonstrate a strong and visible dedication to its fundamental principles. These principles serve as the driving force behind transformative change and must be fully embraced in order to have a real impact. While not every initiative will encompass all five principles, each one plays a crucial role and should be given equal consideration. Choosing to prioritise even just one principle can still have a transformative potential. It's important to note, however, that **circular agriculture** seeks to **offer a holistic solution to environmental issues**, making it essential to strive for a balanced approach that minimises trade-offs between principles whenever possible.

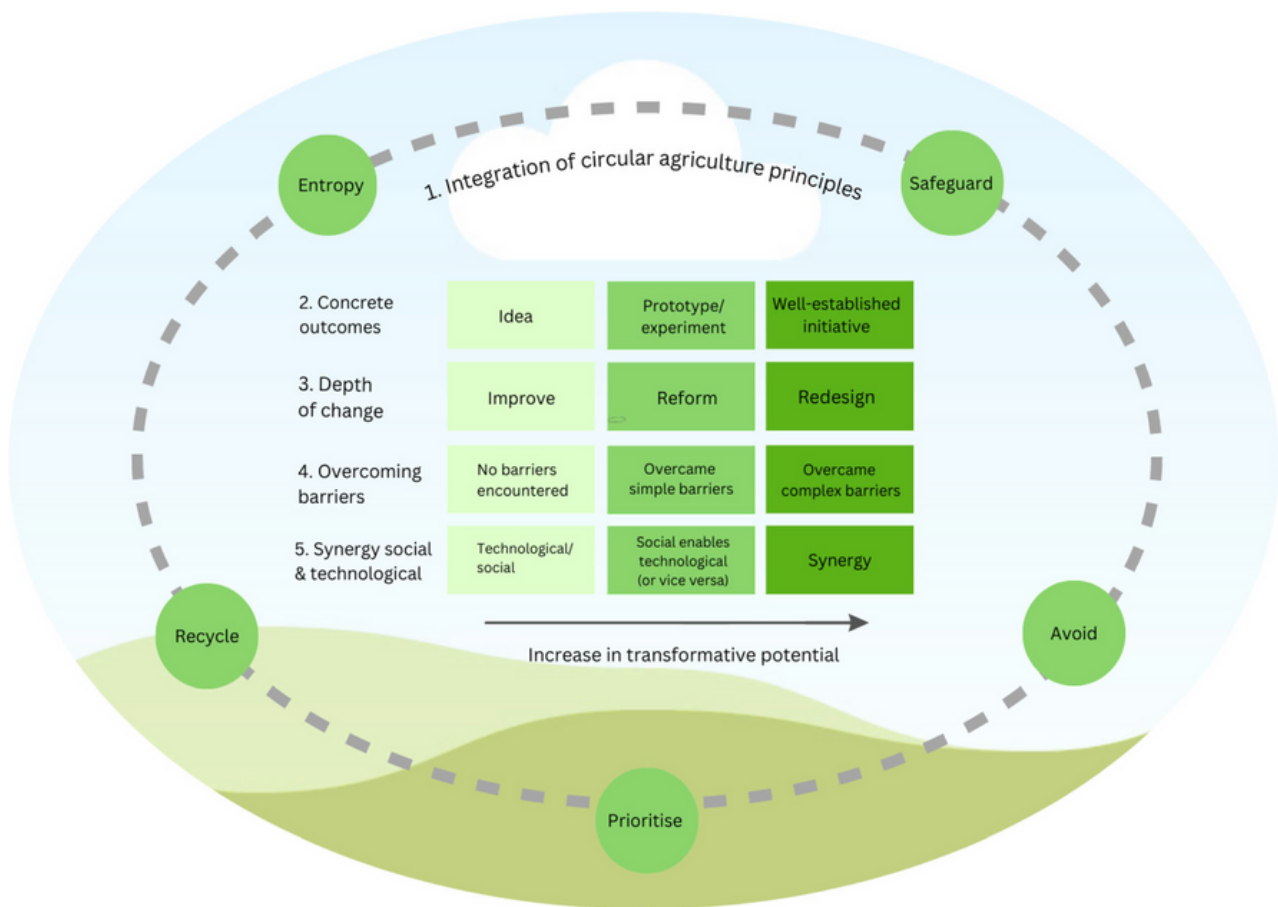
One example is **Fertile Nutrient Cycles**, which contributes to the safeguard principle by implementing measures to decrease nitrogen and phosphorus emissions. This is achieved through optimizing fertilization timing and incorporating manure into the fertilization process. These efforts not only prevent nutrient losses, but also improve resource efficiency, aligning with the avoid principle. Additionally, Fertile Nutrient Cycles encourages farmers to reduce the use of feed concentrates, which compete with human-edible resources, partially addressing the prioritize principle. However, its main emphasis remains on optimising nutrient cycling.

In contrast, **Circular Broilers** places a strong emphasis on the concept of recycling. This is accomplished by using leftover materials from agriculture to feed broilers and then returning their manure to the land. In addition, the initiative follows the prioritise principle by substituting traditional feed with residual streams that are not fit for human consumption. This not only promotes sustainability, but also supports the production of renewable energy, an important aspect of the entropy principle that reflects a comprehensive approach to resource management.



Agricycling is a shining example of a comprehensive strategy, where municipal waste is repurposed through both composting and using it as a natural fertilizer. Not only is the concept of recycling addressed, but it also aligns perfectly with the principles of minimizing waste and preserving our environment by reducing the use of harmful artificial fertilizers and capturing soil organic carbon. This holistic approach beautifully illustrates how circular agriculture principles are interconnected and have the power to spark meaningful change when implemented effectively in farming methods.

The following illustration shows the **five characteristics** that determine the transformative potential of circular agriculture initiatives. Initiatives may exhibit these characteristics to different extents, indicating different levels of transformative potential.





In order for an initiative to truly hold the power to transform, it must go beyond mere promises or abstract ideas and actively put circular practices into action. This means **producing tangible outcomes** that directly benefit all stakeholders involved. Referring to the concept of a "good Anthropocene" as described by Bennett et al. (2016), which includes elements such as prototypes, experiments, and start-ups, we can say that all three of these initiatives have become well-established. Through their concrete results for participants and other stakeholders, they have proven their effectiveness and potential to drive meaningful and lasting change.

Circular agriculture initiatives can bring about change in a range of ways, from small tweaks to established methods to completely new strategies. However, initiatives that delve deeper and tackle the underlying causes of problems have a greater potential to drive transformation. To better comprehend the extent of change, we classify these modifications into three categories: **optimise**, **reform**, and **redesign**. These classifications align with diverse understandings of change seen in areas like policy and organisational studies. Building upon these frameworks, we outline the different levels of change that can occur in the realm of circular agriculture.

1. **Optimisation** refers to the process of continuously improving and refining existing practices and techniques while staying within the current mindset. This involves maintaining the same goals and underlying assumptions about how to achieve them. The primary goal of this type of change is to increase resource efficiency and minimise environmental impact by optimising the use of traditional inputs and methods. A prime example of this is the implementation of flower strips in field margins, which can be achieved without disrupting established practices.
2. **Reform** involves disrupting conventional thinking and reexamining strategies for problem-solving and goal attainment. This can result in the adoption of innovative methods and the forging of new connections, creating opportunities for effective solutions. In the context of circular agriculture, second-order change may require redistributing resources among stakeholders or embracing more sustainable techniques, while still upholding the core structure and functions of the agriculture system.

3. **Redesigning** the agricultural system represents a significant shift in its values, goals, and identities. This realization comes from acknowledging that the issues with the current system are deeply rooted in its design and objectives. The main goal is to critically examine the system's design and address the fundamental causes of problems, instead of simply trying to manage them after the fact. This could involve restructuring the management of natural resources, integrating various functions, and reevaluating the boundaries of the agricultural system.

BENEFITS OF CIRCULAR AGRICULTURE

REDUCED WASTE AND POLLUTION

By integrating circular principles, such as waste reduction, resource optimisation, and pollution mitigation, agricultural practices can play a critical role in creating a more ecologically friendly and sustainable system. This approach not only minimises the environmental impact of farming operations, but also maximises efficiency and productivity. At its core, circular agriculture is about minimizing waste through the implementation of resource-efficient practices and closed-loop systems. For instance, leftover crop residues and animal manure can be repurposed through composting or anaerobic digestion, creating valuable organic fertilisers and bioenergy. By embracing circular agriculture, we not only reduce waste output, but also reap the benefits of using natural resources more efficiently.

In circular agriculture, the focus is on maximising resource usage by implementing techniques like precision irrigation, nutrient management, and energy-efficient farming. This not only minimizes resource wastage but also boosts overall productivity. By prioritising efficient resource allocation, circular agriculture not only benefits the environment by reducing pressure on natural systems, but also preserves valuable resources for generations to come.

It's a vital contributor to decreasing pollution caused by agricultural activities. Through practices like limiting the use of synthetic fertilisers and pesticides, implementing sustainable methods for pest and disease control, and prioritizing soil conservation, circular agriculture greatly reduces the harmful effects of traditional farming practices on the environment. This also benefits the well-being of both humans and the planet.



IMPROVED SOIL HEALTH

Implementing circular agriculture methods that enhance soil health, soil fertility and nutrient availability are improved, water retention is increased, and microbial activity is boosted. Healthy soils play a vital role in ensuring a sustainable agricultural output as they aid in plant growth, increase crop resilience to pests and diseases, and provide crucial support for plant development. Additionally, the beneficial impact of healthy soils goes beyond agriculture, as they act as a carbon sink, absorbing carbon dioxide from the atmosphere and helping to combat the effects of climate change.

INCREASED BIODIVERSITY

Circular agriculture promotes ecological stability by enhancing biodiversity, leading to a host of benefits such as improved ecosystem resilience, better pest and disease control, and overall ecological balance. This approach also results in vital pollination services, healthy soil, clean water, and the sustained sustainability of agricultural systems. Furthermore, the variety of habitats and species supported by circular agriculture not only supports cultural and recreational activities, but also adds value to the aesthetic appeal of agricultural landscapes.

INCREASED RESILIENCE TO CLIMATE CHANGE

Circular agriculture is a beneficial approach to help farmers adapt to the impact of climate change, minimize risks, and sustain agricultural productivity despite changing weather patterns. This not only guarantees food security, but also ensures the self-sufficiency of farming communities, ultimately promoting overall sustainability and long-term success of agriculture.

ENHANCED FOOD SECURITY

By incorporating circular agriculture principles and techniques, food systems have the potential to greatly increase productivity, resilience, and sustainability. This, in turn, will have a positive impact on food security at the local, national, and global levels. By emphasizing the principles of availability, affordability, and accessibility, circular agriculture promotes the provision of healthy, nutritious food, ultimately benefiting the livelihoods and overall well-being of communities worldwide.



ECONOMIC BENEFITS FOR FARMERS

Overall, circular agriculture has a positive impact on the economy by improving resource efficiency, reducing input expenses, increasing output, opening up opportunities for niche markets, and promoting resilience. By adopting circular methods, smallholder farmers can improve their financial profitability, long-term viability, and economic sustainability amidst the constantly changing landscape of agriculture.

CIRCULAR AGRICULTURE PRACTICES

- AGROFORESTRY
- CROP ROTATION
- COMPOSTING
- ORGANIC FARMING
- REGENERATIVE AGRICULTURE

The practices mentioned above are all interconnected practices that aim to promote sustainable and environmentally friendly methods of food production. These approaches prioritise soil health, biodiversity conservation, and long-term agricultural resilience.

AGROFORESTRY

Circular agriculture encompasses agroforestry, a pivotal component that underpins the resilience and sustainability of agricultural systems. This form of farming leverages the power of trees within its landscape to enhance biodiversity, enrich soil health, bolster climate resilience, and unlock economic potential. By maximising resource utilisation, promoting ecosystem processes, and fostering the development of resilient and sustainable agricultural systems, agroforestry serves as a shining example of circularity.

Agroforestry Farming Systems

Alley cropping involves the strategic placement of crops between rows of trees to generate income while the trees reach maturity. This innovative method can yield a diverse range of products such as fruits, vegetables, grains, flowers, and even materials for bioenergy. It is also referred to as intercropping, depending on the layout of the trees and crops.



Forest farming, on the other hand, revolves around cultivating food, medicinal, and ornamental crops beneath a forest canopy. This carefully managed approach ensures optimal levels of shade while also providing a variety of other valuable resources. Some may also know it as multi-story cropping.

Silvopasture is the ingenious integration of trees, animals, and forage on a single plot of land. By combining these elements, farmers are able to reap benefits such as timber, fruit, fodder, and nuts, while the livestock are provided with shade and shelter. This not only minimises stress on the animals from harsh weather conditions like scorching summers or frigid winters, but also ensures abundant forage for their feed.

Linear Agroforestry Practices

Riparian forest buffers are vital ecosystems found along the edges of rivers and streams, comprised of trees, shrubs, and grasses. Not only do they act as natural or restored barriers, but they also play a critical role in filtering farm runoff and stabilising the banks of bodies of water to prevent erosion. These multi-faceted areas also serve as important habitats for wildlife and can serve as an additional source of income.

In addition, **windbreaks** serve a vital purpose in protecting crops, animals, buildings, and soil from harsh weather elements such as wind, snow, dust, and unpleasant odours. These living barriers, also known as shelter-belts, hedgerows, vegetated environmental buffers, or living snow fences, have the added benefit of providing support for local wildlife and serving as a potential source of income.

CROP ROTATION

Crop rotation is a tried and true technique that involves the strategic planting of various crops in a sequence on a single plot of land. This method not only benefits soil health, but also maximizes nutrient intake and effectively manages pest and weed issues. To illustrate, imagine a farmer who has previously grown a lush field of corn. After the harvest, the farmer may choose to sow beans in the same location as corn depletes nitrogen from the soil while beans replenish it. Ranging from uncomplicated cycles of two or three crops to elaborate systems with numerous rotations, farmers have multiple options at their disposal.



Each type of plant has its own unique set of nutritional requirements and vulnerabilities to various pathogens and pests. When a farmer repeatedly grows the same crop in the same location, as often seen in traditional farming methods, the soil becomes depleted of specific nutrients. This creates a favorable environment for pests and diseases to establish themselves, as their preferred food source is consistently available. As a result, farmers rely on increasingly higher amounts of synthetic fertilizers and pesticides to maintain high crop yields and control infestations. Through crop rotation, essential nutrients are replenished in the soil without the use of artificial additives.

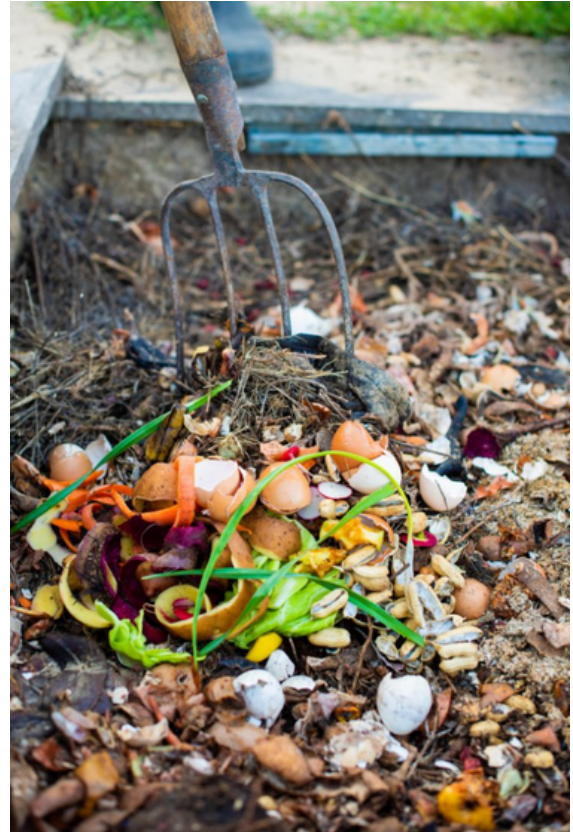
In addition, this practice serves to break the cycle of pests and diseases, enhance soil health through the growth of diverse root structures in various crops, and foster an increase in biodiversity on the farm. This variety is crucial for sustaining a thriving ecosystem in the soil, and also helps to attract beneficial insects and pollinators to the diverse range of plants above ground.





COMPOSTING

Engage in the process of composting, a controlled and oxygen-dependent method that transforms organic matter into a beneficial soil amendment or mulch through natural decay. Compost, the ultimate result, is cultivated by microorganisms that thrive on materials added to the compost pile. Through consuming carbon and nitrogen, utilizing water for digestion, and breathing in oxygen, they facilitate the transformation. A great way to participate in composting is by using food scraps from your kitchen as well as dry leaves and wood from your yard.



ORGANIC FARMING

Organic farming is a sustainable method of agriculture that employs environmentally friendly pest control techniques and utilizes natural fertilisers sourced from animal and plant wastes, as well as nitrogen-fixing cover crops. This innovative approach to farming emerged in response to the negative impact of chemical pesticides and synthetic fertilisers on the environment, and it boasts a multitude of ecological advantages.

When it comes to agriculture, organic farming stands out for its minimal use of pesticides, reduction of soil erosion, and lower levels of nitrate leaching into water sources. Additionally, it adopts the practice of recycling animal waste within the farm.



However, these advantages come at a cost - organic food tends to be pricier for consumers and yields are generally lower compared to conventionally grown crops. While research has shown that organic yields can be about 25% lower on average, this can vary greatly depending on the specific crop. Moving forward, the key for organic farming will be to continue providing its environmental benefits, while also increasing yields and lowering prices. This will prove to be a challenging task, especially with factors like climate change and a growing global population.



REGENERATIVE AGRICULTURE

Regenerative agriculture goes beyond simply sustaining our land and resources. It is a holistic and dynamic approach to farming, aimed at revitalizing the very ecosystem that sustains us. By nurturing the soil and promoting cyclical growth and renewal, regenerative agriculture not only ensures sustainable practices, but also has the potential to regenerate our food production systems. With its focus on promoting healthy soil, diverse habitats, and climate resilience, it offers a promising solution for the future of farming.



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