THEORETICAL MANUAL

INCLUSIVE HYDROPONIC CROPS

Inclusive Hydroponic Crops

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Co-funded by the European Union

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Theoretical training

Introduction

The development of inclusive gardens for people with disabilities represents a unique opportunity to promote social inclusion, personal empowerment, and environmental sustainability.

Through adapted agricultural activities, such as hydroponics, multiple benefits can be generated for both people with disabilities and the community at large.

They also allow for the acquisition of experiences and knowledge of social and environmental value, as they provide practical and experiential application of knowledge related to plant cultivation.

What is hydroponics?

Hydroponics is a soil-less cultivation system that allows plants to grow in nutrient-rich water solutions or in inert substrates such as coconut fiber, rock wool, or perlite.

This method is highly efficient, as it optimizes water use and allows for cultivation in small spaces, making it a sustainable alternative for food production and a valuable therapeutic tool.

Hydroponic crops do away with soil, replacing it with a nutrient solution in water or inert substrates. Thanks to their low resource consumption, they represent a more sustainable alternative to conventional agriculture.

In a context where environmental conservation is a global challenge, hydroponics is positioned as a key solution for more efficient and planet-friendly agriculture. Plus, you can set up your own hydroponic garden at home and contribute to the change!

Benefits of these crops

Efficient use of water

Hydroponics **consumes much less water** compared to traditional farming, as the water is recirculated within the system.

It reduces water waste, making it a more sustainable option in areas with water scarcity.

Rapid growth and increased production

Plants receive essential nutrients directly, which accelerates their development.
Faster harvests and shorter growth cycles are achieved, increasing food production.

Savings in agricultural consumption

Less use of fertilizers and compost: Hydroponic technology allows for precise distribution of nutrients, reducing costs and avoiding waste.

No herbicides needed: Since there is no soil, weeds do not grow, eliminating the need to apply herbicides.

Pest and disease reduction

The absence of soil reduces the risk of pests and diseases, thus reducing the need for pesticides and fungicides.
A **cleaner and healthier production** is obtained.

Cultivation under limiting environmental conditions

It enables food production in arid regions or with soils unsuitable for agriculture, and even in urban environments or small spaces, using vertical and stacked systems.

Independence from weather conditions

Hydroponic crops can be grown in controlled environments, allowing for year-round production, regardless of external climatic factors such as rainfall or extreme temperatures.

Higher crop quality

By having complete control over the supply of water and nutrients, higher quality products are achieved compared to those grown in open fields.

The resulting foods are usually **more nutritious and homogeneous.**

Maximum use of space

Hydroponics allows for growing in vertical and stacked systems, optimizing the use of available space.

It is ideal for urban areas with limited land.

Lower environmental impact

Efficient use of fertilizers prevents nutrient runoff into the soil, reducing pollution.

By requiring fewer chemical inputs, it reduces its ecological impact compared to conventional agriculture.

Benefits of these crops

There are several hydroponic growing techniques, and in our project we will work with the Kratky Method.

This **method is a passive system where roots absorb nutrients from a reservoir** without the need for pumps or electricity.

This method offers an easy way to obtain fresh fruits and vegetables in small spaces, without much work. Hydroponic growing can sometimes take up a lot of space, require energy, and can be complex depending on the system. It's a way to grow your plants hydroponically in a "container" without the need for electricity, pumps, or anything else.
With this system, we can use everyday containers to become the base for our crops, thus working with concepts related to recycling and the circular economy.

We'll give new life to the bottles and plastics we have at home, and we can also work with other everyday containers like yogurt containers or egg cartons.

With this, we will increase the active participation of people with disabilities and introduce more specific training, such as the one they will receive on farming techniques using everyday items, facilitating their understanding and sparking their interest.

We'll have to work in groups to choose the plants we want to grow and, based on that, gather the appropriate containers to house these plants. We'll choose, recycle, prepare, and clean them for their next use, and even decorate them, giving people with disabilities a special role from the initial stages of the process.

In addition, by decorating these containers and bottles, we can work on other aspects such as creativity, artistic expression, and manual skills.

As far as the cultivation technique itself is concerned, its operation is simple.

Operation

It's essential to select the most suitable containers based on the type of plant you want to grow, taking into account both its size and the amount of water it needs to thrive. (OUTLINE) This selection will be discussed in depth during the practical phase, in which the different steps of the cultivation process using this method will be explained.

The system consists of a container containing a mixture of water and nutrients. At its base is a diluted nutrient solution, while holes are drilled in the top to allow water to rise to the plant's roots by capillary action.

As the plant absorbs water, the liquid level in the container progressively decreases. This decrease creates an air space at the bottom, which acts as a source of oxygen for the roots, thus promoting their oxygenation and growth.

When the water in the container is completely gone, the crop is ready to harvest. However, if you want to prolong the plant's life cycle, simply lift the lid and add more water along with the nutrient solution.

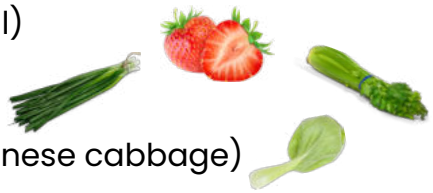
It's a simple procedure, with key aspects including: choosing the right plant species, selecting the most suitable container, and precisely controlling the amount of water needed for optimal growth.

1	Container with nutrient solution	Water with nutrients is placed in a closed container
2	Plant suspended in the solution	The plant is held in the lid of the container with a wick, allowing its roots to reach the water.
3	Air space for oxygenation	As the plant absorbs water, the solution level drops, leaving an air space that helps oxygenate the roots.
4	Growth without intervention	It does not require pumps or water circulation, since the plant takes what it needs until the water runs out.

Not all plants adapt well to this method; shallow-rooted plants such as lettuce, spinach, cucumbers, pumpkins, and zucchini adapt better than deep-rooted plants such as tomatoes and potatoes.

The Kratky method is ideal for growing short-cycle plants with low water and nutrient consumption.

Featured Crops

GREEN LEAFY VEGETABLES (grow quickly and do not require deep roots)	• **Lettuce** (romaine, iceberg, escarole, etc.) • **Spinach** • **Chard** • **Kale** • **Green mustard** 
AROMATIC HERBS (they don't need much space or excess nutrients)	• **Basil** • **Cilantro** • **Parsley** • **Menta** • **Oregano** • **Romero** • **Thyme** 
SMALL VEGETABLES (can grow well if a larger container is used)	• **Radishes**  • **Strawberries** (they take longer, but they work well) • **Chives** • **Celery** • **Pak choi** (Chinese cabbage) 
EXPERIMENTAL CROPS (Some larger plants can be grown with Kratky if an enlarged system with more water volume is used)	• **Cherry tomatoes** (require support and more nutrients)  • **Small peppers** (jalapeño or Padrón peppers) • **Mini cucumbers** 
NOT RECOMMENDED	• **Deep-rooted plants** (carrots, potatoes, beets). • **Crops that require a lot of water and space** (corn, watermelon, melon). • **Fruit trees or very large plants** (avocado, citrus, etc.).

Guidelines for practice

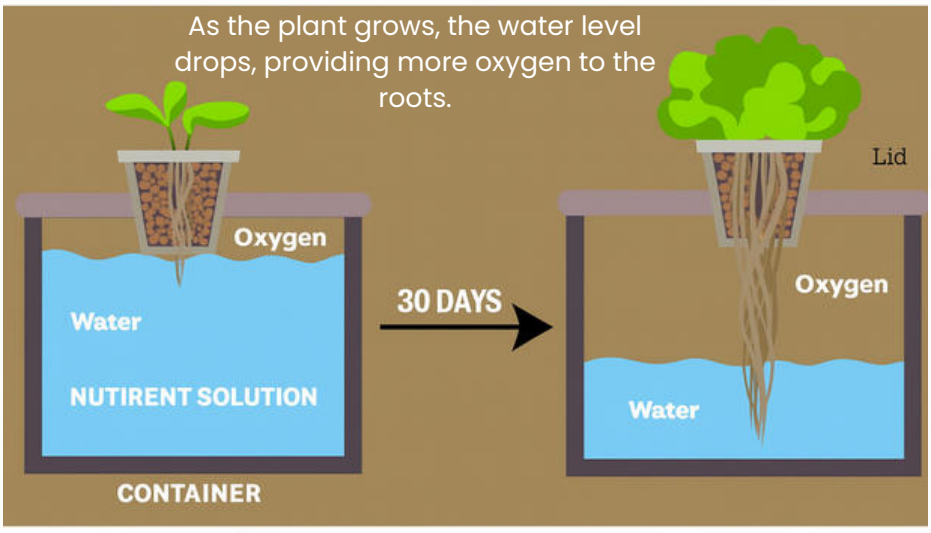
This section will explain the planting and harvesting process step by step, including crop sheets, necessary materials, and adaptations that can facilitate the participation of people with cerebral palsy. Examples of community participation activities within the project framework will also be included.

How does it work?

INITIAL PHASE
The roots of the plants are in direct contact with the nutrient solution

PROGRESSIVE GROWTH
As the plants consume water, the roots grow towards the bottom of the container.

NATURAL OXYGENATION
Part of the roots are exposed to the air, which allows for adequate oxygenation for growth.



Necessary materials

Seeds for sowing

- It is advisable to use certified seeds for sowing, since many seeds extracted directly from the fruit have been modified to not germinate or produce sterile plants.
- Choosing selected seeds guarantees better quality, variety and yield compared to ordinary seeds.

Opaque container or receptacle

Blocks out light to prevent algae growth. Key features:

- **Size:** It must be large enough to allow root development and contain the nutrient solution.
- **Material:** It can be made of plastic, wood or recycled materials, as long as it does not release toxic substances into the nutrient solution.
- **Shape:** This will depend on the crop. Long, narrow containers are ideal for lettuce, while wider, deeper ones work best for tomatoes or peppers.

Nutrient solution

This is a specific blend of nutrients dissolved in water, designed to feed plants in hydroponic systems. This solution provides all the essential elements needed for plant growth, including nitrogen, phosphorus, potassium, other macronutrients, and all essential micronutrients.

There are ready-made Nutrient Solutions that only need to be dissolved in water and do not precipitate.

Necessary materials

Substrate for hydroponics

A hydroponic substrate is an inert material used in hydroponic growing systems to support plant roots and provide a medium for growth. Unlike ordinary soil, which contains nutrients and microorganisms, a hydroponic substrate does not provide nutrients to plants; these are supplied through the water to which the nutrient solution is added.

Stages of the cultivation method

Based on these initial considerations, we will divide our cultivation method into the following stages:

1. Choosing the crops and obtaining the containers
2. Preparing the containers
3. Crop
4. Growth monitoring
5. Harvesting plants and fruits
6. Cooperative activities

1 Choosing the crops and obtaining the containers

1.1 Choice of crop

Determining what we want to plant.

The Kratky method allows for the planting of a wide variety of crops, from leafy greens like lettuce and cabbage to varieties of other crops such as cherry tomatoes, radishes, strawberries, and various varieties of herbs like parsley and rosemary.

To make it easier to choose crop varieties, we have developed product sheets, detailed in the appendices, in which we specify elements such as the amount of light each variety requires and its approximate growth time.

The choice of variety will depend on the time available for our project, the amount of light they receive based on the location of the growing containers, and the personal preferences of the users.

This is a good time to encourage decision-making with users. Therefore, if we are in classrooms or centers serving people with disabilities, we will encourage group and participatory decision-making.

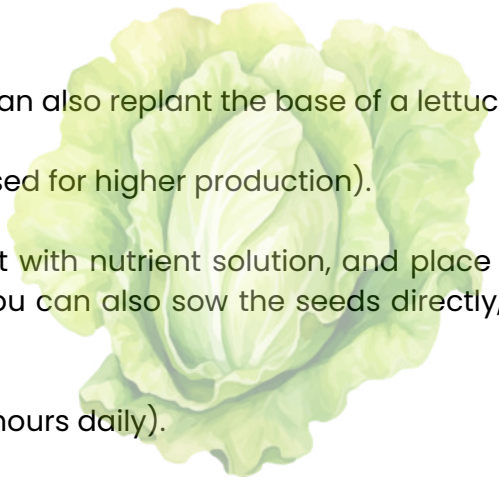
Once the theoretical phase is complete, and after training both the center's professionals and the people with disabilities based on the contents of the previous block, we will use the support materials included in the appendices of this manual to conduct a practical exercise. In this exercise, participants will be able to make an informed choice about the crop they wish to develop.

Recommendation:

We suggest choosing short-cycle crops that don't require a long development period and can be grown in accessible, common containers, such as 1.5- or 2-liter plastic bottles. Therefore, we will use the example of lettuce throughout the project, as it makes it easier to understand the different stages of the process.

Example of information that a crop sheet may contain

Crop Sheet: **Lettuce**



Seed: Your own or from a nursery. You can also replant the base of a lettuce.

Container: 1.5L or 2L bottle (5L can be used for higher production).

How to plant: Cut open the bottle, fill it with nutrient solution, and place the seedling with its roots in contact with the water. You can also sow the seeds directly, which must be germinated beforehand.

☀ **Light**: Plenty of sunlight (minimum 5-6 hours daily).

Growth time: 30-45 days.

Best time to plant: All year round, preferably in spring and autumn.

Although we will use lettuce as an example in this manual, we recommend that during this phase, group members encourage joint decision-making to collaboratively define the crop(s) they wish to develop in the project.

To this end, once the different crop sheets available in the annexes section of Block III have been reviewed, they will be compared. Based on this comparison, an activity specifically designed to promote shared decision-making can be carried out.

Example of an activity to work on decision-making when choosing which crops to grow:

We will show between 4 and 8 examples of crop varieties, selecting one or two for each category, from the following:

- Vegetables: lettuce and cabbage.
- Herbs: parsley and oregano.
- Vegetables: strawberries and radishes.
- Others: tomatoes and small peppers.

Next, we'll create a poster board on which we'll place photographs of each crop, organized in rows on the left. At the top, we'll include a series of columns with different evaluation criteria, such as:

- Personal growing preferences.
- Ease of obtaining and using the necessary container.
- Light exposure requirements.
- Duration of the sowing and harvesting period.
- Recommended time of year for cultivation.

To assess each criterion, we will use a signaling system with colored circles that simulates a traffic light:

Green, for the options with the highest acceptance or positive evaluation
Orange, for those who generate divided opinions
Red, for those with lower acceptance

For example, we'll ask the group how many people prefer a particular crop, whether they find the container easy to obtain, or whether the cultivation time seems adequate. If the majority answers affirmatively, a green circle will be placed in that column; if there are mixed opinions, an orange one; and if the majority answers negatively, a red one.

This exercise will facilitate shared decision-making and help the group choose, in a thoughtful and consensual manner, the crop or crops to grow.

CROP	PREFERENCES /TASTES	CONTAINER	NEEDS LIGHT	GROWTH TIME	GROWING SEASON
					
					
					

This system facilitates shared decision-making, allows for practical work with the information sheets for the different types of crops, and reinforces the knowledge acquired during theoretical training. Furthermore, it uses a visual format that facilitates understanding of the information by all users, regardless of their reading level or prior experience.

1.2 Obtaining the containers

Once you've chosen your crop, you'll need to gather the appropriate containers for the type of seed you're choosing. For lettuce, like the crop we chose in our example, we can use 1.5- or 2-liter bottles, or even larger ones, such as 3- or 5-liter bottles.

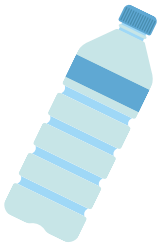
In this project, we will opt for smaller-capacity bottles, as they are more common, accessible, and manageable. Collecting these containers will mark the completion of the first of the six phases of the cultivation and harvesting process. It also represents an excellent opportunity to involve a larger number of people and create collaborative networks around the project, thus working on concepts such as recycling and the circular economy through the reuse of everyday objects.

We will begin by **involving the families of people with disabilities**, strengthening their active role in the project and encouraging their direct participation. We will explain the types of materials we need and, to the extent possible, we will ask them to contribute used containers or bottles from their homes.

If possible, opaque or tinted bottles (such as some milk bottles) would also be helpful, as they could facilitate some of the later stages of the cultivation process. However, for this harvesting phase, the most important thing is that the containers have the appropriate capacity—preferably 1, 1.5, or 2 liters—as most are made of the same type of plastic and have similar characteristics.

This stage can also be an opportunity to raise the profile of the project. We can contact schools with school cafeterias, other organizations in the social or environmental sector, and local businesses to present the initiative and request their collaboration in collecting containers. To facilitate this process, project presentation documents are included in the annexes and can be used as supporting material.

Recommendation:



- Work on shared decision-making on the crops to be grown
- Involve other community stakeholders in the collection of containers

Support materials in this phase:

- Crop selection documents.
- Crop sheets.
- Presentation document for families.
- Expanded presentation document.

2 Preparing the containers

One of the most fun parts of the process

And also one in which people with cerebral palsy can actively participate in multiple ways.
We will divide this phase into three steps:

2.1 CLEANING THE BOTTLE

1. Cleaning the bottle
Before you begin, it is essential to clean the bottle thoroughly.

- Wash it with soap and water to remove any residue, especially if it contained sugary drinks or chemicals.
- Rinse several times with clean water to ensure that no detergent residue remains.
- This task can be done in groups and is an excellent opportunity to encourage participation, either directly or through physical, visual, or verbal support.

2. Cutting the bottle
This step requires attention to security, but can be adapted to actively involve users:

- Cut the bottle about **one-third of the way down**, separating the top from the bottom.
- It is recommended that a professional make an initial incision with a box **cutter** and then continue cutting with scissors for added safety.
- Once cut, cover the sharp edges with electrical tape, surrounding both the base and the top. This will prevent cuts or scratches when handling the container.
- The top of the bottle (the one with the stopper) will be **inverted** and placed inside the base, forming a structure similar to a small flowerpot with a reservoir.
- Small holes will be made in the plug or at the bottom of this section to allow air to filter through and water to drain.

3. Light blocking to prevent algae
This step serves a dual purpose: first, to prevent algae growth inside the culture vessel by limiting light penetration; and second, to encourage creativity and active participation among people with disabilities.

Reducing the light inside the container helps keep the water cleaner and healthier for plant growth. This task can be easily adapted to each individual's abilities and lends itself well to manual, artistic, and teamwork.

Creative options for blocking light:

- Opaque tape: Wrap the container with colored or black tape to cover the transparent areas.
- Paint: Decorate the outside of the bottle with tempera, acrylic, or spray paint. This can be applied with a brush, sponge, fingers, or stencils.
- Aluminum foil: Cover the bottle completely or partially with aluminum foil, which also helps maintain the water temperature.
- Opaque or decorative spray: Use spray paint to quickly cover the surface. This is best done in a well-ventilated area with the support of a professional.

AS A RECOMMENDATION:

We can use any of the aforementioned methods to block light from entering containers, and even combine them. In our case, we recommend using opaque or decorative spray, as it allows for quick, uniform, and visually appealing coverage of bottles.

Growth observation: leave a free strip
It's very important to leave an uncovered area in each bottle to allow direct observation of the interior. This will avoid the need to lift the top of the container to check the status of the culture and will make it easier for people with disabilities to monitor the process more independently.

Personalization of bottles
Once the spray coating has been applied, it's recommended to personalize each bottle, both individually and as a group. This not only reinforces each person's emotional involvement in the project but also encourages ongoing crop monitoring. Some options include:

- **Permanent (indelible) markers:** ideal for writing names, symbols or messages.
- **Water-resistant paint:** Must be non-toxic and suitable for outdoor use.
- **Finger paint:** Although less durable against water or sunlight, it's the most recommended paint due to its safety (toxic-free) and ease of use for many people with disabilities. It can be used especially for beginners or in combination with other, more resistant materials.

General recommendations:
- Encourage creativity in decorating containers.
- Personalize the bottles as much as possible, allowing each participant (or group) to identify their creation.
- Use this phase as an opportunity to strengthen your connection to the project, increase motivation, and foster interest in the following stages: cultivation, monitoring, and harvesting.

3 Cultivation phase

Before beginning this crucial phase of the project, it's essential to have all the necessary elements in place. You can find them in detail on the first page of this section, but here's a brief overview:

Necessary materials

Seeds for sowing
- Nutrient solution
- Hydroponic substrate (rock wool, coconut fiber or sponge)
- Pre-prepared containers (decorated and ready bottles)
- Clean water (preferably chlorine-free)

Once all the materials have been gathered, we will proceed with the following actions:

3.1 Preparation of the nutrient solution

- **We fill the container** with clean water, leaving about 3 to 5 cm of space at the top.
- We add the **nutrient solution**, carefully following the manufacturer's instructions.
- We mix well to ensure an even distribution of the nutrients.

3.2 Seed germination

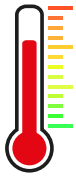
- **We prepare the substrate:** if we use coconut fiber, we moisten it until it expands and acquires a texture similar to soil.
- **We place the seeds** in the selected substrate (coconut fiber, rock wool or sponge).
- We keep the substrate **slightly moist and in a warm place** until the seeds germinate.

3.3 Placing the plants in the system

- Once germinated, we introduce the substrate with the seedling into the **top of the bottle**, previously cut and placed upside down, like a flowerpot.
- We make sure the roots **come into contact with the nutrient solution** so they can absorb water and nutrients.
- If the roots are still short, we can use a **wick (for example, a strip of fabric or cord)** to connect the substrate to the nutrient solution.
- It is important **not to completely submerge the roots:** part of them should be exposed to the air to allow proper **oxygenation.**

4 Monitoring plant growth

During the growth and flowering process of plants, we must pay special attention to three key factors that directly influence their proper development:



Important environmental factors:

- **Relative humidity:** keep it between 70% and 90%.
- **Ideal temperature:** Most seeds germinate well between 20ºC and 25ºC.
- **Avoid waterlogging:** Excess water can drown the seeds and prevent their growth.

4.1 Tips to promote proper crop development

1. Sun exposure

We will place the crops in a place with good natural light, either outdoors or indoors near a window.

It is important to avoid direct and prolonged exposure to sunlight, which can damage plants.

To do this:

- We'll use opaque bottles or bottles coated with the materials we worked on in previous phases. If the sun is very intense, you can use shade screens or move the containers during the hottest hours of the day.

2. Excess humidity

Excess water, especially from heavy rains or ponding, can damage the root system and stunt growth.

To avoid this:

- We will place the crops in covered spaces during periods of prolonged rain.
- We will monitor the amount of water accumulated in the containers and remove it if it is excessive.
- We will ensure that the container is not completely full, allowing for adequate ventilation.

3. Control of water level and quality

The quality of water is as important as its quantity.

We will observe the following indicators:

- If the water level is too low, we will add clean water and, if appropriate, more nutrient solution.
- If the water appears cloudy, has a bad odor, or contains residue, we will replace it completely and prepare the nutrient solution again according to the recommended dosages.

AS A RECOMMENDATION:

Check the water level weekly.
Observe the condition of the leaves: if they have spots, dull colors, or are wilted, it could be a sign of excess or lack of nutrients.

- **Adjust the nutrient solution** or water volume according to the observed signs.

5 Harvesting phase

The timing and method of harvesting our crops directly influences the **quality and productivity** of the plants. Although the **crop charts** used during the first phase include an estimated duration for the process, it can vary depending on factors such as weather, the type of container, and the levels of water and nutrient solution.

Therefore, it is essential to maintain **weekly supervision**, as indicated in the previous phase, observing the appearance, color, and consistency of the plants or fruits to decide if it is time to harvest.

Practical tips for a correct harvest
Below, we offer a series of recommendations to ensure that harvesting is as appropriate as possible for each crop type:

For green leaves (lettuce, spinach, kale)

- **Selective harvesting:** Cut only the outer leaves, leaving the center intact so the plant continues to grow.
- **Total Harvest:** If you prefer to harvest the entire plant, do so by cutting it just above the roots.

For aromatic herbs (basil, mint, parsley)

- Cut the **largest leaves first.**
- Use **clean, disinfected scissors** to avoid damaging the plant or introducing microorganisms.

For fruits like tomatoes or strawberries

- Cut the fruit leaving a **small piece of stem,** instead of tearing it off.
- Don't wait too long to harvest: overripe fruit can attract pests or deteriorate quickly.

Extra tip: don't throw away the roots!
In some cases, plants can regenerate if we leave the roots in the nutrient solution. You can experiment and see if they sprout new leaves.

What to do after the harvest?
Once the harvest is complete, we can **clean the containers** with water and a diluted vinegar mixture to remove any algae and debris.
However, **we recommend taking advantage of this opportunity to start the process** over again, reusing or creating new containers and applying all the lessons learned throughout the project. This will reinforce knowledge, foster self-sufficiency among participants, and maintain their enthusiasm for continuing to grow.

6 Cooperative activities

This phase is not directly part of the **preparation, cultivation, and harvesting process** for the selected plants or seeds, but it does utilize **the hydroponic technique and the steps described above** as an excellent opportunity to encourage the active **participation of people with disabilities,** one of the fundamental objectives of this educational project.

Therefore, we propose **expanding the scope of the work** done so far, extending it to the **community environment** of the participants.

Connection with the local community
From the very first step of the project, we already discussed the benefits of **involving other people** in collecting plastic bottles, which we would later use as containers for the crops.

In this new phase, we aim to **continue this open and inclusive approach** by promoting **joint activities with other groups** in our local community. The goal is twofold: on the one hand, to share the knowledge and **skills acquired** in hydroponics, and on the other, to raise awareness about **environmental** issues such as recycling and the circular economy.

Proposals for community activities
Below are two activity ideas, supported by practical templates, to encourage participation and inclusion through collaborative work:

1. Workshop on container making: decorating plastic bottles
A creative and accessible activity that allows people with disabilities to share their previous experience with other groups and apply the steps they already know (cleaning, cutting, painting, personalizing, etc.).

In addition to reinforcing what has been learned, this workshop promotes:

- **Creativity** and individual expression.
- **Teamwork** with people of different ages or profiles.
- **Environmental awareness,** by reusing waste materials.
- **Recognition of participants' capabilities** as active agents in their environment.

Below we introduce two ideas, represented by templates, for preparing community activities:

1. Workshop on making containers through the decoration of plastic bottles

WORKSHOP SHEET: PLASTIC BOTTLE DECORATION	
Workshop name	Creative Plastic Bottle Decoration
General Objective	Promote social inclusion among people with disabilities and other groups in their community, especially children in primary education centers, through collaborative artistic activities, promoting creativity, recycling, and teamwork.
Specific Objectives	• Facilitate interaction and cooperation among participants. • Raise awareness among children about the importance of inclusion and diversity. • Reuse plastic bottles to promote recycling and environmental awareness. • Stimulate creativity and fine motor skills in all participants.
Addressed to	• People with disabilities who are users of the project. • Boys and girls from participating schools.
Methodology	• Practical activity with an inclusive approach. • I work in pairs or small groups where each team is made up of people with disabilities and children. • Use of accessible materials adapted to the needs of participants. • Space for dialogue and reflection at the end of the activity.
Necessary Materials	• Recycled plastic bottles (different sizes and shapes). • Finger paints and brushes. • Stickers and other decorative elements. • Round-tipped scissors with holes. • Permanent markers. • Newspaper or tablecloths to protect surfaces.

WORKSHOP SHEET: WORKSHOP DEVELOPMENT	
Welcome and presentation (10 min)	• Explanation of the purpose of the workshop. • Brief integration dynamics between participants.
Introduction to the activity (10 min)	• Short talk on the importance of recycling and creativity. • Explanation of the steps to follow in decorating the bottles.
Activity development (40 min)	• Formation of work teams. • Decorating the bottles with the materials provided. • Support and guidance from facilitators.
Presentation and closing (20 min)	• Presentation of the work carried out by each team. • Reflection on the lived experience and the importance of teamwork. • Presentation of certificates or symbolic recognitions to participants.
Total Duration	• Approximately **1 hour and 30 minutes**
Workshop Leaders	• Project coordinator. • Teachers and inclusion facilitators. • Volunteers or support monitors
Assessment	• Observation of the level of interaction and participation of attendees. • Short satisfaction survey. • Final reflection where participants express how they felt during the activity.
Expected Results	• Greater integration and collaboration between people with disabilities and children. • Development of creativity and motor skills. • Raising awareness about recycling and inclusion. • Creating decorated bottles that can be used as flower pots, pencil holders or other useful objects
Special Considerations	• Adapt materials and tools to the specific needs of participants with disabilities. • Ensure an accessible and comfortable environment for all. • Promote an attitude of respect, empathy and collaboration among attendees

2. Environmental awareness talk

WORKSHOP SHEET: INTRODUCTION TO HYDROPONICS	
Workshop name	"Discovering Hydroponics: Growing Without Soil"
General Objective	Promote social inclusion and collaborative learning through the presentation and practical demonstration of hydroponics by people with disabilities, fostering interest in this sustainable cultivation technique.
Specific Objectives	• Explain clearly and simply what hydroponics is and its benefits. • Show how hydroponic cultivation is carried out, with practical examples and testimonials. • Promote interaction between people with disabilities and other local stakeholders. • Offer a sensory experience through an optional tasting of the cultivated products.
Addressed to	• High school students and the general public. • People with disabilities participating in the project.
Methodology	• Theoretical presentation with audiovisual support. • Practical demonstration of hydroponic cultivation. • Testimonies from participants with disabilities. • Optional tasting of cultivated products.
Necessary Materials	• Projector for explanatory video. • Images or photos of the participants' experience. • Examples of hydroponic systems (bottles, trays, nutrient solution). • Products grown for tasting (lettuce, basil, strawberries, etc.). • Printed information sheets for attendees.

WORKSHOP SHEET: WORKSHOP DEVELOPMENT	
Welcome and presentation (10 min)	• Introduction to the activity and presentation of the participants. • Brief integration dynamics between participants.
Theoretical Explanation (15 min)	• What is hydroponics? Benefits and differences with traditional agriculture. • Explanation of the hydroponic cultivation process (nutrients, water, substrates). • Presentation of images and explanatory video with photos of the participants in action.
Practical Demonstration (20 min)	• Formation of work teams. • Decorating the bottles with the materials provided. • Support and guidance from facilitators.
Testimonies and Reflection (10 min)	• Space for questions and exchange of ideas.
Tasting of Cultivated Products (Optional) (15 min)	• Tasting of fresh products grown hydroponically. • Explanation of its properties and health benefits.
Total Duration:	Approximately **1 hour and 10 minutes** (not including the optional tasting).
Assessment	• Brief satisfaction survey for attendees. • Observation of the level of interest and participation. • Comments and suggestions for future activities.
Special Considerations:	• Ensure accessibility for all participants. • Tailor information to the target audience. • Promote an inclusive and participatory environment.

ANNEXES

This section contains supplementary materials to facilitate project management and implementation, such as project presentation documents for people with disabilities and their families, presentations that will support the training provided in the manual, and specific environmental training and awareness modules, which will be implemented transversally throughout the project.

Links to materials:

1. Introduction to the project for users

2. Presentation of the project to families/environment

3. Environmental Awareness Module
   3.1. Support for environmental awareness training

4. New Technologies Module
   4.1. European Digital Push Project supporting training

5. Crop sheets

Inclusive Hydroponic Crops

CASTLE ELLIS
INVESTMENT & DEVELOPMENT

ASOCIACIÓN SEVILLANA DE PARÁLISIS CEREBRAL
ASPACE

Co-funded by
the European Union

Inclusive Hydroponic Crops is funded by the European Union. The opinions and views expressed are solely those of the author(s) and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

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