



AGROECOLOGY FOR WEEDS

[www.goodhorizon.eu](http://www.goodhorizon.eu)

## AGROECOLOGICAL WEED MANAGEMENT REPOSITORY

The Agroecological Weed Management (AWM) Repository (<https://www.goodhorizon.eu/platform/awm-practices/>)

is a virtual space where you can freely and openly find information and educational material on current and agroecological weed management practices in the European Union. You can browse and learn about several weed management practices and crops.

#@Agroecology is GOOD



Version 1.0 – April 2024



# 18

## ROBOTS (AUTOMATIC)

### DESCRIPTION & BENEFITS

Automatic autonomous robots are the “next big thing” in sustainable weed management allowing to:

- **identify and eliminate weeds** in a precise and efficient manner through the use of cameras, advanced sensors and site-specific treatments for targeted weed removal
- **reduce the chemical input** due to optimized and targeted treatments (e.g., spot spraying of herbicides, mechanical weeding, thermal weeding etc.)
- **operate autonomously** increasing the efficiency of weed management over larger areas and providing an alternative to farmers

## STRENGTHS

- Continuous and autonomous operations that allow effective weed management over larger areas faster and with less labor
- Increased efficiency due to the use of advanced imagery and sensors that allow for weed detection and targeted weed removal, thus minimizing crop damage
- Collection of real-time data on weed flora and crop health, which could train more models and improve decision-making if combined with smart tools (e.g., DSS)

## OPPORTUNITIES

- Potential reduction of synthetic herbicides due to the precise herbicide applications based on the existing weed species and their growth stage
- Alternative for weed management in areas with a shortage of agricultural labour or in large areas where weed management has a short time window
- Continuous advancements in this market as Artificial Intelligence, machine learning and robotics offer more and innovative solutions over time

## WEAKNESSES

- Potential high costs for initial investment in the acquisition and the operations of autonomous robots, which in turn, could be a limiting factor for smallholder farmers
- Need for training, expertise and knowledge on the use of these robots and possibly ongoing support and technical experts.
- Potential under-performance in adverse field conditions (e.g., extreme weather, rocky areas, uneven ground, dense vegetation)

## THREATS

- Costs of purchasing, maintaining and improving autonomous robots for weed management which may depend on market price fluctuations and orientation
- Lack of knowledge and habits of farmers who are reluctant to adopt novel and technological solutions for weed management
- Regulations and laws on safety, data privacy and environmental impact that may be barriers to the deployment of autonomous robots in certain regions or farming systems

## TIPS

- **select and attend courses** to train on the use, maintenance and improvement of autonomous robots which will allow you to minimize time consumption, potential losses or risks
- **test autonomous robots on small scale first** to understand their capabilities and limitations, as well as their benefits and potential negative impacts in your specific farming system and context
- **continuously monitor the performance and effectiveness of autonomous robots** in your field to assess the efficiency of weed management, collect data to improve decision-making, and adjust operational strategies if needed
- **combine autonomous robots with other weed management strategies** to enhance overall efficiency and resilience by reducing chemical input and redesigning the agroecosystem

### LIABILITY DISCLAIMER

This is the first version of AWM repository released in April 2024. While every effort has been made to ensure the accuracy and reliability of the information provided in this factsheet, we make no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability, or availability of the information contained herein for any purpose. Any reliance you place on such information is therefore strictly at your own risk. In no event will we be liable for any loss or damage, including without limitation, indirect or consequential loss or damage, or any loss or damage whatsoever arising from loss of data or profits arising out of, or in connection with, the use of this factsheet.