AGROECOLOGY FOR WEEDS

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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.

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10 MECHANICAL CONTROL

DESCRIPTION & BENEFITS

Mechanical control involves the use of machinery tools (e.g, hoes, harrowers, cultivators) to:

- **physically remove or destroy weeds from fields**
- **minimize crop-weed competition for resources**
- **reduce reliance on synthetic herbicides** to manage weeds, as mechanical means do not pollute the environment with chemicals (important to keep rational use though to avoid increasing carbon emissions)
- **manage weeds in organic farming systems** being a valuable option for farmers
- **control herbicide-resistant weeds**
- **break weed life cycle and disrupt their growth and reproduction**
- **reduce weed soil seedbank**

STRENGTHS

- Use in various agricultural systems, including annual row-permanent crops, and conventional-organic farming systems
- Effective in controlling a broad spectrum of weeds, including both annual and perennial weeds
- Quick results in weed control reducing the need for chemical input, making it suitable for organic farming

WEAKNESSES

- Potential unsuitability in some field conditions (e.g., terrains with rocks or high slope)
- Requirement of specialized equipment and machinery, increasing the costs to purchase, operate, and maintain
- Increase in fuel consumption, thus, increasing the carbon emissions and the environmental impact

OPPORTUNITIES

- Precision targeting of weeds, minimizing damage to crops and reducing off-target effects
- Combination with other weed management practices, such as use of cover crops or bioherbicides
- Increase of labor opportunities, particularly in regions where hand weeding is often applied

THREATS

- Risk of soil compaction and erosion from repeated machinery passes, particularly in wet soil conditions
- Potential for crop damage and impact on non-target organisms
- Dependence on the weather conditions, energy sector and fuel price fluctuations

TIPS

- **select appropriate tools and machinery** according to the availability of machinery, the crop, weed species (type, level of infestation), soil conditions, field conditions (e.g., rocky terrain)
- **learn the differences between the different mechanical means and what is the purpose of their use** (e.g., plowing or cultivating soil results in the uproot or burial of weeds, but harrows use often rotating blades to disrupt weed seedlings and prevent their growth)
- **decide the appropriate timing for operation(s)** based on the expected effectiveness, weed growth stage, infestation level, and cost-benefit
- **treat weeds early** in the growth stages that are competitive with crops for resources to give crops an advantage
- **be careful with the use of mechanical means** that manage weeds to avoid dispersing weed propagules (e.g., root and rhizomes cutting and fragmentation of perennial weeds)
- **regularly monitor the weed density and germination rates** to detect weed infestations early and implement timely mechanical control measures
- **avoid unnecessary passes,** thus, reducing the carbon emissions
- **try to invest on machinery that does not use fossil fuels or derivatives**
- **avoid disturbing the soil** by using lighter machinery (less soil compaction) and no-tillage mechanical means (prevents disturbance of top-soil)
- **combine mechanical weeding** with other weed management strategies such as crop rotation and bioherbicides to achieve sufficient levels of weed control

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