



LIFE + Environment Policy and Governance

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WASTEREUSE

The logo for WASTEREUSE features the word "WASTEREUSE" in a bold, sans-serif font. The "WASTE" part is in a dark grey color with a distressed, textured appearance, while "REUSE" is in a solid teal color. To the right of the text is a stylized graphic of three overlapping leaf-like shapes in shades of yellow and teal.

Project: Best Practices for Agricultural Wastes Treatment and Reuse in the Mediterranean countries

www.wastereuse.eu

Action 8 – Report on Policy Measures, means and actions for the safe reuse of agricultural wastes in Mediterranean countries

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Executive Summary

The current report presents a set of policy measures and concrete actions that could be adopted and implemented by the competent authorities in Mediterranean countries in order to accelerate and mainstream the use of organic waste in agriculture with a view to achieve higher and more efficient productivity and long term sustainability while mitigating the environmental and other risks associated with the reuse of agricultural waste. The report summarizes the benefits for the producers and for the environment and makes recommendations for the organization and establishment of mechanisms that could foster the systemic and safe use of organic waste in agriculture. The findings of this report are the result of the analysis included in the “Code of Waste Management Practices for Agricultural Application” and summarize its key points and recommendations.

The WasteReuse Scenario was developed on the basis of the findings from the study of 60 types of AW and their application in different crops, in Italy and in Spain and is presented in the form of well-defined sequence of eight actions / steps that should be followed in order to ensure sustainable and safe reuse of organic wastes in the agricultural sector.

These eight steps are dealing with measures that should be adopted by the users and by the competent authorities, with a view to create a coherent enabling environment for they systematic and safe reuse of AW. The eight steps are: soil characterization, definition of quantified cultivation targets, physical-chemical-biological characterisation of the wastes to be reused, establishment of soil/water quality criteria, development of specific cultivation practices, ensure safe use of wastes and protection of workers’ and citizens’ health and finally design of a regular monitoring strategy to assess potential risks and safe reuse.



1. Soil characterization and analyses

Without doubt, the choice among cultivation practices, available waste types and fertilization schemes depend upon the type of cultivated crops and soil properties. For this, prior to the selection and application of any cultivation practice, the soil to be cultivated should be analysed for a series of parameters that determine its quality and fertility. Soil analysis should be repeated annually, not only to assist farmers to identify the most

appropriate cultivation practice but also in order to define any potential adverse effects caused to soil health due to previous practices or waste use. Soil analysis is therefore recommended to determine its level of available nutrients in order to establish the baseline level of micronutrients.

2. Definition of quantified cultivation targets

In order for farmers to benefit the most by the reuse of AW, they should exactly determine what they are trying to achieve, e.g. restoration of the productivity of an eroded soil, provide supplemental nutrients to a high value crop, and to determine what practical and workable combinations of organic materials and mineral fertilizers are most appropriate to accomplish the proposed task.

3. Physical, chemical and biological characterization of wastes

Prior to reuse of processed or unprocessed AW in the agricultural sector, the suitability of wastes should be proved. Suitable wastes need to be identified through chemical/physical characterization and, if appropriate, grouped into the three categories to make for a workable classification for use across the EU. The three categories are:

- **Class 1:** Farm residues recycled on the farm of production e.
- **Class 2:** Benign wastes containing negligible levels of contaminants e.g. green waste, biological sludge from food waste treatment.
- **Class 3:** Wastes which may contain contaminants (pathogens, heavy metals and other potentially toxic elements, organic contaminants)

Wastes' nutritional status is also an important factor that should be identified in order for the appropriate fertilization plan to be determined. Nutritional status can be defined by evaluating the results of the chemical analyses and comparing them with generally accepted values for composts and AW, as can be found in the leading literature in this field.

4. Establishment of soil/water quality criteria

In order to maintain the environmental quality at waste reuse areas, it is important to ensure that the reuse will not cause any adverse effect on soil and water quality and will not negatively affect established standards for the surrounding area (e.g. aesthetic, touristic, etcetera). These standards and preconditions should be carefully studied and considered before waste land spreading as well as general and specific area properties and regional and local development plans are or will be defined by the local/regional priorities. Responsible authorities should be informed and provided with detailed plans regarding data collected during the previous 3 steps. The period and duration of land spreading should be taken into account and a time plan should be submitted to the responsible local/regional authorities so as to be able to design the appropriate monitoring plan. A Risk Assessment study should be also carried out and submitted.

5. Development of cultivation practices

It should be highlighted that soil must always maintain all its functions and its absorption capacity to ensure a sustainable system and for this, the ultimate goal when applying AW to land should be to apply them in such a way that the soil either filters the potential toxic elements effectively, or electrochemically absorbs them or decomposes them in order for a clean solution to infiltrate through the soil body. When considering the use of organic wastes in crop production or field application, application rates should be carefully estimated and should be based upon soil fertility, crop requirements, and chemical characteristics of waste.

After the definition of all the appropriate soil and waste parameters, the rate of nutrients to be applied, meaning the doses of AW and supplementary inorganic fertilizers, can be estimated, considering that the applied nutrients should be equal to or greater than the nutrients removed by the crop over time so that soil fertility can be maintained. Irrigation water quality and composition should also be taken into account. If the nutrient content of

the irrigation water is considerable, then the respective nutrient amounts should be extracted from the total estimated nutrient supplement.

Three more parameters should be determined:

- I. Maximum permitted AW amount.
- II. Annual permitted application of AW.
- III. Time of AW application for different crops.

6. Ensure safe use of wastes and protection of workers and citizens health

A vital priority when considering reuse of AW on soil is the protection of workers and citizens health during and also after land spreading. For this, the users should follow certain instructions. It is also important that the responsible local, regional or governmental services undertake or supervise the monitoring of all appropriate actions that ensure safe reuse.

7. Ensure safe food production

Apart from the ordinary tests for the harvested crops other constituents, typical of the wastes used during the cultivation, should also be measured by following a well-designed sampling and laboratory analysis plan. The elements or constituents to be determined are those defined during step 3 while the analyses results should be compared to standards for safe food production.

8. Design of a regular monitoring strategy to assess potential risks and safe reuse

Monitoring areas of AW reuse should be performed by local, regional or governmental authorities, but farmers could also play a significant role in monitoring and maintaining soil and water quality. An effective monitoring system has to consider the geomorphology, the hydrology, the soil types of the application area, the peculiarities and the characteristics of the produced AW as well as, the local meteorological conditions.

It is, therefore, recommended that a monitoring tool fully suited to AW reuse in the agricultural sector should include:

- An optimized set of soil quality indicators
- Threshold values for the quality indicators
- Periodical soil and water quality monitoring

In addition, it is recommended to record and monitor areas of waste reuse using GIS web tools which allow easy and visualized evaluation by local authorities, scientists, and others.