

European directives 86/278 (utilization in agriculture), 2008/98 (wastes)

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Directive 86/278

Sludge definition

- ⇒ Residual sludge from sewage plants treating domestic or urban waste waters and from other sewage plants treating waste waters of a composition similar to domestic and urban waste waters.
- ⇒ Sludge shall be treated before being used in agriculture. Member States may nevertheless authorize, under conditions to be laid down by them, the use of untreated sludge if it is injected or worked into the soil.

Prohibitions

- ⇒ Use on grassland or forage crops if the grassland is to be grazed or the forage crops to be harvested before a certain period has elapsed. This period, which shall be set by the Member States taking particular account of their geographical and climatic situation, shall under no circumstances be less than three weeks;
- ⇒ Use on soil in which fruit and vegetable crops are growing, with the exception of fruit trees;
- ⇒ Use on ground intended for the cultivation of fruit and vegetable crops which are normally in direct contact with the soil and normally eaten raw, for a period of 10 months preceding the harvest of the crops and during the harvest itself.

Rules to be observed

- ⇒ The sludge shall be used in such a way that account is taken of the nutrient needs of the plants and that the quality of the soil and of the surface and ground water is not impaired;
- ⇒ Where sludge is used on soils of which the pH is below 6, Member States shall take into account the increased mobility and availability to the crop of heavy metals and shall, if necessary, reduce the limit values.

Up-date recording of Member States

- ⇒ The quantities of sludge produced and the quantities supplied for use in agriculture;
- ⇒ The composition and properties of the sludge in relation to the parameters referred to in Annex II A;
- ⇒ The type of treatment carried out;
- ⇒ The names and addresses of the recipients of the sludge and the place where the sludge is to be used.

Limit values for concentrations of heavy metals in soil (mg/kg of dry matter in a representative sample of soil with a pH 6 to 7

Parameters	Limit values ⁽¹⁾
Cadmium	1 to 3
Copper ⁽²⁾	50 to 140
Nickel ⁽²⁾	30 to 75
Lead	50 to 300
Zinc ⁽²⁾	150 to 300
Mercury	1 to 1,5
Chromium ⁽³⁾	—

⁽¹⁾ Member States may permit the limit values they fix to be exceeded in the case of the use of sludge on land which at the time of notification of this Directive is dedicated to the disposal of sludge but on which commercial food crops are being grown exclusively for animal consumption. Member States must inform the Commission of the number and type of sites concerned. They must also seek to ensure that there is no resulting hazard to human health or the environment.

⁽²⁾ Member States may permit the limit values they fix to be exceeded in respect of these parameters on soil with a pH consistently higher than 7. The maximum authorized concentrations of these heavy metals must in no case exceed those values by more than 50 %. Member States must also seek to ensure that there is no resulting hazard to human health or the environment and in particular to ground water.

⁽³⁾ It is not possible at this stage to fix limit values for chromium. The Council will fix these limit values later on the basis of proposals to be submitted by the Commission, within one year following notification of this Directive.

Limit values for heavy metals concentration in sludge for use in agriculture

Parameters	Limit values
Cadmium	20 to 40
Copper	1 000 to 1 750
Nickel	300 to 400
Lead	750 to 1 200
Zinc	2 500 to 4 000
Mercury	16 to 25
Chromium (1)	—

(1) It is not possible at this stage to fix limit values for chromium. The Council will fix these limit values later on the basis of proposals to be submitted by the Commission within one year following notification of this Directive.

Limit values for amount of heavy metals (kg/ha/year) which may be added annually to agricultural land based on a 10 year average

Parameters	Limit values ⁽¹⁾
Cadmium	0,15
Copper	12
Nickel	3
Lead	15
Zinc	30
Mercury	0,1
Chromium ⁽²⁾	—

⁽¹⁾ Member States may permit these limit values to be exceeded in the case of the use of sludge on land which at the time of notification of this Directive is dedicated to the disposal of sludge but on which commercial food crops are being grown exclusively for animal consumption. Member States must inform the Commission of the number and type of sites concerned. They must also ensure that there is no resulting hazard to human health or the environment.

⁽²⁾ It is not possible at this stage to fix limit values for chromium. The Council will fix these limit values later on the basis of proposals to be submitted by the Commission within one year following notification of this Directive.

Sludge analysis

1. As a rule, sludge must be analyzed at least every six months. Where changes occur in the characteristics of the waste water being treated, the frequency of the analyses must be increased. If the results of the analyses do not vary significantly over a full year, the sludge must be analyzed at least every 12 months.
3. Subject to the provisions of paragraph 4, analysis should cover the following parameters:
 - dry matter, organic matter,
 - pH,
 - nitrogen and phosphorus,
 - cadmium, copper, nickel, lead, zinc, mercury, chromium.
4. In the case of copper, zinc and chromium, where it has been shown, to the satisfaction of the competent authority of the Member State concerned that they are either not present at all or present only in negligible quantities in the waste water treated by the sewage plant, Member States shall decide on the frequency of the analyses to be carried out.

Soil analysis

1. Whenever sludge other than sludge from the treatment plants referred to in Article 11 is used, Member States must first ensure that the heavy metal content of the soil does not exceed the limit values laid down in accordance with Annex IA. For this purpose, Member States shall decide what analyses to carry out, taking account of available scientific data on soil characteristics and homogeneity.
2. Member States shall decide on the frequency of further analyses, taking account of the metal content of the soil prior to the use of sludge, the quantity and composition of the sludge used and any other relevant factors.
3. Analysis should cover the following parameters:
 - pH,
 - cadmium, copper, nickel, lead, zinc, mercury and chromium.

Sampling and analysis method

1. Soil sampling

The representative soil samples for analysis should normally be made up by mixing together 25 core samples taken over an area not exceeding 5 hectares which is farmed for the same purpose.

The samples must be taken to a depth of 25 cm unless the depth of the surface soil is less than that value; however, the sampling depth in the latter case must not be less than 10 cm.

2. Sludge sampling

Sludge must be sampled after processing, but before delivery to the user, and should be representative of the sludge production.

3. Methods of analysis

Analysis for heavy metals must be carried out following strong acid digestion. The reference method of analysis must be that of atomic absorption spectrometry and the limit of detection for each metal should be no greater than 10 % of the appropriate limit value.

Directive 2008/98

⇒ Objectives of this directive

- ✧ Prevention and reduction of environmental impact due to the use of resources;
- ✧ Decoupling the economic growth from the environmental impact due to the wastes produced;
- ✧ Recycling as much as possible avoiding the waste production and maximizing the waste utilisation as resources.

The principle of decoupling

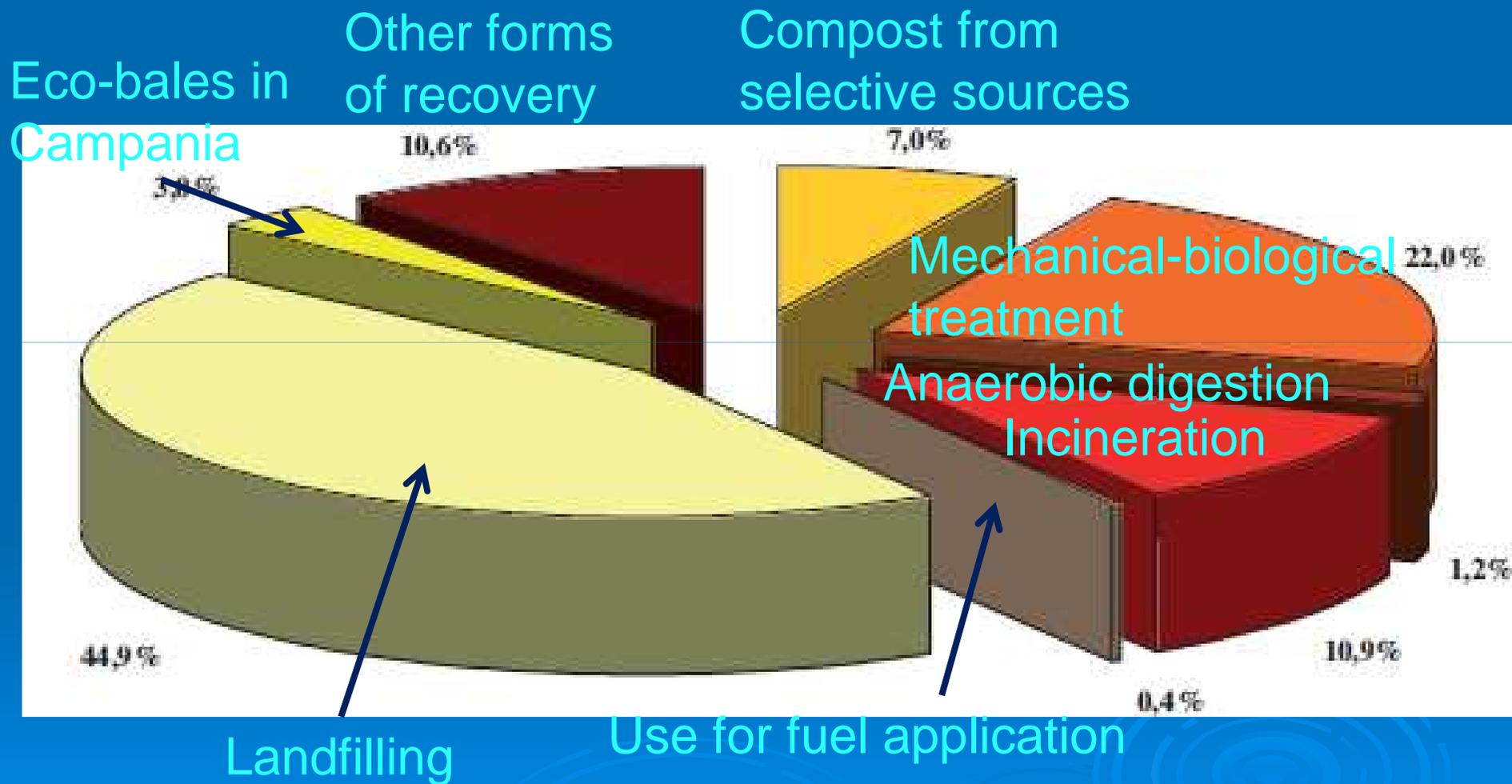
- ⇒ The Member States have to prepare prevention programmes for wastes addressed to minimizing the whole environmental impact due to waste management and taking into account the whole life cycle of products and materials.
- ⇒ The above measures should be addressed to decoupling the economic growth with the waste production.

Prevention

⇒ By the end of 2011 the Commission has to present to the European Parliament an intermediate report on:

- a) Evolution of waste production;
- b) Evolution of waste prevention;
- c) Setting up a politics of ecological design of products allowing to reduce the waste production and their content of noxious substances;
- d) Setting up an action plan for modifying the current consumerism.

Current outlets of wastes in Italy



Waste hierarchy

- a) prevention;
- b) preparing for re-use;
- c) recycling;
- d) other recovery, e.g. energy recovery; and
- e) disposal.

When applying the waste hierarchy, Member States shall take measures to encourage the options that deliver the best overall environmental outcome.

This may require specific waste streams departing from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste.

From the waste to a bio-product

- ⇒ A substance or object, resulting from a production process, the primary aim of which is not the production of that item, may be regarded as not being waste but as being a by-product only if the following conditions are met together:
- a) further use of the substance or object is certain;
 - b) the substance or object can be used directly without any further processing other than normal industrial practice;
 - c) the substance or object is produced as an integral part of a production process;
 - d) further use is lawful, i.e. the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

End-of-waste status

- ⇒ Certain specified waste shall cease to be waste when it has undergone a recovery, including recycling, operation and complies with specific criteria to be developed in accordance with the following conditions:
- a) the substance or object is commonly used for specific purposes;
 - b) a market or demand exists for such a substance or object;
 - c) the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products;
 - d) the use of the substance or object will not lead to overall adverse environmental or human health impacts.

Can sewage sludge reach the end-of-waste status?

- ⇒ Yes, when it is commonly used for specific purposes, for example for beneficial growing of crops, and when
- ⇒ A market or demand exists, and when
- ⇒ Sludge fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products (see compost for example), and when
- ⇒ The use of sludge does not lead to overall adverse environmental or human health impact.

Critical aspects for reaching the end-of-waste status

- ⇒ It is very difficult to establish a market or to sustain the sludge demand to such an high extent to overcome the sludge production.
- ⇒ It might be very difficult to meet the technical requirements for products.
- ⇒ It is currently a great concern regarding the presence of pathogens and organic micropollutants, with specific regards to pharmaceutical compounds and endocrine disruptors. Many sewage sludge might pose much more higher problems than industrial sludge.

Conclusions

- ⇒ In the coming years we still expect to continue and manage sewage sludge as a waste.
- ⇒ The term biosolids for sewage sludge is currently outside the European way of thinking and legislation.