European Union Network for the Implementation and Enforcement of Environmental Law

Sustainable Landspreading Report

***Date of report: November* 2021**

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Introduction to IMPEL

The European Union Network for the Implementation and Enforcement of Environmental Law (IMPEL) is an international non-profit association of the environmental authorities of the EU Member States, acceding and candidate countries of the European Union and EEA countries. The association is registered in Belgium and its legal seat is in Brussels, Belgium.

IMPEL was set up in 1992 as an informal Network of European regulators and authorities concerned with the implementation and enforcement of environmental law. The Network's objective is to create the necessary impetus in the European Community to make progress on ensuring a more effective application of environmental legislation. The core of the IMPEL activities concerns awareness raising, capacity building and exchange of information and experiences on implementation, enforcement and international enforcement collaboration as well as promoting and supporting the practicability and enforceability of European environmental legislation.

During the previous years IMPEL has developed into a considerable, widely known organisation, being mentioned in a number of EU legislative and policy documents, e.g. the 7th Environment Action Programme and the Recommendation on Minimum Criteria for Environmental Inspections.

The expertise and experience of the participants within IMPEL make the network uniquely qualified to work on both technical and regulatory aspects of EU environmental legislation.

Information on the IMPEL Network is also available through its website at: www.impel.eu

Title of the report:	Number report:
Sustainable Landspreading Report	2020/12
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Executive Summary

This is the report for the IMPEL 'Sustainable Landspreading' project based on the results of a questionnaire provided to Impel members between December 2020 and April 2021. This work is part of the overarching 'Safeguarding the Water Environment Throughout Europe (SWETE) project which is overseen by IMPEL's Land and Water Expert Team.

This phase of the project builds on the previous phases of SWETE, discussions at the Land and Water Expert Team Meeting in Rome in October 2019 and a workshop at Cranfield University in 2020 the results of which were presented in the 'Landspreading Materials Conference Report, in 2020.

This follow up work was necessary to assess how circular economy principles where being applied to support reuse of materials on land as fertilisers and soil conditioners and to ensure this support for reuse is undertaken in a manner that does not allow unacceptable and avoidable impacts on soil health and quality.

The aims were to compare and contrast the different approaches to sludge management in different member countries and organisations to highlight common problems, solutions and areas of best practice as examples for others to learn from.

In phase II of this work, the project team produced a questionnaire (24 questions) designed to

gather information to help achieve these aims. The questionnaire was circulated to IMPEL's Water and Land Expert Team, put on Basecamp, sent to IMEPL national coordinators and provided directly to contacts that the project team were aware of from previous work.

In total completed questionnaires were received from 8 countries. In addition 6 responses were received from different Italian regions.

Although the response rate was lower than the project team would have wished it was still possible to obtain interesting and useful information from the questionnaires. The main conclusions identified by the project team are shown below. The question from which the conclusion was obtained are referenced in brackets.

Summary of Conclusions

1) (Q10) The way that sludge is characterised is different across the responders. In England it is traditionally associated with heavy industry i.e. heavy metals but in Italy (Lombardia region) it is more modern and considers more modern industries and their associated contaminants such as pharmaceuticals.
2) (Italian regional responses) Different industries across the Italian regions (e.g. agricultural, industrial) affect whether sludge is viewed as a waste or a resource. For example, Puglia is a rural area with lots of agriculture and views sludge as a resource.
3) (Q4 and 5) There is a recognition from the different responders that septic tank sludge is different to sludge produced by water companies, but only England and Wales appear to allow untreated septic tank sludge to be spread to land without treatment
4) (Q14) There is not a good awareness of where the main sources of contaminants such as metals and plastic in sludge come from
5) (Q1) Eight countries responded and all countries have an awareness of how much sludge they produce. However, it is not clear whether the tonnages were being reported as tonnes dry solids or wet tonnes.
6) (Q2) With the exception of Belgium all corresponding countries allow spreading of sludge to land. Belgium only allows the spreading of non-sewage sludge to land. Slovenia doesn't use agricultural land as an outlet and Portugal doesn't use agricultural often.
7) (Q3) What is surprising is the low uptake of land restoration with only England and Iceland using brownfield and landfill restoration as an outlet for sludge. For the remaining countries that responded, there is a varied picture of landfill use ranging from not used to commonly used. The same is the case for incineration.
8) (Q4) Half of the responding countries don't differentiate between sludge produced by water companies and other sources such as septic tank sludge. The other half

appear to differentiate between these 2 waste streams which is evident through their waste classification.

9) (Q5) Only the UK (England and Wales) identified the acceptable use of untreated septic tank sludge to land.
10) (Q6) It varies across the responding countries whether sludge is managed nationally or regionally.
11) (Q7) There is a mixture of public and private ownership across the responding countries with only England identifying that all companies are privately owned.
12) (Q8) The regulation controlling the use of sludge was shown to be associated with a European Directive with individual country implementation of this domestic legislation.
13) (Q9) Not all countries are able to report on how their sludge is treated. Those that did respond showed that there is a variation in treatment technologies. Predominant treatment technologies appear to be digestion followed by composting and the addition of lime.
14) (Q10) Slovenia does not collect information on what contaminants are tested in the sludge. The majority of the respondents' test for selected metals.
15) (Q11) There is export of sludge from 5 out of 8 of the responding countries.
16) (Q12) Unable to comment on whether there is a pattern of integration of sludge and other materials across the countries. There is some indication of sludge being combined with other wastes, but the picture is unclear.
17) (Q13) Most countries recognise that there are problems with environmental and public amenity issues associated with sewage sludge.
18) (Q16) Responders appear to understand the generic risks associated with sludge, but not the specific risks associated with their own sludge.
19) (Q17) There is variable public interest across the countries, which seems to t increase or decrease as local issues concerning sludge arise.
20) (Q18) Recognition by several countries of the age of the regulations used to control sludge.

The project team considers that these conclusions indicate areas which would be useful to investigate further as part of a possible further phase of this project.

The project team would like to thank all colleagues and IMPEL members who kindly contributed to this project by providing completed questionnaires.

TABLE OF CONTENTS

Introduction and Background

Many different waste materials may be spread on land across Europe. This includes industrial and domestic material such as food and paper waste, anaerobic digestate, compost and different types of ash. Perhaps the most significant waste that may be spread to land from a volume and environmental perspective is sewage sludge; the residual solid waste left over from the treatment of urban waste waters.

Sludge is made up of domestic and industrial effluents and surface water run-off. It mostly comes from wastewater recycling centres (sewage plants). Some of it comes from private treatment such as package treatment plants or septic tanks.

Sludge contains useful levels of organic matter and plant nutrients. It can also contain chemicals, microplastics and pathogens that could risk human health and the environment.

Although regulators and others use the term sewage sludge some producers and end users use the term biosolids for treated sludge. This reflects the different perspectives of those involved in the sludge production and supply chain.

Some European countries, notably the UK, consider that the most sustainable option is to recycle it to agricultural land as organic manure.

An organic manure is fertilizer which comes from animal, plant or human sources. Organic manures commonly used in agriculture include:

- animal manure or slurry
- compost
- anaerobic digestate
- biosolids and septic tank sludge

Sludge can provide beneficial amounts of organic matter and nutrients to the soil. It is important to manage sludge properly to make sure:

- sludge treatment, storage and uses are sustainable
- risks to the environment, soil, plants, animal and human health are understood and addressed
- farmers and land managers can safely spread it to benefit land

If sludge is not correctly managed and used to benefit soil, it needs to be disposed of in other ways. Even in the UK sludge management is being considered as part of a new sludge strategy driven by drivers which include:

- there have been changes to treatment processes, with a greater focus on digestion and the energy value of sludge
- new hazards are emerging compared to the previously considered metals from heavy industry
- there have been over application concerns, complaints, pollution and poor management practices involving sludge and more so septic tank sludge

Delegates from across Europe attending the Landspreading Conference at Cranfield University in 2021 confirmed that these issues were of concern in their countries. Indeed, some European countries do not allow the spreading of sewage sludge to land because of these current and emerging concerns. For these countries' other possible disposal routes for sludge include incineration or landfill.

This phase of the SWETE project builds on the previous phases of SWETE and discussions at the Land and Water Expert Team Meeting in Rome in October 2019 and the Cranfield conference in 2020 the results of which were presented in the 'Landspreading Materials Conference Report'.

This follow up work was necessary to properly apply circular economy principles to support reuse of materials on land as fertilisers and soil conditioners and to ensure this support for reuse is undertaken in a manner that does not allow unacceptable and avoidable impacts on soil health and quality.

This report presents the findings of a survey which had the aims of comparing and contrasting the different approaches to sludge management in different member countries and organisations to highlight common problems, solutions and areas of best practice as examples for others to learn from.

Survey Development and Format

The project team developed the questionnaire (24 questions) informed by their knowledge of landspreading practices and by the outcomes of the 2020 Cranfield Conference. The questions were designed to gather information to help achieve the project aims which were:

- to compare and contrast the different approaches to sludge management in different member countries and organisations
- to highlight common problems, solutions and areas of best practice as examples for others to learn from.

The questions were divided into the following sections:

- Sludge Management in your country
- Problems and Issues
- Knowledge
- Good practice and solutions

The final list of questions are included in annex 1.

Responses

The questionnaire was circulated to IMPEL's Water and Land Expert Team, put on Basecamp, sent to IMEPL national coordinators and provided directly to contacts that the project team were aware of from previous work.

In total completed questionnaires were received from 8 countries. In addition, 6 responses were received from different Italian regions. Some questions were not answered by all respondees.

The contributing countries/regions were:

- Azores
- Wales
- Portugal
- Slovenia
- Belgium
- Iceland
- England

and the Italian Regions of:

- FVG
- Compania
- Lombardia
- Marche
- Puglia
- Veneto

Although the response rate was lower than the project team would have wished it was still possible to obtain interesting and useful information from the questionnaires. The project team is very grateful to everyone who provided a response.

The consolidated responses are provided in annex 2.

Conclusions

The main conclusions identified by the project team are shown below. These reference the question from which the conclusion was obtained.

1) (Q10) The way that sludge is characterised is different across the responders. In England it is traditionally associated with heavy industry i.e. heavy metals but in Italy (Lombardia

region) it is more modern and considers more modern industries and their associated contaminants such as pharmaceuticals.

2) (Italian responses) Different industries across the Italian regions (e.g. agricultural, industrial) affect whether sludge is viewed as a waste or a resource. For example Puglia is a rural area with lots of agriculture and views sludge as a resource.
3) (Q4 and 5) There is a recognition from the different responders that septic tank sludge is different to sludge produced by water companies, but only England and Wales appear to allow untreated septic tank sludge to be spread to land without treatment
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9) (Q5) Only the UK (England and Wales) identified the acceptable use of untreated septic tank sludge to land.
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12) (Q8) The regulation controlling the use of sludge was shown to be associated with a European Directive with individual country implementation of this domestic legislation.
13) (Q9) Not all countries are able to report on how their sludge is treated. Those that did respond showed that there is a variation in treatment technologies. Predominant treatment technologies appear to be digestion followed by composting and the addition of lime.
14) (Q10) Slovenia does not collect information on what contaminants are tested in the sludge. The majority of the respondents test for selected metals.

15) (Q11) There is export of sludge from 5 out of 8 of the responding countries.
16) (Q12) Unable to comment on whether there is a pattern of integration of sludge and other materials across the countries. There is some indication of sludge being combined with other wastes but the picture is unclear.
17) (Q13) Most countries recognise that there are problems with environmental and public amenity issues associated with sewage sludge.
18) (Q16) Responders appear to understand the generic risks associated with sludge, but not the specific risks associated with their own sludge.
19) (Q17) There is variable public interest across the countries, with a suspicion that it increases or decreases across local issues.
20) (Q18) Recognition by several countries of the age of the regulations used to control sludge.

Recommendations and next steps

The project team considers that these conclusions provide a number of areas which would be useful to investigate further as part of the next phase (Phase III) of the project. These conclusions provide a basis for further investigation to provide possible guidance and best practice for other IMPEL members to benefit from.

Annexes

a) Sludge Management in your country

1) Approximately how much sludge is produced by your country annually? (Estimate if necessary)

2) Is landspreading of sludge allowed in your country? (If so under what circumstances?)

3) Where does the sludge go to? Score from 1 (not used) to 5 (most used) for each category.

- Agricultural landspreading 1 2 3 4 5
- Other landspreading 1 2 3 4 5
- Land restoration 1 2 3 4 5
- Landfill 1 2 3 4 5
- Incineration 1 2 3 4 5
- Other 1 2 3 4 5

4) Do you distinguish between sludge produced by water companies (or your sewerage and sewage treatment provider) at sewage works and other sources such as septic tank sludge

5) Does your country allow spreading of untreated septic tank sludge direct to land?

6) Is sludge in your country regulated nationally or regionally?

7) Are the Water Companies or your sewerage and sewage treatment provider (as sludge producers) in your country in public or private ownership? Approximately how many are there?

8) What is the main national regulation governing sludge and how does it operate?

9) What treatment methods are used for sludge in your country? Score from 1 (not used) to 5 (most used) for each category.

• Digestion	1	2	3	4	5
• Composting	1	2	3	4	5
• Heat treatment	1	2	3	4	5
• Addition of lime	1	2	3	4	5
• Long term storage	1	2	3	4	5
• Addition of other wastes	1	2	3	4	5

10) What contaminants are tested for in your sludge? Consider:

• Chemicals	yes	no
• Plastics	yes	no
• Pharmaceuticals	yes	no
• Metals	yes	no
• Any other contaminants?		

11) Does your country export sludge to another country? (if so which one(s)?)

12) Is your sludge combined with other wastes in your country? Score from 1 (not relevant) to 5 (most relevant) for each category

• Green wastes	1	2	3	4	5
• Industrial effluents	1	2	3	4	5
• Industrial solid wastes	1	2	3	4	5
• Other (explain what)	1	2	3	4	5

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b) Problems and Issues

13) What problems and issues does sewage sludge management present in your country or region? Consider the following:

- Environmental
- Political

- Public awareness or Pressure Grps
- Regulatory
- Operational
- Market effects (eg is sludge traded between different water companies)

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c) Knowledge

14) Do you know where the main source of contamination (Chemicals, plastics etc) in your countries sludge comes from?

15) Is there any research currently being done into sludge in your country? (Please make reference to any documents also in your home language)

16) Have you a good knowledge of the environmental impacts of sludge in your country?

17) Does the management of sludge have a high profile in your country? Do Environmental Pressure Grps show an interest in how sludge is managed?

18) Do the regulations in your country reflect the current knowledge concerning sludge treatment and usage? Or is there a gap between the two?

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d) Good practice and solutions

19) What changes to the regulation of sludge could help a framework of sustainable landspreading?

20) What changes to the management of sludge (*under existing regulation*) could help a framework of sustainable landspreading?

21) Would this resolve most of the existing problems?

22) What is preventing these changes being implemented?
23) Are there aspects of sludge management or regulation in your country that you consider as good practice and would like to share with others?

Have you any other comments concerning the management of sludge in your country that you would like to make?

Country	Azores	Wales	Portugal	Slovenia	Belgium	Iceland	England	Italy (consolidated)
1) Approximately how much sludge is produced by your country annually? (Estimate if necessary)								
	7183 ton (data from 2019), only in the Azores islands.	38,648 Tds	All types of sludge: 2016- 611,989 tons 2017- 750,293 tons 2018- 839,129 tons UWWT sludge: 2016- 428,967 tons 2017- 517,222 tons 2018- 551,130 tons	Approximately 35.000 ton (in dry substance)	UWWT sludge: 1.472 kT in 2018 (food)industry sludge: 629,6 kT	Approximately 458 tons.	2020 data – 807,882tds	Approximately 441,722 tons
2) Is land spreading of sludge allowed in your country? (If so under what circumstances?)								

	Yes. Only treated sludge that meet contaminant limits provided by regulation.	Yes	Yes, the referred spreading operation, agronomically identified as agricultural sludge recovery (valorização agrícola de lamas – "VAL"), is allowed when the requirements defined in Portuguese law are accomplished (DL nº. 276/2009, of 2nd of October)	If sludge from a municipal sewage treatment plant is intended to be used in agriculture or placed on the market for agricultural use, sludge must be processed. Regular measurement of treated sludge parameters must be always provided. The Ministry shall report to the Commission every three years.	UWWT sludge is not allowed, but sludge originating from the (food)industry is allowed If treated: see VLAREMA annex 2.3.1.D 1° Under certain circumstances: VLAREMA article 5.3.2.4	Iceland has implemented the Sewage sludge directive 86/278 and follows those requirements. It´s use is allowed in agriculture (treated before) and has to be worked into the soil.	Yes, under SUiAR to agricultural land and under EPR land spreading permits to non-agricultural land, including restoration sites, some dedicated sites	Yes, though each region faces different constraints
3) Where does the sludge go to? Score from 1 (not used) to 5 (most used) for each category.								
Agricultural land spreading	5	5	2	1	3	1	5	2-5
Other land spreading	1	1	1	1	1	1	2	1-2
Land	1	1	1	1	1	3	4	1

restoration								
Landfill	4	1	1	3	1	5	3	1-5
Incineration	4	1	1	4	1	1	4	2
Other	4	1	1	5	3 digestion> agricultural land spreading	1	3 industrial use: cement	1-5 composting
4) Do you distinguish between sludge produced by water companies (or your sewerage and sewage treatment provider) at sewage works and other sources such as septic tank sludge								
	No. (Septic tank sludge sent to wastewater treatment plants for treatment)	Yes, in terms of where the waste is sourced and sector that generates them. There is currently separate reference to them under the regulations.	Yes, article 3 of DL nr. 276/2009, identifies the different types of sludge, depending on its origin; they all have different codes according to the LIST OF WASTE (Directive 2014/955/EU).	No	We distinguish two kinds of sludge, i.e. VLAREMA article 1.2.1 § 2 90°: (a) sludge derived from domestic or municipal wastewater treatment plants; (b) sludge from treatment plants for commercial wastewater; Sceptic tank sludge must be collected and treated in a municipal waste water treatment plant.	No	Yes. Septic tank waste-20 03 04; cess pool waste-20 03 09, raw sewage sludge-19 08 05 Regulatory position statement 231 provides further details on how sewage is coded	Yes
5) Does your country allow spreading of untreated septic tank sludge direct to land?								
	No	Yes, under sludge regs with requirement	In accordance with article 12, nr 1, point c) of DL nr.	No	No	No	Yes	No

		to either inject or work in asap	276/2009, of 2nd of October, it can only be subject to VAL, the sludge that meets the quality criteria foreseen in this same diploma, namely with regard to the concentration of heavy metals and organic compounds and also the presence of certain microorganisms - Escherichia coli. and salmonella. The control of microbial activity is only possible with the previous treatment of the sludge, so it is considered that it is not possible to value untreated sludge agriculturally.					
6) Is sludge in your country regulated nationally or regionally?								

	Regionally (for the Azores).	Nationally	In Portugal, the diploma DL nr. 276/2009, of 2nd of October, establishes the regime for the use of sewage sludge and sludge of similar composition in agricultural soils, transposing into the internal legal order Directive nr. 86/278/EEC, of the Council, of 12th of June.	Nationally	Regionally (waste regulation) +nationally (fertiliser regulation)	Nationally, but regional health inspectorate are responsible for enforcement in their area.	Nationally	Both
7) Are the Water Companies or your sewerage and sewage treatment provider (as sludge producers) in your country in public or private ownership? Approximately how many are there?								
	Public ownership. 19 public entities on the Azores.	Private – not for profit	Urban Waste Water Treatment Plants (WWTP) are generally managed by public companies. About 60 management entities, sludge-	They are in public and in private ownership. There are approx. 100 companies, mostly in public ownership.	6 private drink water companies (according to Flemish federation for water and sewage companies. Aquafin (private-public) is the only company in Flanders responsible for treatment of urban waste water	Almost all are in public ownership (municipalities). I can only think of one that is privately owned. Approximately one for each municipality so around 60-70.	9 English water companies, all privately owned.	Over 40 across 6 regions either public, private or a mix of both

			producing “organizations” are identified, which in most cases manage more than one WWTP. The remaining WWTPs that produce sludge within the scope of the Sludge Diploma are produced mainly by private operators, especially the paper and agri-food industry.					
8) What is the main national regulation governing sludge and how does it operate?								
	In the Azores, the regulation for sludge is the Decreto Legislativo Regional n.º 18/2009/A and the governing body is the	Sludge (Use in Agriculture) Regulations 1989 Environmental Permitting Regulations	National diploma nr. 276/2009, of 2nd of October, as mentioned, establishes the regime for the use of sewage sludge and sludge of similar	Decree on the discharge and treatment of municipal wastewater (URL RS, št. 98/15, 76/17 in 81/19).- for the use of sewage sludge in	Regional regulation, cfr. 2) In addition to the regional regulation, on the federal level one needs the permission to apply (food)industry sludge on land. (https://fytoweb.be/nl/meststoffen/zuiveringsslib)	The Sewage sludge directive 86/278. https://www.reglugerd.is/reglugerdir/eftir-raduneytum/umhverfisraduneyti/nr/4292	The Environment Agency Regulate the use of sewage sludge under the Sludge Use in Agriculture Regulations (1989), treatment of	National decree n. 99/1992

	environmental department of the Azores (Direção Regional do Ambiente), which collects information on sludge production and is responsible for land spreading permit emission.		composition in agricultural soils, transposing into the internal legal order Directive nr. 86/278/CEE, of the Council, of 12th June, in order to avoid harmful effects for man, animals, vegetation and the environment, especially soils and water, promoting its correct use.	agriculture: Decree on the use of sludge from municipal sewage treatment plants in agriculture (URL RS, št. 62/08)			sludge is regulated under the Environmental Permitting (England and Wales) Regulations 2010	
9) **What treatment methods are used for sludge in your country? Score from 1 (not used) to 5 (most used) for each category.**								
				We do not collect data on this	Municipal sewage sludge: 100% incineration (0% landfill) Industry sludge: *Cfr. Treatment criteria Vlarema BIJLAGE 2.3.1.D 1°, mandatory treatments before use on agricultural soils.	Not known, but most likely addition of lime.		

Digestion	5	5	1		3		5	2-5
Composting	4	1	1		2		3	3-5
Heat treatment	1	1	1		5*		2	1-2
Addition of lime	1	3	5		5*		4	2-4
Long term storage	4	1	1		5*		2	1-2
Addition of other wastes	1	1	1				2	1-3
10) What contaminants are tested for in your sludge?								
				We do not collect data on this.				
Chemicals	Yes	Yes	5 (organic compounds)		Yes	No	No	Yes
Plastics	No	No	1		No	No	No	No
Pharmaceuticals	No	No	1		No	No	No	No (except Lombardia)
Metals	Yes	Yes	5		Yes	Yes	Yes	Yes
Any other contaminants?	No	Pathogens	5 (microorganisms)		No	No	Pathogens (voluntarily) nutrients (regulatory requirement)	Salmonella, Bacteria, PAHs, PCBs, Dioxins, Hydrocarbons Other contaminants such as organic compounds, micro organic contaminants as PCDD, PCB, IPA, and

								biological.
11) Does your country export sludge to another country? (If so which one(s)?)								
	No	Small quantity to England	Currently, we have only undergoing, one process for sludge removal from Urban WWTP to Spain	Yes, In 2018 and 2019 sludge was exported to Hungary.	Yes, France (treated commercial sludge for agricultural land spreading).	No	Yes, within UK	Yes, within Italian regions, Spain and Hungary
12) Is your sludge combined with other wastes in your country? Score from 1 (not relevant) to 5 (most relevant) for each category								
			No complete answer to this question. Urban WWTP sludge is in most situations composted on its own, however, sometimes it may occur it's mixing with other types of sludge such as paper pulp or the agri-food industry (what might be referred to as industrial effluents). The	We were unable to obtain this information/data.				

			mixing of other types of Waste typology is also not very frequent and the amounts of sludge are clearly prevalent. Green waste is used as a mixture in some waste management operators.					
Green wastes	4	1			1	1	4	3-5
Industrial effluents	1	1			1	1	4	1-2
Industrial solid wastes	1	1			3	1	2	1-3
Other (explain what)	1	1			3 Commercial sludge is mixed during treatment with organic industrial waste, agricultural waste or animal manure, or after treatment with other organic soil improvers/fertilisers.	1	5 - Final effluent, Food waste (co-digestion) potential	1-5

13) What problems and issues does sewage sludge management present in your country or region?

	Environment	Environmenta	Response in the context of	We were unable to	Environmental	Most agglomerations are discharging wastewater	Environmental, political, public	Environmental, political, public

	al Operational	l Public awareness Pressure Grps Regulatory Operational	agricultural sludge recovery (VAL): <u>Associated environmental problems:</u> a) Non-compliance with the quality criteria, as they contain substances harmful to the soil where they are applied, such as heavy metals, organic chemical contaminants and pathogenic microorganisms. The presence of these substances can devalue or even render the sludge useless, thus preventing them from being used as an agricultural fertilizer, either as fertilizer or as a corrective; b) The volatilization of pollutants into	obtain this information/data.	Regulatory	into less sensitive area and regulations in Iceland only require primary treatment to be done with screening. Many smaller agglomerations under 10.000 pe. do not have any treatment so very little sludge is collected. Due to no political pressure and large cost regarding wastewater treatment for small communities, little emphasis has been on better wastewater treatment or sludge management. That is though changing and the government is giving municipalities financial support for waste water treatment and more interest is in the use of sludge.	awareness and pressure groups, regulatory, operational, market effects	awareness and pressure groups, regulatory, operational

			the air and the consequent production of bad odours when not properly treated / sanitized. <u>Operational problems:</u> When the conditions defined in DL 276/2009 are not fulfilled, which contributes to the above mentioned problems					
14) Do you know where the main source of contamination (Chemicals, plastics etc.) in your countries sludge comes from?								
	No	Likely from the sewer via domestic and trade effluents	Known and analyzed contaminants: microbiological contamination, heavy metals and organic compounds	We were unable to obtain this information/data.	The main sources of sludge pollution are agriculture, domestic and industrial activities. In all cases, these are both direct discharges and discharges through sewage treatment plants. Hence also sludge originating from these treatment plants contains	No	Domestic and industrial sources and surface run off (highways), further details required	Metals. Industrial effluent

					contaminations.			
15) Is there any research currently being done into sludge in your country? (Please make reference to any documents also in your home language)								
	Not that I know	Not directly	Study undergoing on National Institute for agriculture and a veterinary investigation (INIAV - Instituto Nacional de Investigação Agrária e Veterinária, I.P.) in collaboration with AEVO Innovate.	We were unable to obtain this information/data.	Currently the UGent and Vlaamse Milieumaatschappij (VMM) are conducting a study about microplastics in sludge (contact person ma.verdievel@vmm.be) Aquafin is conducting research on raw material recovery within the current treatment plant and on alternative techniques (https://www.aquafin.be/nl-be/onderzoekers/energie-en-grondstoffen/verwerkingstechnieken-voor-slib) Research on emerging contaminants is ongoing.	Agency commissioned an analysis of greenhouse gas emissions from primary treatment was made this year. https://ust.is/library/sida/haf-og-vatn/Greinarger%c3%b0%20um%20aukna%20s%c3%b6fnun%20seyru%20og%20losun%20GHL%20161220.pdf A new study is underway where available organic waste types are mapped and their nutritional content calculated. Then the aim is to look for solutions to adjust the nutritional content so that it is suitable as a fertilizer. https://matis.is/matis-og-samstarfsadilar-hljota-um-150-milljona-krona-styrk-ur-markaaetlun/	Chemical Investigation Programme	In Lombardia and Puglia. Lombardia-regional waste program with special part for sludge, Puglia there are some experimental project as reported below: - BFBios – BioFuel and Biomethane from Sludge; - RONSAS Project– Recovery of Organics and Nutrients from Sludge on Apulian Soil.

16) Have you a good knowledge of the environmental impacts of sludge in your country?								
	Theoretically, yes.	Mainly from a nutrient's perspective	YES a) Negative environmental impacts identified in inspection operations, associated with soil contamination, water and air; b) Positive environmental impacts: as a fertilizer, when it meets the quality criteria.	We were unable to obtain this information/data.	Yes, we have knowledge of the composition of sludge and its applications.	Yes I would say so but we are also working on acquiring better knowledge as there is more interest in the matter today.	In development	Generally yes across the regions
17) Does the management of sludge have a high profile in your country? Do Environmental Pressure Groups show an interest in how sludge is managed?								
	No.	No	It allows the development of VAL activity, ensuring that the application of sludge does not affect the quality of the environment, especially water and soil, and does not constitute a risk to public	Yes, special last years.	No	No, not much. I would say that the public organisation *The soil conservation service of Iceland* has been the driving force as of yet.	Yes, in recent years	Yes, with particular interest in experimental technologies to reduce sludge production (in Puglia)

			health. Yes, they demonstrate, through the publication of articles, for example, denouncing some bad practices associated with unsustainable sludge management.					
18) Do the regulations in your country reflect the current knowledge concerning sludge treatment and usage? Or is there a gap between the two?								
	Yes	Current legislation is out of date with current practices and emerging risks	Yes, The regulation defines operational, control and monitoring procedures, aiming to safeguard not only the quality of the sludge itself, but also the characteristics of the soil and climate of the regions where they will be	We were unable to obtain this information/data.	Research is ongoing for the knowledge gap concerning emerging contaminants.	Similar to the rest of Europe, I think? That is we need more information on micro pollutants in sludge and possible effect on vegetation, soil, water… We are also closely following the review of the directive.	The SUiAR are over 30 years and focus on metals as the main contaminants as that was the concern at the time from industry however there are now potentially other chemicals of concerns in sludge that we don't yet properly understand the	Generally regions identify there is a gap due to the age of the national reference Law (D.Lgs. 99/1992) which, although it has undergone changes over the years, requires an overall review to make it current. Though Lombardia considers that the regulations reflect the current knowledge concerning sludge treatment and usage.

			applied, taking into account the cultural systems and requirements of a legal nature. In short, not all sewage sludge has quality for agricultural use and not all soils have the conditions to be able to receive sludge as fertilizer.				risk	
19) What changes to the regulation of sludge could help a framework of sustainable land spreading?								
	Not Answered	Change needs a regulatory framework that drives continuous improvement in quality of sludge, innovation in treatment and use and improved understandin g of the receiving land bank and	National legislation that regulates the agricultural recovery of sludge is being revised, in view of the alignment with the principles of the circular economy, a greater demand for the quality of sludge, the inclusion of the	We were unable to obtain this information/d ata.	Regulating emerging contaminants	Not Answered	Movement of sludge use out of SUiAR and into the more modern EPR framework, enforcement of FRfW (rule 1)	Targets for improvement of sludges quality for producers, higher responsibility for producers in sustainable management of sludges.

		receptors.	inspection procedure and the dematerializati on of the entire procedure of licensing of sludge production and management operation for agricultural recovery. This update also arises from the need to harmonize the diploma with other legal regimes that have been approved in the meantime, namely the Law of General Bases for Public Policy on Soils, Spatial Planning and Urban Planning, Law Nr. 31/2014, of 30th of May, amended by Law Nr. 74/2017, of 16th of August, focusing on its purposes and					

			the respective general principles, as well as that of the Basic Law for Environmental Policy, Law Nr. 19/2014, of 14th of April and the respective assumptions and also Law nr. 25/2019, of 26th of March, which updates article 18 of Law nr. 50/2006, of 29th of August, amended by Laws nr. 89/2009, of August 31st, and 114/2015, of August 28th and by Decree-Law nr. 42-A/2016, of August 12th. It should also be noted that Article 13 of Law nr. 19/2014, of April 14th, expresses the transversality of					

			environmental policy and imposes its consideration in all sectors of economic, social and cultural life, and requires its articulation and integration with the other sectorial policies, aiming at promoting relations of coherence and complementarity. Likewise, Decree-Law Nr. 73/2011, of 17th of June, defines as a priority objective of the waste management policy to avoid and reduce risks to human health and the environment, ensuring that production, collection and transportation, preliminary storage and waste treatment are carried out					

			using processes or methods that are not likely to have adverse effects on the environment, namely water, air, soil pollution, fauna or flora affectation, noise or odours or damage to any places of interest and the landscape.					
20) What changes to the management of sludge (*under existing regulation*) could help a framework of sustainable land spreading?								
	Not Answered	Greater consideration of the receiving land bank, better understanding of the emerging risks, control over inputs to the sewer (domestic and trade)	Change: - at source, that is, at the level of wastewater treatment plants (WWTP), which should apply more efficient sludge treatment and stabilization technologies and processes, in order to generate	We were unable to obtain this information/data.	No opinion.	Not Answered	Additional sludge treatment, storage provision and hazard identification.	Treatment by producers (digestion, composting) in order to get sludges ready to be used in agriculture and control of treatment system, sludges composition and soil quality by regional EPA and importance of following existing rules in sludge management.

			sludge with guaranteed quality; - at the level of sludge management operators, who must follow and respect the applicable regulations / legal framework; - in the destination: greater demand at the level of the farmer who will receive the sludge, as a fertilizer, in the soil where he will develop his activity; -strengthening the control of agricultural sludge recovery - development of a computer platform that allows the dematerializati on of information					

			related to sludge management, at the level of origin, carrier and destination.					
21) Would this resolve most of the existing problems?								
	Not Answered	Review of current regulatory framework using evidence-based risk assessment. Accepting that as a regulator the "precautionary principle" may need to be applied.	We believe so. They would improve VAL	We were unable to obtain this information/data.	There is a need for better treatment technology in order to recover more nutrients, other raw materials and/or energy from urban waste water treatment sludge.	Not Answered	Yes	Yes
22) What is preventing these changes being implemented?								
	Not Answered	Will be reviewing the application of changes in England	The diploma was published in 2009, and its review was not considered opportune in the following years. Since 2020, the	We were unable to obtain this information/data.	The market value of the recovered resources is mostly not covering the additional cost of necessary treatment.	Not Answered	The cost of change and acceptance of the need for change	Water companies have different priorities in their working programmes and continue to manage sludges as wastes and not as resources.

			revision proposal is being prepared.					
23) Are there aspects of sludge management or regulation in your country that you consider as good practice and would like to share with others?								
	Not Answered	Amendments have been made on a voluntary basis to the degree of assessment prior to application of sewage sludge to land to protect water and habitats.	Effective treatment at the origin (WWTP) and at the operator (transports / stores / treats / values), with the objective of producing and enhancing a quality sludge, which complies with the legislation; - Effective supervision/control across the entire chain: at the origin, at the operator and at the farmer, - Computer system associated with VAL operations,	We were unable to obtain this information/data.	No	Not Answered	Our soil testing requirements, down to 5ha scale, and with the data available on a register for inspection by the regulator	To introduce a compulsory preventive and final control of soil where sludges are going to or are landspreaded under the EPA surveillance could better monitor environmental effect of sludges use as fertilizer. IT application by web to manage all information and analytical data of sludge (lombardia). Experimental projects ongoing in Puglia.

			accessible to all actors; - recognized training in collecting sludge samples for analysis, - Brief publication of new legislation					
24) Have you any other comments concerning the management of sludge in your country that you would like to make?								
	Not Answered	Not Answered	Not Answered	Not Answered	Not Answered	Not Answered	Resilience and how companies adapt to climate change given their reliance on land spreading.	

Italian responses

Region	**FVG**	**Compania**	**Lombardia**	**Marche**	**Puglia**	**Veneto**
1) Approximately how much sludge is produced by your country annually? (Estimate if necessary)						

	Below is a summary table[1] concerning the production of sludge from the treatment of urban and industrial waste water classified with EWC code 190805, 190812 and 190814; the table contains also the production data relating to EWC code 200304 "septic tank sludge"; the data were extracted from the MUD (Unified Declaration Form) 2018 database (data for 2017) and 2019 (data for 2018), or from the Environmental Declaration submitted annually by the subjects obliged under Law n. 70/1994 "*Rules for the simplification of environmental, health and public safety obligations and for the implementation of*	375.450 tons or Mg (in the year 2019)	The production of sludge in Lombardia is about 500.000 ton (EER 190805) and other 350.000 ton (industrial biological sludge) a year	About 70000 tons handled as waste, CER 190805	The total amount of sludge produced in the Puglia Region during 2014 was approximately 360˙000 tT.Q.. The estimation of sludge production for 2021 is 379˙000 tT.Q. (Data source: https://pugliacon.regione.puglia.it/web/sit-puglia-dipartimento/rifiuti-e-fanghi)	350.000 tons

	the eco-management and environmental audit system". It should be noted that these data may be underestimated, as there is no obligation of MUD for companies that carry out waste water treatment that have fewer than 10 employees, and also for some producers of non-hazardous special waste including those that produce the EWC 200304. This could be one of the reasons why in 2018 the total produced (see the following table) is less than the total managed (see question 9). Sludges classified with other EWC codes were not analysed (hazardous sludges of Chapter 19 and waste from other chapters of the EWC list).					

	ARPA Friuli Venezia Giulia is available for further information. 2017 – 133.405t/y 2018- 147.212					
2) Is land spreading of sludge allowed in your country? (If so under what circumstances?)						
	The spreading of sludge in agriculture is regulated by D.Lgs. 99/1992 “Implementation of Directive n. 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture”.	Yes, according to national and regional law	Yes, according to National and Regional Law	Handled as waste	Actually, land spreading of sludge is a potentially usable practice in Puglia but difficult to apply due to legal limitations	Yes
3) Where does the sludge go to? Score from 1 (not used) to 5 (most used) for each category.						
Agricultural land spreading	5		4		2	2
Other land spreading	1		2			1
Land restoration	1		1		1	1

Landfill	2		1	5	3	2
Incineration	2		2		2	2
Other	2		1		3	5 - composting
	The scores have been assigned according to the analysis carried out for the question n. 9) and considering the second fate of the treated sludge in the plants authorized for their management. It should be noted that 95% of the sludge (after treatment or not) is destined for agriculture (considering therefore also its transformation into compost / soil improver at authorized plants).	No data available		Disposed of in landfill		
4) Do you distinguish between sludge produced by water companies (or your sewerage and sewage treatment provider) at sewage works and other sources such as septic tank sludge						
	In terms of production, the distinction is made through the analysis of the MUD database	Yes. we distinguish about 60 kind of sludge, defined by different codes of eer	Yes we do. We have data of all kind of sludges and we have a list of sludges that are allowed to use in	Not answered	Yes. The septic tank sludge is carried by Water Company to some wastewater treatment plants, adopting pre-treatment of sludge.	Yes

	(see for the reading of Question No. 1)		agriculture.			
5) Does your country allow spreading of untreated septic tank sludge direct to land?						
	Septic tank sludge spreading on land without prior treatment shall not be allowed.	No	No, in Lombardia region is necessary to treat the sludge before spreading	Not answered	No	No
6) Is sludge in your country regulated nationally or regionally?						
	In our country sludge is regulated both nationally and regionally.	Both	In our country sludge is regulated both nationally and regionally.	Handled as waste	Yes, it is regulated nationally and regionally.	Both
7) Are the Water Companies or your sewerage and sewage treatment provider (as sludge producers) in your country in public or private ownership? Approximately how many are there?						
	In Friuli Venezia Giulia Region the main producers of waste arising from urban waste water treatment (identified with EWC code 190805) are 6; they are all joint-stock companies with total public capital with the exception of one that is a public-private mixed-participation company.	Public. In Campania region (5.800.000 inhabitants), in 5 districts there are 5 principal water companies and a lot of little municipal water companies. Also, there are about 10 regional sewage treatment providers and a lot of municipal sewage treatment providers.	In Lombardia we have about 20 private plants authorized to collect, treat and landfill spreading. They treat a total of 800.000 t of sludge per year.	Companies with public participation	In Puglia, currently there is only one Water Company as sewerage and sewage treatment provider, named AQP SpA. This Company is a public-private one, and the Puglia Region Government represents 100% (SpA a single shareholder). (*Society web links - https://www.aqp.it/ - http://www.asecospa.com*).	Public, about 10 in veneto region (5.000.000 inhabitants)

	The producers of sludge from industrial wastewater treatment (identified with EWC code 190812 and 190814) are mainly private companies; significant is also the contribution made by a joint-stock company with public participation.					
8) What is the main national regulation governing sludge and how does it operate?						
	The Legislative Decree n.99/1992 regulates the activity of spreading sludge through limits defined for chemical parameters to be detected in sludge and soil; it also defines quantitative limits of sludge that can be disposed in the soil (as a function of pH and CSC exchange of the	National decree n. 99/1992 and regional decree n. 239 del 24.05.2016. Region authorizes who ask for land spreading sludges on agricultural land. Sludges have to respect limits set for chemical and microbiological parameters such as soil on which they have to be spread.	Main national regulation governing sludge is d.lgs 27/01/1992 n. 99. In Lombardia the first rule was issued in 1980 and the new regional regulation is DGR_2031 del 1_07_2014 and D.G.R. 11 settembre 2017 n. 7076. The Provinces of	Regional regulations	- Legislative Decree 152/2006 – art. 127 – part III and subsequent amendments and additions; - Legislative Decree 99/1992; - Legislative Decree 75/2010 and subsequent amendments and additions for sludge land spreading; - DM 5/2/98 for co-incineration and to produce energy; - D. Lgs 121/2020 - landfill regulations" - L. 16/11/2018, n.130 (art. 41 ex D.L. 109/2018 Decree "Genova") In Puglia: - R.R. n. 2/1989 Discipline for the spreading of sludge on the soil and sub-soil; - L.R. 29/1995 "…functions of the	Decree n. 99/1992 region authorizes who ask for land spreading sludges on agricultural land. sludges has to respect limits set for chemical and microbiological parameters such as soil on which they have to be spread

	soil).		Lombardia authorizes who ask for land spreading sludges on Agricultural land. Sludge has to respect limits set for chemical and microbiological parameters such as soil on which they have to be spread.		provincial administration and the use of sewage sludge in agriculture". - the Special Waste Management Plan - DGR 819_23/4/2015; - DGR 1482/2018 – Adoption of the proposal Regional Urban Waste Management Plan (sewage sludge).	
9) What treatment methods are used for sludge in your country? Score from 1 (not used) to 5 (most used) for each category.						
Digestion	2		4	5	3	3
Composting	3		3	4	3	5
Heat treatment	2		1		2	2
Addition of lime	4		4		2	2
Long term storage	1		2		1	2
Addition of other wastes	1		2		3	1
	Other – material recovery – R3) 4 Other	We actually have no data to answer this question				

	Environmental recovery – R10) 4					
10) What contaminants are tested for in your sludge?						
Chemicals	Yes	Yes	Yes		Yes	Yes
Plastics	No	No	No		No	No
Pharmaceuticals	No	No	Yes		No	No
Metals	Yes	Yes	Yes		Yes	Yes
Any other contaminants?	Bacteria, PAHs, PCBs, Dioxins, Hydrocarbons	Salmonella	Other contaminants such as organic compounds, micro organic contaminants as PCDD, PCB, IPA, …. And biological		Biological: Salmonella.	Salmonella
	D. Lgs. N. 99/1992 has been amended by D.L.n. 109/2018 converted into Law n. 130/ 2018. This modification implemented the standardized analytes in sludge for use in agriculture, introducing organic compounds (PAHs, PCBs, Dioxins,			Categorized as waste		

	Hydrocarbons) and adding other metals.					
11) Does your country export sludge to another country? (If so which one(s)?)						
	There is no evidence that sludges classified with the EWC codes considered in the analysis above, are destined for foreign countries	Yes, 50% of sludge is exported in other Italian regions, Puglia (30,8%), Toscana (5%), Lazio (3,7%), and in other European countries, Spain (1,3%) and Hungary (1,2%).	No, it does not. We receive sludge (50%) from other region as (Veneto, Piemonte, Emilia Romagna,).	Partly sent out of the region	Sludge is exported in extra-regional plants (in Italy), for material recovery or other.	Yes, in other Italian regions (Lombardia)
12) Is your sludge combined with other wastes in your country? Score from 1 (not relevant) to 5 (most relevant) for each category						
Green wastes			3		4	5
Industrial effluents			2		1	2
Industrial solid wastes			1		3	2
Other (explain what)			1		The sludge is combined with the organic waste (c.d. FORSU) and green waste in the composting and anaerobic digestion process, to produce soil conditioner.	5- organic urban waste
	Sludge waste from urban or industrial waste water treatment are managed together with other waste in	We actually have not data to answer this question		The sludge produced by water purification is disposed of as waste in landfills		

	dedicated plants, which in addition to sludge may also receive other waste (some plant processes are carried out precisely through a mixing, e.g. anaerobic digestion composting, mechanical-biological treatment and chemical treatment,...); obviously these processes are authorized.					
13) What problems and issues does sewage sludge management present in your country or region?						
	Not answered	Public awareness or pressure groups, regulatory, operational	In our region the main problems and issues are environmental, Regulatory and Public awareness or Pressure Grps.	Political and environmental problems	Environmental, political, public awareness and pressure groups, regulatory, operational	Public awareness and pressure groups, regulatory. operational
14) Do you know where the main source of contamination (Chemicals, plastics etc.) in your countries sludge comes from?						
	ARPA Friuli-Venezia Giulia does not regularly carry out analyses of sludge; there is no systematic	Metals	The main sources of contamination are metals and organic compounds and they comes from	Not answered	Metals- Chemicals	Metals

	collection of data and information available in the Region to allow a reliable assessment of the sources of contamination		Industrial waste water.			
15) Is there any research currently being done into sludge in your country? (Please make reference to any documents also in your home language)						
	ARPA Friuli-Venezia Giulia is not aware of any particular studies in progress.	No	Lombardia Region is preparing the regional waste program with a special part for sludge.	Not answered	In Puglia, there are some experimental project as reported below: - BFBios – BioFuel and Biomethane from Sludge; - RONSAS Project– Recovery of Organics and Nutrients from Sludge on Apulian Soil; - Phytoremedition; - Life Perbiof Project- SBBGR (Sequencing Batch Biofilter Granular Reactor) Technology (CNR-IRSA).	No
16) Have you a good knowledge of the environmental impacts of sludge in your country?						
	ARPA Friuli-Venezia Giulia does not systematically sample soils to assess the impacts of sludge	Yes	Yes, the main impact is due to olfactory harassment in my Region.	Handled as waste	Yes	Yes

	use.					
17) Does the management of sludge have a high profile in your country? Do Environmental Pressure Groups show an interest in how sludge is managed?						
	ARPA Friuli-Venezia Giulia, as far as it's within its competence, does not detect any particular reports in this regard.	It is not adequately faced. env pressure grps have few attention on it	Yes, it does. Yes, they do.	Not answered	In Puglia, the management of sludge have a high profile; at present, there is particular attention to experimental technologies in order to reduce the sludge production.	It is not adequately faced. env pressure grps have few attention on it
18) Do the regulations in your country reflect the current knowledge concerning sludge treatment and usage? Or is there a gap between the two?						
	We think that there is a gap due to the age of the national reference Law (D.Lgs. 99/1992) which, although it has undergone changes over the years, requires an overall review to make it current.	It is not adequately faced. env pressure grps have few attention on it	Yes the regulations in our country and especially in Lombardia Region reflect the current knowledge concerning sludge treatment and usage.	Not answered	Some aspects are not well regulated, nationally and regionally, for both treatment and usage of sludge.	It is not adequately faced. Environmental pressure groups have few attention on it.
19) What changes to the regulation of sludge could help a framework of sustainable land spreading?						
	Not answered	Targets for improvement of sludges quality for producers, higher	It could be useful to introduce treatment processing for	Not answered	Best identification of limit concentration values for the parameters to be investigated.	Targets for improvement of sludges quality for producers, higher responsibility for

		responsibility for producers in sustainable management of sludges	improving the quality of sludge material and the stabilization of organic matter.			producers in sustainable management of sludges
20) What changes to the management of sludge (*under existing regulation*) could help a framework of sustainable land spreading?						
	Not answered	Treatment by producers (composting) in order to get sludges ready to be used in agriculture and control of treatment system, sludges composition and soil quality by regional epa	It's important to stick to the rules in management of sludge for ensuring a sustainable land spreading	Not answered	In Puglia, the management of sludge in terms of prevention, reuse and recycling have to be implemented (A.4 – to see proposal Regional Planning G.R.U. – DGR 1482/2018) changing the rules.	Treatment by producers (digestion, composting) in order to get sludges ready to be used in agriculture and control of treatment system, sludges composition and soil quality by regional epa
21) Would this resolve most of the existing problems?						
	Not answered	Yes	Yes, it would.	Not answered	This can help the resolution of some existing problems but it isn't enough. It is necessary to verify over time the feasibility of sustainable land spreading.	Yes
22) What is preventing these changes being implemented?						
	Not answered	Water companies manage sludges as wastes and not as resource	Policy choices.	Not answered	A strategic planning for sustainable sludge land spreading with appropriate regulation, together with the information to the citizens and farmers. In Puglia, agriculture is a significant productive activity.	Water companies have different priorities in their working programmes and continue to manage sludges as wastes and not as resources
23) Are there aspects of sludge management or regulation in your country that you consider as good practice and would like to						

share with others?						
	Not answered	To introduce a compulsory preventive and final control of soil where sludges are going to or are landspreaded under the epa surveillance could monitor environmental effect of sludges use as fertilizer	In Lombardia Region we are implementing an IT application by web to manage all information and analytical data of sludge.	The sludge produced by water purification is disposed of as waste in landfills	In Puglia, there are some experimental projects, as above reported.	To introduce a compulsory preventive and final control of soil where sludges are going to or are landspreaded under the epa surveillance could better monitor environmental effect of sludges use as fertilizer
24) Have you any other comments concerning the management of sludge in your country that you would like to make?						
	Not answered	Not answered	Not answered	Not answered	Not answered	Not answered

1 Summary table provided for FVG in response to Question 1

EWC code	description	2017 (t/y)	2018 (t/y)
190805	sludges from treatment of urban waste water	81.734	79.810
190812	sludges from biological treatment of industrial waste water other than those mentioned in 19 08 11	10.107	14.174
190814	sludges from other treatment of industrial waste water other than those mentioned in 19 08 13	1.376	1.552
200304	septic tank sludge	40.188	51.676
Total amount (t/y)	**133.405**	**147.212**	