

## Lesson 15

# Understanding policies and initiatives supporting vermicomposting

### Learning outcomes

- The trainee knows the legal regulations regarding solid waste management in Turkey and Europe.
- The trainee knows the limits of heavy metal in the soil
- The trainee knows the quality parameters followed in vermicompost.
- The trainee knows the physical, chemical and biological qualities that composts must have in the regions above mentioned
- The trainee knows the financial and technical support provided to vermicompost production and organic agriculture.

### Instructions for the trainer

- The trainer shares theoretical knowledge through presentation.

**Basic requirements:** Computer, projector

# 15. Understanding policies and initiatives supporting vermicomposting

## 15.1. Türkiye

### 15.1.1. Policies

Although there is no specific legal regulation on vermicomposting in Turkey, the first legal restriction on the composting of solid wastes was determined in the Regulation on Solid Waste Control published in the Official Gazette dated 14.03.1991 and numbered 20814. After that, the Regulation on Soil Pollution Control was published in the Official Gazette dated 10.12.2001 and numbered 24609 and then the Regulation on Amendment of the Regulation on Solid Waste Control was published in the Official Gazette dated 25.04.2002 and numbered 24736 and some provisions in this regulation were subjected to the provisions in the Regulation on Soil Pollution Control.

Article 36 of the by-Law on Control of Solid Wastes, which determines the quality criteria of compost intended to be used in agriculture, and Article 37, which determines the heavy metal content and limit values of compost, have been combined in the by-Law on Soil Pollution Control and regulated under Article 10.

While Article 37 of the by Law on Solid Waste Control stipulates that heavy metal analyses in soil should be carried out on lands larger than one hectare, Article 10 of the by-Law on Soil Pollution Control does not stipulate such a condition for heavy metal analyses, and stipulates that such analyses should be carried out on lands of any size.

While the limitation on the heavy metal load of the soil in the by-Law on Solid Waste Control is valid in case of repeated application of the compost to the land, this statement is corrected in the by-Law on Soil Pollution Control as the application of the compost to the land every year in a 10-year period and the application period is tied to a certain period.

The heavy metal limit values in the by-Law on Solid Waste Control were reorganised in the by- Law on Soil Pollution Control. While the limit values of heavy metals in soil were stated as a single value in the by-Law on Solid Waste Control, these values are regulated according to two different conditions according to the pH of the soil being greater than 6 and less than 6 in the by-Law on Soil Pollution Control published later. The heavy metal limit values in the Regulation on Soil Pollution Control and the Regulation on Solid Waste Control are given below in comparison (Table 11).

<b>Table 11. Comparison of heavy metal limit values in soil.</b>			
<b>Type</b>	<b>by-Law on Solid Waste Control</b>		<b>by-Law on Soil Pollution Control</b>
	<b>PH&lt;6 mg/kg</b>	<b>PH&gt;6 mg/kg</b>	<b>mg/kg</b>
Bullet	50	300	100
Cadmium	1	3	3
Chromium	100	100	100
Copper	50	140	100
Nickel	30	75	50
Zinc	150	300	300
Mercury	1	1,5	2

There is not yet a specifically developed standard for compost quality in our country. In by-Law on Solid Waste Control and by-Law on Soil Pollution Control, it is insufficient for high quality compost and there are some gaps. The statement stated in Article 10 of by-Law on Soil Pollution Control that the compost should be hygienically perfect and not threaten the health of humans and all living things is insufficient. The reason for this is that there is no criterion for whether the compost is hygienically perfect and the standard does not clearly state the parameters by which perfection will be determined. Especially if the processed compost will be used for various purposes, limit values of parameters such as pH, mineral content and particle distribution of the final compost should be determined, compost

quality classes suitable for various purposes should be developed and expressed according to the compost quality class in the standard.

Organic fertilizers and soil enrichers of animal origin must be produced within the framework of the criteria specified in the "Regulation on Animal By-Products Not Intended for Human Consumption" published in the Official Gazette dated 24.12.2011 and numbered 28152 and the Communiqués and Instructions based on this Regulation (Official Gazette, 2018). The criteria of the fertilizer are evaluated within the scope of the 'Regulation on Organic, Mineral and Microbial Source Fertilizers Used in Agriculture' published by the Ministry of Food, Agriculture and Livestock in the Official Gazette dated 23 February 2018 and numbered 30341. In accordance with this regulation, enterprises must obtain a license and registration certificate. Companies that do not have these documents cannot supply vermicompost to the market. Companies that do not have these documents must obtain the necessary documents within ten months. Penal action is initiated for businesses that do not complete their documents during the specified transition period. One of the developments regarding vermicompost production in our country is the Turkish Vermicompost Producers Association (TOSGEB), a professional organization established by certified and non-certified producers.

Market placement conditions and product specifications of worm castings are regulated by-law 30341 and 28152. The qualifications that solid and liquid vermicompost must have in order to be marketed are given below (Table 12).

<b>Table 12. Specifications for solid and liquid vermicompost.</b>		
	<b>Solid vermicompost</b>	<b>Liquid vermicompost</b>
<b>Information about the method of obtaining the organic product and its</b>	The final product obtained from ground-independent worm beds as a result of passing wastes of plant and/or animal origin through the digestive system of the	The product in solution or suspension form obtained as a result of physical and/or chemical and/or biological processing of solid vermicompost.

<b>main components</b>	worm and processed in accordance with the relevant legislation.	
<b>The product's raw material content, quantity, plant nutrient content and other criteria</b>	Organic matter at least 20% Total nitrogen at least 0.5% Organic nitrogen N+P <sub>2</sub> O <sub>5</sub> +K <sub>2</sub> O up to 7% Maximum humidity 35% C/N: 8-22	Organic matter at least 5% Organic nitrogen
<b>Other information such as EC, pH etc. that should be declared on the product label</b>	pH EC (dS/m)	pH EC (dS/m)
<b>Mandatory content to be declared on the label</b>	Organic matter Total nitrogen Organic Nitrogen Maximum humidity C/N Optional: Water-soluble potassium oxide (K <sub>2</sub> O) Total phosphorus pentoxide (P <sub>2</sub> O <sub>5</sub> ) Total humic acid+fulvic acid can be declared.	Organic matter Organic nitrogen Shelf life cannot exceed one year Optional: Total nitrogen Water-soluble potassium oxide (K <sub>2</sub> O) Total phosphorus pentoxide (P <sub>2</sub> O <sub>5</sub> ) Total humic acid+fulvic acid can be declared.

### 15.1.2. Initiatives Supporting

In Turkey, some financial support is provided by the state depending on the socio-economic development level of the region where vermicompost production will take place. These supports are investment incentive supports provided through the Ministry of Treasury and Finance and entrepreneurship supports provided by the Small and Medium Scale Industry Development and Support Administration (KOSGEB).

Basic supports provided to investors through the investment incentive support program; Tax exemption up to 50% of the total investment, exemption of all expenditures made for investment from value added tax and customs duty, free land allocation for investment, payment of employees' insurance premiums by the state for up to 10 years, 7% discount

on interest rates on bank loans to be used for investment. (2% for foreign currency loans).

The fully non-refundable supports provided by KOSGEB for organic fertilizer, which is evaluated within the scope of Medium-High Technology Investments, are as follows; company establishment support (10.000 TL), consultancy-mentoring support (10.000 TL), machinery-equipment purchasing support (200.000 TL), product certification support (5.000 TL) and performance support (20.000 TL).

## **15.2. Composting Regulations in The United States and Europe**

According to organic waste activities, Europe is examined in four classes. It is found in Austria, Belgium, Germany, Switzerland, Luxembourg, Italy, Spain (Catalonia), Sweden and the Netherlands in the first class. These countries have spread their policies throughout the country and have established their policies. These countries recover 80% of their organic waste collected separately at source by composting. Refutation is used sparingly. Denmark, England and Norway are in the second grade. These countries have established the quality and organization policy required for separate collection and composting. Finland and France are in the third grade. These countries have defined their composting strategies and are at the starting point of implementation. In the fourth grade, countries such as Spain, Greece, Ireland and Portugal are collected separately and have not done any work on composting management at the source of organic waste. In these countries, waste is mixed collected and composted [53].

Quality assurance of the final product is important in composting. Final product quality, composting processing and composting techniques should be carefully considered when planning composting. In countries with an established compost system, such as Austria, Germany, Denmark, the Netherlands and Belgium, the role of quality assurance is great. A quality system has been established in these countries. In many countries such as Sweden, Norway, Italy and France, this system is under design. The quality assurance organizations are Compost Quality Assurance Organization (CQAO) in Germany, KGVO in Austria, VLACO in Belgium and VVAV in the

Netherlands, respectively. In Europe, the quality assurance system consists of raw materials, input control, quantity of harmful substances, quality criterion of valuable substances in compost, composting production, external control (of product and/or production), product quality label, plant or product certification, declaration of compost properties, operator training and ability, operation and maintenance of facilities, and certificates. The quality assurance status of compost quality in Europe and the quality assurance status of composting and rotting plants in Europe are given below, respectively [53].

520 large compost and digestion plants in Austria, Belgium (Flanders), Germany, Luxembourg, the Netherlands and Sweden are controlled by a quality monitoring system. In Germany, the quality of the final compost is determined by the RAL mark. Two different attitudes prevail in the Netherlands and Belgium. Here final product control is combined with production control. In Belgium, the application period for a quality mark for a new compost facility is two years. In the first year, production is constantly monitored. In the second year of the application, only the compost produced is checked.

It can be seen that regulations regarding composting in Europe focus especially on the heavy metal content of compost. Especially in Austria, compost quality classes are determined according to heavy metal content. In Germany, compost classes are determined according to the properties or use of the compost. In Belgium (Flanders); Compost quality is determined by the raw material used. Mainly the quality of the final compost; It depends on the raw material used, heavy metal content and intended use. In America, special limits apply for sewage sludge compost. These limits are quite flexible (Table 14). Heavy metal limits in American and European countries are shown below [53].

In European countries, compost limits also apply to sewage sludge. Heavy metal limits of compost are different in each country. In America, the limits are quite high, whereas in Europe, the limits are quite low and it is very difficult to meet them. While the limits in American standards are determined according to health risk, the limits in European standards are determined close to the natural limits of these heavy metals in the soil and

are not flexible. Thus, compost prevents soil pollution and is safer for public health. The required temperatures during the biological process during compost production in Europe and the anticipated holding times to ensure hygienic conditions at this temperature are shown in Table 15. In addition, since the usage areas of compost are different, the limits that compost must meet are different [53].

**Table 13. Compost Organizations in Europe and America**

<b>Table 13. Compost Organizations in Europe and America</b>					
<b>Quality Labeled Organizations</b>			<b>Without-Quality Labeled Organizations</b>		
<b>Country</b>	<b>Abbrv.</b>	<b>Organisation name</b>	<b>Country</b>	<b>Abbrv.</b>	<b>Organisation name</b>
Austria	KGVÖ	Austrian Compost Quality Association	Austria	ARGE	Compost and Biogas
Belgium	VLACO	Flemish Compost Organization	Czech Republic	CZ	Biom
Germany	BGK	Bundesgütegemeinschaft Compost	Ireland	Crè	Irish Compost Association
Sweden	RVF	Swedish Waste Management Association	Italy	CIC	Italian Compost Association
Holland	VVAV	Dutch Waste Processing Association	Japan	JORA	Japanese Organic Waste Recovery Association
England	CA	Compost Union	Switzerland	VKS	Verband Kompostwerke Schweiz
New Zealand	NGIA	Nursery and Garden Industry Association	Europe	ECN	European Compost Network
			Canada	CCC	Compost Council of Canada
			California		California Compost Quality Council
			America		United States Compost Council
			Türkiye		Vermicomposting Producers Association
			Türkiye		Vermiculture Association



Table 14. Heavy metal limits in European countries and America, mg/kg.

Countries	Quality Standard	Cd	Cr	Cu	Hg	Ni	Pb	Zn
<b>Austria</b>	Biowaste Regulation Class A	1	70	150	0.7	60	120	500
<b>Belgium (FL)</b>	Ministry of Agriculture	1.5	70	90	1	20	120	300
<b>Denmark</b>	Ministry of Agriculture	0.4	-	1000	0.8	30	120	4000
<b>Germany</b>	Biowaste Regulation Type II	1.5	100	100	1	50	150	400
<b>Ireland</b>	Draft	1.5	100	100	1	50	150	350
<b>Luxembourg</b>	Ministry of Environment	1.5	100	100	1	50	150	400
<b>Holland</b>	Second Class Compost	1	50	60	0.3	20	100	200
<b>Spain</b>	A Class	2	100	100	1	60	150	400
<b>Sweden</b>	Quality Assurance Organization	1	100	100	1	50	100	300
<b>England</b>	TCA Quality Label	1.5	100	200	1	50	150	400
<b>Türkiye</b>	By-law 30341	3	350	450	5	120	150	1100
<b>America</b>	ABD EPA 503	39	-	1500	17	420	300	2800

Table 15. Holding times at the required temperature to hygiene compost to be used during biological process in some European countries and America.

Countries	Hygiene Temperature, °C	Holding Time, Day
Belgium	60	4
Denmark	55	14
Italy	55	3
Holland	55	4
Austria	65	6
Cuba	55	3
Korea	55	3
England	55	3
Spain	55	3
America	55	3

The standard for labeling compost was prepared in the European Union on December 31, 1994. In this context, standards have been developed for soil improvers. On the label of the compost produced according to this standard, the manufacturer, the person, the properties of the compost, storage conditions, production code, date, intended use, instructions for use and details about public health must be stated. In addition, compost should not cause any odor after application, in terms of human health; It should not contain glass, wire, metal and hard plastic. The limits in the standard are shown in Table 16.

In Austria, the Ö-NORM S 2200 standard was developed for compost quality. This standard was developed by research institutes and universities in Austria, Germany, the Netherlands and Switzerland. Experts have not determined a limit value for organic substances in compost and accept that these substances have a self-limiting feature because they stop the compost process. In Austria, there is a procedure that must be implemented to maintain the quality of compost, and according to this procedure, the quality of compost is checked every two months by government organizations or institutions authorized by the state. The use of compost as fertilizer is limited to 7 tons/ha/year, and as a soil improver to 10 tons/ha/year by Ö-NORM S. Austria's Ö-NORM standard is shown in Table 17. In Austria, all waste is collected by municipalities. Centers are established to collect organic waste, and organic waste is accumulated in these centers. These centers are close to living centers. Transfer stations have also been established for compost facilities with a distance of more than 30 km. Waste is first collected at these transfer stations, and from there it is transported to solid waste compost facilities [53].

<b>Table 16. Limit values of EU standard compost ingredients</b>	
<b>Parameters</b>	<b>Limits of EU Standard</b>
Dry matter (DM)	>%25
Nitrogen	8 g/m <sup>2</sup>
K <sub>2</sub> O	12 g/m <sup>2</sup>

Salmonella	<25 g
E.coli	<1000 MPN(most probable number)
<b>Elements</b>	<b>Limits of EU Standard. Heavy metal, mg/kg</b>
Zn	300
Cu	75
Ni	50
Cd	1,5
Pb	140
Hg	1
Cr	140
Mo	2
Se	1,5
As	7
Fl	200

Table 17. Austria Ö-NORM 2200 standard compost limits.

<b>Organic contents(DM%)</b>	
<b>Parameters</b>	<b>Ö-NORM S 2200 Limits</b>
Volatile solids	> 20
Total carbon	> 12
<b>Macronutrients</b>	
Total nitrogen (DM%)	< 0,2
Total nitrate (N-NO <sub>3</sub> ) (DM%)	< 0,1
Total ammonia (N-NH <sub>4</sub> ) (DM%)	Determined by the manufacturer
Phosphorus (total P <sub>2</sub> O <sub>5</sub> )	Determined by the manufacturer
Phosphorus (possible)	Determined by the manufacturer
Calcium (total CaO)	Determined by the manufacturer
Potassium (total K <sub>2</sub> O)(DM%)	Determined by the manufacturer
Potassium (possible)(DM%)	Determined by the manufacturer
Manganese (total MgO)(DM%)	Determined by the manufacturer
Boron (mg/kg DM)	< 10
Carbon/Nitrogen (C:N)	Determined by the manufacturer
<b>Heavy metals, mg/kg</b>	
Chrome	70
Nickel	42
Copper	70
Zinc	210

Cadmium	0,7
Mercury	0,7
Lead	70
Lindane	0,1
<b>Physical properties</b>	
Moisture content (%raw weight)	25-50
Moisture capacity (DM%)	> 100
Raw density (kg 1 raw weight)	< 0,85
pH (H <sub>2</sub> O) (-)	Determined by the manufacturer
EC (pS/cm)	< 2,0
Particle size > 25 mm (DM%)	< 3
Total physical contamination (DM%)	< 0,5
Will include plastics > 200 (DM%)	0,2
Will include plastics > 20 mm (DM%)	0
<b>Plant tolerance margin, %15 compost</b>	
Plant biomass (% reference mass)	100
Germination delay (days)	0
Germination number (%)	100
<b>Plant tolerance, %30 compost</b>	
Plant biomass (% reference mass)	100
Germination delay (days)	0
Germination number (%)	100
<b>Plant tolerance, %30 compost</b>	
Plant biomass (% reference mass)	90
Germination delay (days)	1
Germination number (%)	100

### 15.3. Greece

In the sector of sustainable agriculture and waste management, vermicomposting appears as a innovative practice, combining environmental management with agricultural innovation. INNOPOLIS's contribution to the "Powerworms:Vermicomposting" project underscores the significance of integrating vermicomposting within the European context, particularly through the Greek national legislation and policy frameworks. This initiative seeks to navigate the complex legal landscape, identifying the synergies and gaps in existing regulations that impact the adoption and effective implementation of vermicomposting practices.

Central to INNOPOLIS's analysis is the exploration of the Greek legal framework, which encompasses a broad spectrum of regulations from waste management to environmental protection, and agricultural practices. Key legislative pieces, such as Law 4685/2020, highlight Greece's commitment to harmonizing its environmental policies with EU directives and the Green Deal, fostering a conducive environment for renewable energy projects and sustainable waste management practices, including vermicomposting. This legal framework provides a foundation for examining the categorization of vermicompost, the regulatory status of worms in the composting process, and the relationship between different regulatory domains such as waste, environmental, and agricultural regulations.

The challenges of incorporating vermicomposting into Greece's existing legal and policy frameworks are multifaceted. They underscore the need for legislative clarity and adaptability to embrace innovative waste management solutions. INNOPOLIS's contribution is geared towards highlighting these challenges while proposing pathways for integrating vermicomposting more seamlessly into national strategies. This involves a detailed analysis of the potential legal adjustments required to support vermicomposting, addressing issues such as the classification of vermicompost under current waste and fertilizer regulations, the legal status of bio-waste management practices, and the promotion of circular economy principles within the agricultural sector.

Moreover, INNOPOLIS's engagement with Greek authorities, including the Ministry of Environment and Energy and the Ministry of Rural Development and Food, is instrumental in fostering a dialogue on sustainable waste management practices. This collaborative approach not only enhances the knowledge base around sustainable agricultural practices but also paves the way for legislative reforms that align with environmental sustainability goals and the broader objectives of the "Powerworms: Vermicomposting" project.

Through this initiative, INNOPOLIS seeks to contribute to the development of a more resilient and sustainable agricultural sector in Europe, supported by legal and policy framework for vermicomposting.

**Greek Law 4951/2022**, although not directly addressing vermicomposting, plays a significant role in the broader context of renewable energy and environmental sustainability in Greece, which can indirectly influence sustainable practices like vermicomposting. This law focuses on further simplifying and accelerating the permit-granting process for renewable energy projects, building on the foundation set by previous legislation (such as Law 4685/2020). By enhancing the legal and regulatory framework for renewable energy initiatives, Law 4951/2022 aims to facilitate Greece's transition to a more sustainable and environmentally friendly energy mix. The streamlined processes and supportive environment for renewable energy development underscore the country's commitment to sustainability and climate change mitigation, principles that are also central to the practice of vermicomposting.

The relevance of Law 4951/2022 to vermicomposting, while indirect, lies in its contribution to creating a more favorable regulatory landscape for sustainable practices. Vermicomposting, as a method of recycling organic waste into nutrient-rich compost, aligns with the objectives of environmental sustainability and reduction of carbon footprint that Law 4951/2022 seeks to promote through the support of renewable energy projects. Although the law specifically targets the energy sector, its broader implications for sustainability can encourage the adoption and integration of circular economy practices, including vermicomposting, within Greece's environmental policy framework. This legislation highlights the interconnectedness of renewable energy development, waste management, and agricultural practices in achieving overall environmental sustainability goals.

**Greek Law 4685/2020 - Environmental Protection and Enhancement:** This comprehensive environmental law, approved in May 2020, significantly reforms Greece's legal framework towards harmonization with EU law and the Green Deal. It covers a wide range of environmental issues, aiming to simplify the environmental licensing process, maximize renewable energy projects, and update the Forest Charter. Key provisions include extending the Environmental Conditions Approval Decision (AEPO) duration,

simplifying the procedure for AEPO renewal/modification, and introducing an Electronic Environment Register for streamlined processing.

Law 4685/2020, a comprehensive piece of legislation on Environmental Protection and Enhancement in Greece, plays a significant role in shaping the legal landscape for sustainable practices like vermicomposting. Specifically, it simplifies the environmental licensing processes and introduces measures aimed at promoting renewable energy sources, which indirectly supports the infrastructure necessary for vermicomposting projects.

Through these regulations, vermicomposting initiatives, which transform organic waste into valuable compost using earthworms, can gain momentum by aligning with the law's objectives of sustainable development and environmental protection.

Moreover, the emphasis Law 4685/2020 places on the circular economy and the sustainable management of bio-waste presents opportunities for vermicomposting to be integrated into national waste management strategies. The law's provisions for waste reduction, recycling, and the valorization of organic waste echo the principles of vermicomposting, which not only diverts waste from landfills but also transforms it into a resource for agricultural use. By fostering an environment that values the recycling of organic waste and the reduction of environmental footprints, this law underpins the relevance and importance of vermicomposting within Greece's framework for environmental stewardship and sustainable agriculture. This alignment with national and EU environmental goals underscores the potential for vermicomposting to contribute significantly to Greece's sustainable development objectives, leveraging legal support to enhance its implementation and impact.

### **Legal Framework in Environmental Governance and Decentralization:**

Greece has a decentralized system of environmental governance, with significant efforts made to increase transparency, accountability, and reduce the regulatory burden on enterprises. However, challenges remain in effectively implementing environmental law and utilizing good regulatory practices, particularly in compliance assurance.

Greek Law 4414/2016 establishes a comprehensive framework for the promotion of renewable energy sources (RES) in alignment with the country's commitments to environmental sustainability and the reduction of greenhouse gas emissions. This legislation is pivotal in setting the support schemes for renewable energy projects, detailing the financial incentives, and outlining the operational framework for the production, transmission, and distribution of energy from renewable sources. It is designed to accelerate the adoption of renewable energy within Greece's energy mix, contributing to the national and European targets for sustainable development and climate change mitigation. The law's emphasis on clean energy and its mechanisms for supporting RES projects underscore the government's dedication to transitioning towards a low-carbon economy.

The relevance of Law 4414/2016 to vermicomposting is found in its broader objectives of sustainability and environmental protection. While the law directly addresses the renewable energy sector, its implications for sustainable practices, like vermicomposting, are significant.

Vermicomposting, as an eco-friendly method of waste management, aligns with the principles of sustainability and resource efficiency promoted by the law. By encouraging the reduction of waste and the utilization of organic materials as resources, vermicomposting contributes to the environmental goals that Law 4414/2016 seeks to achieve through the promotion of renewable energy sources. This interconnection highlights the importance of integrating various sustainable practices, including renewable energy development and organic waste recycling, in achieving comprehensive environmental sustainability objectives.

**Greek Law 3851/2010** - Accelerating the Development of Renewable Energy Sources to Confront Climate Change: Although primarily focused on renewable energy, this law contributes to a broader environmental governance framework that supports sustainability initiatives, including waste management. By promoting the use of renewable energy and setting ambitious targets for its integration into the national energy mix, the law indirectly supports the energy efficiency and sustainability of operations like vermicomposting facilities. It underlines the Greek government's



commitment to sustainable development and environmental protection, which are essential for practices that contribute to a circular economy and sustainable agriculture.

Greek Law 3851/2010, aimed at accelerating the development of renewable energy sources to confront climate change, indirectly supports sustainable practices like vermicomposting through its emphasis on environmental sustainability and energy efficiency. By fostering a legal and regulatory environment that encourages the adoption of renewable energy and the sustainable management of resources, this law enhances the feasibility and attractiveness of vermicomposting projects. These projects, in turn, contribute to the law's objectives by promoting the recycling of organic waste into valuable compost, thereby reducing greenhouse gas emissions associated with waste decomposition in landfills. Vermicomposting aligns with the spirit of Law 3851/2010 by integrating sustainable waste management with the broader goals of energy efficiency and environmental protection. This synergy underscores the relevance of the law to vermicomposting initiatives, as both seek to mitigate climate change impacts through innovative and sustainable practices.

**Renewable Energy Legislation and Incentives:** Greece has made substantial advancements in renewable energy (RES), holding a global rank for its use in gross final energy consumption. Laws such as 4685/2020, 4951/2022, and 4414/2016 regulate the development and operation of RES projects, aiming to simplify and accelerate the permit-granting process. These laws support the transition to a low-carbon economy, in line with EU guidelines and national goals for climate neutrality and reducing dependency on fossil fuels. Incentive programs for energy upgrading and self-production, such as the installation of rooftop PV systems and net-metering, are promoted to increase RES penetration and support citizens becoming "prosumers".

This legislative and regulatory framework forms the basis of Greece's national efforts to promote sustainable environmental practices, including vermicomposting, by fostering a supportive context for renewable energy and environmental protection. These initiatives are integral to achieving broader sustainability goals, enhancing the legal and operational

environment for vermicomposting projects by emphasizing renewable energy use, environmental conservation, and participatory governance.

## 15.4. Holland

The legal framework generally highlights issues such as the categorisation of vermicompost, the status of worms used in the composting process, and the complex interplay between different legal frameworks like waste, environmental, and agricultural regulations. Specific regulations include the Waste and Environment Legislation, Regulation on Animal By-products, Feed Regulation, Fertilizers Law, Animal Law, and Environmental Law. The challenges in integrating vermicomposting into existing legal frameworks emphasise the need for clarity and possible adjustments in legislation to support this sustainable waste management practice. The Ministry of Agriculture, Nature and Fisheries, including the Agro Desk and the Dutch Food and Consumer Product Safety Authority, for their knowledge of the legal frameworks in this case.

### 15.4.1. Dutch national laws and regulations on vermicomposting

**Waste and Environmental Legislation (Wet Milieubeheer):** In the Netherlands, organic waste processing, including vermicomposting, must comply with strict waste management laws. These laws aim to reduce landfill use and encourage recycling. They impact the categorisation and handling of organic waste for vermicomposting and dictate how organic waste should be collected, treated, and processed.

**Regulation on Animal By-Products (Verordening dierlijke bijproducten) (1069/2009 and 142/2011):** This set of regulations is particularly important in scenarios where vermicomposting uses or produces animal by-products. It details how these materials should be handled, processed, and utilised, ensuring they meet health and safety standards.

**Feed Regulation (Regeling diervoeders):** Governs the use of organic material as animal feed. In vermicomposting, this regulation affects what types of organic waste can be fed to the worms.

Fertilisers Act (Meststoffenwet): This law sets the standards for fertilisers in the Netherlands, including those produced through vermicomposting. It ensures that the compost is safe for use in agriculture by regulating its nutrient content, contaminants, and other properties.

Animal Health and Welfare Act (De Wet Dieren): This law considers the status and welfare of the animals. It refers to regulations regarding breeding, treatment, and use in composting processes.

Composting commercial organic waste is subject to a permit requirement under Article 3.185 Bal, because the activity is not excluded from the list in paragraph 3. Under the Environmental Act, collected or delivered household waste is regarded as industrial waste. Given this, the permit requirement applies under Article 3.185 Bal. Where applicable, a permit requirement may apply for the composting of animal fertilisers.

From a legal point of view, the waste stream is always an 'animal by-product'. However, feeding animal by-products to production animals or transporting organic waste to locations with production animals is not permitted.

#### **15.4.2. Policies and initiatives promoting vermicomposting**

In the Netherlands, a framework of policies and initiatives promotes vermicomposting as part of the broader strategy to foster a sustainable and environmentally conscious society. These policies and initiatives are anchored in several key areas. Firstly, the Circular Economy Action Plan positions the Netherlands as a pioneer in advocating for a circular economy where waste is minimised and resources are continuously reused. Within this framework, vermiculture, the process of using earthworms to convert organic waste into nutrient-rich compost, plays a significant role in recycling organic waste. This approach reduces waste that would otherwise end up in landfills and provides a sustainable source of fertiliser.

Furthermore, the Dutch government offers Subsidies and Financial Support to encourage sustainable waste management practices, including vermicomposting. These financial incentives are designed to stimulate the adoption of eco-friendly practices by businesses and individuals, making

vermicomposting a more viable and attractive option for waste management.

Another critical aspect is Public Awareness and Education. The Dutch authorities and non-governmental organisations raise public awareness about the benefits of composting. These campaigns aim to educate the public on how composting can contribute to environmental sustainability and encourage participation in local community composting initiatives. Lastly, significant Research and Development efforts are ongoing to optimise vermicomposting processes and enhance the compost quality produced. This includes investing in scientific research to improve the efficiency of vermicomposting, exploring innovative methods, and developing better techniques to produce high-quality compost.

## **15.5. North Macedonia**

The agricultural policy in North Macedonia, outlined in the National Agriculture and Rural Development Strategy (NARDS), is primarily governed by the Law on Agriculture and Rural Development (LARD). The Ministry of Agriculture, Forestry and Water Economy (MAFWE) oversees policy planning and regulation related to organic products, while the Agency for Financial Support in Agriculture and Rural Development (AFSARD) handles policy implementation. The State Agricultural Inspectorate and the Food and Veterinary Agency conduct general supervision of organic agriculture. The National Extension Agency (NEA) is responsible for disseminating information to agricultural producers.

For the period of the National Agriculture and Rural Development Strategy 2014–2020, organic production is encouraged to gain traction in the domestic market. Support measures focus on ensuring market-sustainable organic production and promoting the agri-environmental approach. These measures include direct payments per arable land for various organic crops, as well as support for existing orchards, vineyards, cattle, sheep, and goats. Additionally, special payments are allocated for expert control, certification, and analysis of organic production.

Funds allocated for organic production beneficiaries in the 2014–2020 programming period totaled 7.5 million EUR, with an increasing trend year by year. The proportion of support for organic production within the total agricultural policy budgetary transfers ranged from 0.4% in 2014 to 1.1% in 2019. The recently adopted National Agriculture and Rural Development Strategy 2021–2027 continues to provide support for organic agricultural production through measures such as green cover, crop rotation, and organic farming. Control of organic producers, processors, and traders is conducted by registered inspection bodies, with two accredited certification bodies currently authorized by the MAFWE.

### **15.5.1. Waste Management Legislation**

The Law on Waste Management plays a crucial role in establishing the legal framework for the management of different types of waste, including organic waste suitable for composting. It sets out regulations and guidelines for the proper handling, treatment, and disposal of waste materials to promote sustainable waste management practices in North Macedonia.

#### **15.5.1.1. Environmental Protection Act**

The Environmental Protection Act establishes regulations for environmental protection, including guidelines for sustainable waste management practices like composting. This legislation provides a framework for effective waste management and encourages composting and vermicomposting as eco-friendly approaches to divert organic waste from landfills.

#### **15.5.1.2. National Organic Farming Policy**

The National Organic Farming Policy encourages the adoption of organic farming practices, which may include composting, to enhance soil fertility and reduce reliance on chemical fertilizers. This policy actively promotes the integration of composting and vermicomposting into organic farming

systems, providing guidelines, support, and incentives for farmers to utilize these practices, recognizing their significant contributions to soil health, fertility, and sustainable agriculture.

#### **15.5.1.3. Strategy for Sustainable Development**

This strategy may include elements related to sustainable waste management, environmental protection, and incentives for eco-friendly agricultural practices like composting. The Strategy prioritizes organic farming and vermicomposting as key strategies for achieving long-term agricultural and environmental sustainability. It sets targets for increasing organic farming practices, highlights vermicomposting as a crucial soil enrichment technique, and advocates for policy measures to incentivize and support sustainable agricultural methods.

#### **15.5.1.4. National Biodiversity Strategy**

This strategy may promote sustainable waste management approaches like composting as part of broader biodiversity conservation efforts. The National Biodiversity Strategy of North Macedonia actively promotes composting as a critical element in sustainable waste management practices, aligning it with broader efforts to conserve biodiversity. By diverting organic waste through composting, the strategy aims to reduce environmental impacts, safeguard ecosystems, and support diverse plant communities, while also advocating for policy measures to incentivize composting initiatives.

Understanding the legal and policy framework surrounding vermicomposting in North Macedonia is crucial for individuals and businesses looking to engage in sustainable waste management practices. By being aware of existing laws, policies, and support programs, participants can navigate the regulatory landscape effectively.

### 15.5.2. Financial Support in Agriculture

This law includes provisions for financial support and incentives in agriculture, which could extend to organic farming practices and composting. The Law on Agency for Financial Support in Agriculture and Rural Development of North Macedonia includes provisions to incentivize the adoption of organic farming and vermicomposting practices. Eligible farmers may access grants for setup costs, subsidized loans for infrastructure, subsidies for organic certification, and funding for training initiatives, all aimed at promoting sustainable agriculture.

## 15.6. Spain

There is no national approach plan to composting, much less vermicomposting. In Spain there are Autonomous Communities (Political and Geographic Subdivisions) that can independently promote and legislate to a greater or lesser extent, composting in all its formats. Most of the experiences or initiatives launched at the regional level are developed in Catalonia, Galicia, Navarra, Madrid, although there are often other projects distributed throughout Spain.

There is no national information on community composting or vermicomposting programs. Special mention would be some consortia of multidisciplinary Organizations: Public and private Institutions, Associations, Training Centers such as: <https://www.recompostaje.com> and <https://www.compostaenred.org> with a continued activity of exchange of experiences, knowledge, training meetings, published or selected quality material.

The experiences that are in operation are local and often require the social involvement of the group covered by the program. The community composting experience almost always starts with institutional home composting campaigns. Finally, it can be stated that the culture of community composting is quite small, even less so when talking about vermicomposting.

**Legal Framework:** Compost and vermicompost are included in the royal decrees 506/2013 and 865/2010 regarding fertilizers and substrates, where they are described and defined, including the characteristics they must comply with. Also regarding inputs in organic farming it is applicable the Norm UNE 142500:2017

Regarding operating composting sites, there doesn't seem to be any specific legislation or regulations in place. It would be considered as any industrial waste treatment plant, similar to composting facilities. Therefore, the Autonomous Communities would have the authority to determine the requirements that apply to them.

