AWARD
Agricultural Waste valorization for a competitive and sustainable Regional Development

Work Package 3 - Activity 3.1. Deliverable 3.1.2.

PEST (Political, Economic, Social, Technological) analysis in Ilida, Ilia, Greece

FEBRUARY 2015

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Agricultural Waste valorization for a competitive and sustainable Regional Development
Work Package 3 - Activity 3.1.
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1. INTRODUCTION

This research is part of a European program AWARD (Agricultural Waste valorization for a competitive and sustainable Regional Development) which is held under the auspices of the 3rd call for EUROPEAN TERRITORIAL COOPERATION PROGRAMME GREECE - ITALY 2007-2013.

The purpose of the program is to study the application of technologies for sustainable management and exploitation of agricultural plastic waste, as well as the creation of new enterprises for the collection of agricultural waste management and reuse. The ultimate goal of the project is to identify the potential development and economic opportunities of the proper management of plastic waste and their exploitation.

A PEST analysis is required for the eligible area of the project, the Municipality Ilida of Ilia. The PEST (Political - Economic - Socio-cultural-Technological) analysis is a strategic planning tool of management which describes the political, economic, social, cultural and technological environment. It provides an understanding of the wider work environment, encourages the development of strategic thinking and can help an organization to anticipate future difficulties and take action in order to avoid or minimize their effects.

The PEST analysis of agri plastic waste came in conclusions at the meeting - workshop in the Municipality of Ilida, held at City Hall on Monday, May 5, 2014, in the framework of the European Programme AWARD for the disposal and re-use of agricultural plastic waste. The relevant stakeholders who participated and exchanged their experience, ideas and submitted their proposals. Those were the Mayor, the Deputy Mayor, the Presidents of the Agricultural Cooperatives, the President of the New Farmers Association, the President of the Commerce and Economic Chamber, Owners of Recycling Companies, Professors of Agriculture of the local Department of Technological Educational Institute of Patras and the Department of Chemistry of the University of Athens.
The meeting-workshop reached at common conclusions incorporated in a declaration regarding the establishment of an efficient and effective, integrated management scheme and utilization of Agricultural Plastic Waste (Labeled agriwaste). According to this declaration, the integrated management scheme constitutes the prerequisite for an integrated solution of the problem, leading to the public health and environment protection and to the economic development of the Municipality of Ilida. Furthermore, meticulous collection of data, interviews and opinions’ exchange with the stakeholders took place, as well as intensive research, so that the following analysis can be presented in detail.
1. GENERAL CHARACTERISTICS OF THE ELIGIBLE AREA

The prefecture of Ilia is particularly gifted by nature. It occupies the northwestern part of the Peloponnese and the Ionian Sea, with a climate of high rainfall level resulting in lush plantation. It borders with the prefectures of Achaia in North, Messinia in the South and Arcadia in the East. The area of the territory extends to 2621 square kms. The land is mostly flat. The total population is about 193,288 inhabitants, 1.71% of the total population of Greece.

Administratively the County consists of two provinces: The Ilia Province with an area of 1,851 km² and the Olympia Province with an area of 770 sq km. The population of the Ilia Province has about 142,700 inhabitants and the Olympia Province 37,300 inhabitants approximately. The urban center of the prefecture is the city of Pyrgos. Other towns are Amaliada, Gastouni, Krestena and Zaharo.

Population data:

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ilia</td>
<td>164.061</td>
<td>160.305</td>
<td>179.424</td>
<td>182.610</td>
<td>193.288</td>
</tr>
<tr>
<td>Greece</td>
<td>8.768.128</td>
<td>9.740.417</td>
<td>10.259.900</td>
<td>10.475.878</td>
<td>10.964.000</td>
</tr>
</tbody>
</table>

(source Hellenic Statistics’ Authority EL.STAT)
Several rivers flow along Ilia: Alpheus, the Ilia Peneus, Erimanthos and their tributaries. The county is characterized by coastal wetlands (Kotychi, Caiaphas) of outstanding natural beauty and ecological wealth. The plain area of Ilia is the largest in the Peloponnese. Mountains exist only at the province of Olympia. The mountains of Ilia are: Erimanthos, Minthi and Foloi. Larger mountains are on the boundaries of Arcadia sides. The highest peaks in the Ilia are Lampia (1,797 m.) and Skiadovouni. Further south, the Foloi, the Lapiths and Minthi. Specifically according to the NSS, 151,700 hectares are flat, 55,500 hectares are hilly and 54,600 hectares of mountainous terrain.

The climate is marine Mediterranean, with mild winters and cool summers due mainly to the fact that sea temperature rarely falls below zero in winter and only in inland areas. Humidity levels vary from 67.5 to 70%, with the wettest month December and the driest months July and August. Ilia is one of the less cloudy areas. The average yearly cloud cover ranges between 3.5 and 4, with the sunny days more than 150 and the
cloudy ones fewer than 50. During summer months westerly winds blow as sea breezes and northwest ones as winds, which have less intensity and frequency in comparison with the area of the Aegean. Rain is abundant from October to March. The rainfall is more than twice, in contrast to the eastern Peloponnese. Snow, especially in the coastal parts is rare, but frequently hails cause significant damages to agriculture.

Ilia is a privileged area in terms of natural environment and has significant and diverse ecosystems. The natural wealth is seriously threatened by deforestation, illegal logging and grazing, fires, building infrastructures with poor control of conformity to environmental conditions, lack of compensatory measures of environmental impacts and the overexploitation of natural resources.

Regarding water resources, agriculture is the main consumer. The population of the county is mostly rural. Only 25% is urban population. An increase is shown at the coastal municipalities opposed to the mountainous ones, suffering from a significant population decrease. The county is classified as agricultural. Therefore agricultural income and employment is the main financial resource for the residents. However the problems faced by the Greek agriculture in general are acute and demand immediate attention and measures to be taken.

The main problems in the primary sector are:

- Small and fragmented clergy (average 3.43 hectares)
- Age of the rural population.
- Education and training of farmers.
- Weaknesses in trade and mobility of the agricultural products.
- Inadequate organization of Agricultural cooperative organizations and their inability to contribute to a modernized promotion of Produce, as well as an effective and clear distribution of the agricultural subsidizing inputs.
- Large diversity of productivity and income. The disparities are particularly evident in cases of the failure of non-agricultural occupations. In particular it should be noted that the horticultural crops or not, are up to 25% of farmland in the prefecture of Ilia (source: Cultivation Scheme of western Greece, 2012).

Types of crops varying in the municipality Ilida are: olives (6242.69 ha.), feed (2667.62 ha.), other cereals (2099.92 ha.), vegetables (2073.29 ha.), maize (1290.24 ha.) and currants (763.47 ha.). At a smaller scale but significant land crops: Vine (396.73 ha.) and citrus (141.71 ha.). Smaller areas were also recorded with crops of several trees, legumes, nuts, wheat, protein seeds, and breeding places of snails.
(Source: Aggregated farms’ data, Municipality of Ilida. Cultivation scheme, Region of Western Greece 2012)

**MUNICIPALITY of ILIDA:**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SCOPE in (ha.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNCULTIVATED</td>
<td>2946.47</td>
</tr>
<tr>
<td>PASTURE</td>
<td>2857.09</td>
</tr>
<tr>
<td>MAIZE</td>
<td>1290.24</td>
</tr>
<tr>
<td>WHEAT</td>
<td>13.80</td>
</tr>
<tr>
<td>LEGUMINOUS</td>
<td>24.03</td>
</tr>
<tr>
<td>OTHER CEREALS</td>
<td>2099.92</td>
</tr>
<tr>
<td>VINEYARDS</td>
<td>396.73</td>
</tr>
<tr>
<td>RAISINS</td>
<td>763.47</td>
</tr>
<tr>
<td>CERTIFIED OLIVE GROVES</td>
<td>6242.69</td>
</tr>
<tr>
<td>CITRUS CHOPS</td>
<td>141.71</td>
</tr>
<tr>
<td>NUTS</td>
<td>15.42</td>
</tr>
<tr>
<td>FEED</td>
<td>2667.62</td>
</tr>
<tr>
<td>OTHER TREE CHOPS</td>
<td>35.55</td>
</tr>
<tr>
<td>VEGETABLES</td>
<td>2073.29</td>
</tr>
<tr>
<td>PROTEIN CONTENED SEEDS</td>
<td>8.55</td>
</tr>
<tr>
<td>SNAILS’ BREEDING PLACES</td>
<td>0.08</td>
</tr>
<tr>
<td>GRAND TOTAL (hectares)</td>
<td>215.76,66</td>
</tr>
</tbody>
</table>

Aggregated data of Municipality of Ilida.

In percentages:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SCOPE IN %</th>
</tr>
</thead>
<tbody>
<tr>
<td>VINEYARDS</td>
<td>2%</td>
</tr>
<tr>
<td>RAISIN</td>
<td>4%</td>
</tr>
<tr>
<td>OLIVE GROVES</td>
<td>28%</td>
</tr>
<tr>
<td>OTHER CEREALS</td>
<td>10%</td>
</tr>
<tr>
<td>CITRUS CHOPS</td>
<td>1%</td>
</tr>
<tr>
<td>FEED</td>
<td>12%</td>
</tr>
<tr>
<td>MAIZE</td>
<td>6%</td>
</tr>
<tr>
<td>PASTURE</td>
<td>13%</td>
</tr>
<tr>
<td>UNCULTIVATED</td>
<td>14%</td>
</tr>
<tr>
<td>VEGETABLES</td>
<td>10%</td>
</tr>
</tbody>
</table>
2. POLITICAL ENVIRONMENT ANALYSIS

Greece is a parliamentary democracy. Under the Constitution, executive power is exercised by the President of the Republic and the Government. The official Head of State is the President of the Republic, who is elected by the Greek Parliament for five years. In 1986, the jurisdictions of the President of the Republic were reduced greatly, and political power is now exercised by the Prime Minister, who is in head of the cabinet, that is the country's government. Greece is a full member of the European Union since 1981 and participates in the single European currency.

Greece is a single state, and by 2010, structured at four levels of governing: national, regional (regions), county (counties) and municipal (municipalities). It used to follow the “Napoleonic model” of central governance, but in recent years attempts of decentralization were made, the very recent "Kallikrates" scheme, which came into effect since the 1st of January, 2011. The "Kallikrates" amended the administrative structure of the country, which is now divided into 7 major Regions: Attica, Thessaly and Central Greece, Epirus and Western Macedonia, Aegean Islands, Crete, Central-Eastern Macedonia and Thrace, Peloponnese, Ionian Islands, Western Greece. Head is an elected Regional Administrator, elected in regional elections for a term of five years and is assisted by an Advisory Board, composed of elected members in regional elections for a term of five years, too. These administrative authorities operate as decentralized authorities of the central government and are composed of two or three prefectures (excluding Athens and Crete). The entire territory of Greece is divided into 13 NUTS 2-type regions.

Regional disparities of economic development are found within the population, according to the level of urbanization, the location and the availability of transport infrastructure. In 2011, for example, differences in GDP per capita (PPS) ranged between 10.842 to 25.224 euros. Ilia has among the lowest per capita income in Greece, with an average of 11.711 euros. Correspondingly unemployment is at 29.9% (Q2 2014) with an average ratio of 26.6% nationwide. (source data EL.STAT)

In general, regions have all the competence regarding the management of various types’ of waste. They can decide and formulate their own strategies on these issues through regional action plans. The Body of regional planning and implementation for this purpose is F.O.D.S.A (Body for Solid Waste Management). The FODSA (Body for Solid Management) specifies and implements the objectives and actions of the Regional Solid
Waste Management Plans for temporary storage, transshipment, processing, use and disposal of solid waste.

The FODSAs, irrespectively of their legal form, exercise the powers of the Contracting Authority for the required studies (design and licensing of solid waste management projects). Also, they exercise the powers of the developers and the Contracting Authority for the project implementation (tenders and constructions) established by the authorized Regional Solid Waste Management Plan (PECA), within the geographical limits of their area of competence. Also, they can undertake the collection and transportation of solid waste. The FODSAs may as well delegate individual waste management services and other administrative services to legal or natural persons, according to the relevant provisions of the legislation.
Analysis of legal status

1. E.U legislation on waste management

1.1 Biomass definition according to EU directive 2009/28/EC

According to EU directive 2009/28/EC referring to the promotion of the use of energy from renewable sources; ‘biomass’ is the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste.

1.2. Waste definition according to EU directive 2006/12/EC

According to EU directive 2006/12/EC referring to waste; ‘waste’ is any substance or object in the categories specified in the table below, which the holder discards or intends to, or is required to discard.

<table>
<thead>
<tr>
<th>Categories of Waste</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>Production or consumption residues not otherwise specified below</td>
</tr>
<tr>
<td>Q2</td>
<td>Off-specification products</td>
</tr>
<tr>
<td>Q3</td>
<td>Products whose date for appropriate use has expired</td>
</tr>
<tr>
<td>Q4</td>
<td>Contaminated as a result of the mishap</td>
</tr>
<tr>
<td>Q5</td>
<td>Materials contaminated or soiled as a result of planned actions (e.g. residues from cleaning operations, packing materials, containers, etc.)</td>
</tr>
<tr>
<td>Q6</td>
<td>Unusable parts (e.g. rejected batteries, exhausted catalysts, etc.)</td>
</tr>
<tr>
<td>Q7</td>
<td>Substances which no longer perform satisfactorily (e.g. contaminated acids, contaminated solvents, exhausted tempering salts, etc.)</td>
</tr>
<tr>
<td>Q8</td>
<td>Residues of industrial processes (e.g. slags, still bottoms, etc.)</td>
</tr>
<tr>
<td>Q9</td>
<td>Residues from pollution abatement processes (e.g. scrubber sludges, baghouse dusts, spent filters, etc.)</td>
</tr>
<tr>
<td>Q10</td>
<td>Machinery/finishing residues (e.g. lathe turnings, milled scales, etc.)</td>
</tr>
<tr>
<td>Q11</td>
<td>Residues from raw materials extraction and processing (e.g. mining residues, oil field slops, etc.)</td>
</tr>
<tr>
<td>Q12</td>
<td>Adulterated materials (e.g. oils contaminated with PCBs, etc.)</td>
</tr>
<tr>
<td>Q13</td>
<td>Any materials, substances or products, the use of which has been banned by law</td>
</tr>
</tbody>
</table>
2. European Union waste strategy

The EU’s aim is to achieve a significant cut in the amount of waste generated, through new waste prevention initiatives, better use of resources, and encouraging a shift to more sustainable consumption patterns.

The European Union’s approach regarding waste management is based on the following principles (detailed description according to 2008/98 EC):

- **Waste prevention**: This is a key factor in any waste management strategy. By reducing the amount of waste generated in the first place—including hazardous and non-hazardous waste—considerable resources for waste treatment are saved. These resources may include investments on waste treatment capacities, capital, land etc. Waste prevention is closely linked to improving manufacturing methods and influencing consumers to demand greener products and less packaging.

- **Recycling and reuse**: If waste production cannot be prevented, as many of the materials as possible should be recovered, preferably by recycling. The European Commission has defined several ‘waste streams’, where attention should be paid in order to reduce their overall environmental impact. The waste categories included in this group are: packaging waste, end-of-life vehicles, batteries, electrical and electronic waste. EU directives now require Member States to introduce legislation on waste collection, reuse, recycling and disposal of these waste streams. Several EU countries are already capable of recycling over 50% of packaging waste.

- **Improving final disposal and monitoring**: Where possible, waste that cannot be recycled or reused should be safely incinerated, with landfills only used as a last resort. Both these methods need close monitoring because of their potential for causing severe environmental damage. The EU has approved a directive setting strict guidelines for landfill management (Landfill directive 99/31/EC). It bans certain types of waste, such as used tires, and sets
targets for reducing quantities of biodegradable waste. Another recent directive lays down specific limits on emission levels from incinerators (Directive 2000/76/EC). More specifically the target of the EU is the reduction of dioxine emissions and acid gases, such as nitrogen oxides (NOx), sulphur dioxides (SO2), and hydrogen chlorides (HCl), which can be harmful to human health.

**Waste Hierarchy according to EU legislative framework (source: EU Directive 2008/98 EC)**

Apart from municipal waste treatment, the organization and funding of recycling schemes, in the case of waste streams with a considerable environmental impact, has been proved as an exceptionally difficult and complicated task, despite the clear environmental benefits. This resulted in legislative measures for the establishment of recycling systems for packaging waste, end-of-life vehicles and electrical and electronic waste.
The efficient management of other problematic waste streams has been achieved through specific Community directives. Hazardous waste such as waste oils, PCBs/PCTs and batteries has also been included in the legislative framework. Community waste regulations restrict the use of heavy metals in a number of products, finally aiming at qualitative prevention.

Recycling and recovery targets have also been set for some key complex waste flows. Such targets are necessary, where separate collection and recycling schemes are not profitable under free market conditions, but are beneficial for common good. Although there is generally much dispute about which targets to adopt, once adopted they provide the legal certainty and the necessary stability for recycling industries to plan their investments seriously and safely, fast enough to provide recycling services.

In addition, the principle of produce’s responsibility that was introduced into EU waste policy back in 1996, has also provided a stable source of financing to offset the cost disadvantage of recycling, versus energy recovery and landfill. While the current packaging directive is not based on this principle, almost all Member States have chosen to implement it, partly on the basis of the producer’s responsibility. Producer’s responsibility has also had a positive impact upon the way that products are designed. By placing the costs of recycling principally on the producers, it encourages them to design their products differently, make recycling easier and therefore less expensive.

Finally, the widespread use of separate collection systems helps to achieve the objectives of Community directives on specific waste streams, especially for end-of-life products, which would otherwise enter the municipal solid waste stream.
Summary of waste legislation directives and regulations in effect

Framework Legislation

- Waste Framework Directive (Dir. 2008/98/EC)
- Hazardous Waste Directive (Dir. 91/689/EC)
- Waste Landfill Directive (Dir. 99/31/EC)
- Waste Treatment Operations

Waste Streams

- Batteries (Dir. 2013/56/EC)
- Construction and Demolition (integrated in Dir. 2008/98/EC)
- RoHS (Dir. 2008/35/EC Dir. 2011/65/EU)
- Mining Waste (Dir.2006/21/EC)
- Packaging Waste (Dir.94/62/EC amended 2004/12/EC)
- PCBs / PCTs (Dir. 96/59/EU)
- POPs (Reg.756/2010, 757/2010)
- Sewage Sludge (Dir. 86/278/EEC amen. Dir 91/692/EEC)
- Ship Dismantling (Reg.1013/2006)
- Titanium Oxide (Dir. 2010/75/EU)
- Waste Oils (Dir. 75/439/EEC repealed 12/12/2010)
Waste management can be associated with the European energy policy. Energy is essential for Europe to function but its production is quite costly as far as environment is concerned. Energy accounts for 80% of all greenhouse gas (GHG) emission in the EU; it is responsible both for the climate change and mostly for air pollution. The EU is committed to addressing this - by reducing EU and worldwide greenhouse gas emissions. Thus the strategy for a European energy policy has a threefold target: combating climate change, limiting the EU’s external vulnerability to imported hydrocarbons, promoting prosperity and “green” jobs and lastly providing secure and affordable energy to consumers.

Achieving the strategic energy objective set out above, means transforming Europe into a highly energy efficient and low CO2 energy economy. Therefore a feasible option is to use waste to produce energy without burdening the total CO2 emissions, since the waste biogenic content is not accounted as an addition to the total worldwide CO2 levels.

Directive 2008/98/EC on the promotion of the use of energy from renewable sources and the European Directive 2009/28/EC of 23 April 2009 on the promotion of renewable energy, aim at achieving by 2020 a 20% share of energy from renewable sources in the EU’s final consumption of energy and a 10% share of energy from renewable sources in each member state’s transport energy consumption.

To achieve these objectives, the directive for the first time sets for each member state a mandatory national target, for the overall share of energy from renewable sources in gross final consumption of energy, taking into account the countries’ different starting points. The main purpose of mandatory national targets, is to provide certainty for investors and to encourage technological development for energy production of all types of renewable sources. To ensure that the mandatory national targets are achieved, member states have to follow an indicative course of actions towards the achievement of their target.

**Landfill Directive**

The 1999/31EC directive is intended to prevent or reduce the adverse effects of the landfills of waste on the environment. It defines the different categories of waste (municipal waste, hazardous waste, non-hazardous waste and inert waste) and applies to all landfills, defined as waste disposal sites for the deposit of waste onto or into land. Landfills are divided into three categories:

a. Landfills for hazardous waste
b. Landfills for non-hazardous waste
c. Landfills for inert waste
On the other hand, the Directive does not apply to:

a. The spreading on the soil of sludges (including sewage sludges and sludges resulting from dredging operations)

b. The use in landfills of inert waste for redevelopment or restoration work

c. The deposit of unpolluted soil or of non-hazardous inert waste resulting from prospecting and extraction, treatment and storage of mineral resources as well as from the operation of quarries.

d. The deposit of non-hazardous dredging sludges alongside small waterways, by which they have been dredged and of non-hazardous sludges in surface water, including the bed and its subsoil.

Incineration Directive
The directive 2000/76/EC on waste incineration not only applies to solid or liquid waste incineration plants, but also to co-incineration plants, since incineration of both hazardous and non-hazardous waste may cause a considerable environmental impact, through the emissions of pollutants into the air, water and soil, which may have harmful effects on human health. In order to limit these risks, the European Union is willing to impose stricter operating conditions and technical requirements on waste incineration plants and waste co-incineration plants. In order to ensure complete waste combustion, the Directive requires all plants to keep the incineration or co-incineration gases at a temperature of at least 850°C, for at least two seconds. If hazardous waste with a content of more than 1% of halogenated organic substances, expressed as chlorine, is incinerated, the temperature has to be raised to 1100 °C for at least two seconds.

The heat generated by the incineration process has to be utilized. The rate limits for incineration plant emissions to air, concern heavy metals, dioxins and furans, carbon monoxide (CO), dust, total organic carbon (TOC), hydrogen chloride (HCl), hydrogen fluoride (HF), sulphur dioxide (SO2) and the nitrogen oxides (NO and NO2).

Incineration or co-incineration residues must be reduced to a minimum and, as far as possible, recycled. When dry residues are transported, precautions must be taken to prevent their dispersal in the environment. Tests must be carried out to establish the physical and chemical characteristics and the pollutant potential of residues. The Directive requires the installation of measurement systems, so as to monitor all the parameters of the relevant emissions.
Waste Framework Directive

The directive 2008/98/EC establishes a legal framework for the treatment of waste, within the European Community. It aims at protecting the environment and human health, through the prevention of the harmful effects of waste generation and waste management.

As far as waste management is concerned, any producer or holder of waste must carry out their treatment on their own, or else have treatment carried out by a broker, or others. Member States may cooperate, if necessary, to establish a network of waste disposal facilities. Dangerous waste must be stored and treated in conditions that ensure the protection of public health and the environment. It must not, in any case, be mixed with other dangerous waste and must be packaged or labeled in line with the international or Community regulations.

The competent authorities must establish one or more management plans to cover the whole territory of the Member State concerned. These plans include the type, quantity and source of waste, existing collection systems and location criteria. Prevention programs must also be drawn up, with a view to breaking the link between economic growth and the environmental impacts, associated with the generation of waste. These programs should be communicated by Member States to the European Commission.

A very helpful instrument for understanding the European Union’s attitude and legislation, concerning waste management, is the “Guidance of the interpretation of key provisions of the Directive 2008/98/EC on waste” issued by the European Commission Directorate – General, environment department.

Greece is a full member of the EU since the 80s. All the EU legislation and guidelines on waste management have been embodied in the Greek laws. Greek laws and directives are summarized at the following list:
GREECE’S LEGISLATIVE FRAMEWORK FOR THE MANAGEMENT OF SOLID WASTE

The institutional framework governing the management of waste includes:

1. GENERAL FRAMEWORK

- Law 2939/2001 (Government Gazette 179 / A / 06.08.2001) "Packaging and alternative management of packaging other products - Founding of the National Organization for the Alternative Management of Packaging and Other Products (EOEDSAP) and other stipulations", as amended by Law no. 3854 / 10 (Government Gazette 94 / a / 23.06.2010) "Modification of the alternative management of packaging and other products and the National Organization for the Alternative management of Packaging and Other Products (NOAMPO ) and other stipulations "and the Law 4042 / 2012


- Law 4014/11 (Government Gazette 209 / A / 09.11.21) "Environmental licensing of projects and activities, arbitrary buildings’ regulation in relation to creating environmental balance and other, Ministry of Environment provisions" as amended and in force (Article 12).


- Regulation (EC) 1013/2006 on shipments of waste, as amended, supplemented and in force.

- JMD 114218/1997 (Government Gazette 1016 B) “Framework of Training Standards and General Solid Waste Management Programs”

- JMD 29407/3508/2002 (GG 1572 B) “Measures and conditions for the landfill of waste”

- JMD 22912/1117/2005 (GG 759 B) “Measures and conditions for the prevention and reduction of environmental pollution from waste incineration”

- JMD US 4641/232/2006 (GG 168 B) "Determining specifications of small landfills on islands and isolated settlements pursuant to Article 3 (par.4) in conjunction with Article 20 (Fri) and its no.29407 / 3508/2002 CMD "


- JMD 8668/2007 (Government Gazette V'287 / 03.02.2007): Approval of the National Hazardous Waste Management Plan (NEEAP), in accordance with Article 5 (Fri) of no. 13588/725 common ministerial decision "measures, conditions and restrictions on hazardous waste management, etc. "(B 383) and in compliance with the provisions of Article 7 (paragraph 1) of Nos. 91/156 / EC Directive of March 18, 1991. Modification of decision arithm.13588 / 725/2006 Joint Ministerial Decree "Measures conditions and limitations for the management of hazardous waste ... etc." (B 383) and into no.24944 / 1159/206 Joint Ministerial Decision "Approval General Technical Specifications for the handling of hazardous waste ... etc" (B 791).


- CMD no. JMD.146163 / 2012 "Measures and Conditions for Waste Management of Health Units", issued under the authority of Article 38 of par.7 n.4042 / 2012.

2. RECYCLING SYSTEMS - ALTERNATIVE WASTE MANAGEMENT

- Law. 2939/2001 (Government Gazette 179 / A / 06.08.2001) "Packaging and alternative management of packaging other products - Establishment of the National Organization for the Alternative Management of Packaging and Other Products (EOEDSAP) and other provisions" as amended and in force.

- Law. 3854/2010 (Government Gazette 94 / A / 23.06.2010) "Modification of the alternative management of packaging and other products and the National Organization for the Alternative Management of Packaging and Other Products (E.O.E.D.S. AP) and other provisions "as amended and in force.

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3. ENTITIES' SOLID WASTE MANAGEMENT

The issues of solid waste management facilities are regulated in particular by the following provisions:


- Law 3536/2007 (Government Gazette 42 / 23.2.2007). Special arrangements immigration policy and other Interior Ministry competence issues, Public Administration and Decentralization (Article 30)


- Law 3854/2010 (Government Gazette 94 / 23.06.2010). Modification of the alternative management of packaging and other products and the National Organization of Alternative Management of Packaging and Other Products (NOAMPO) and other provisions.

General note:

- Responsible for the waste management strategy per region is the appropriate region itself and the competent body is the regional FO.D.S.A. The municipalities have the obligation to manage urban waste.
- The burning of waste and hence the APW in the open space is prohibited, as well as uncontrolled landfilling of such waste.
- The APW is not municipal waste and not subject to the obligations of the municipalities for municipal solid waste. Responsible for the management of this waste is the current producer of the waste.
- The local FODSA has ruled for social and environmental reasons, the use of waste in combustion plants within its region of jurisdiction.
- If notified to the Commission cases of illegal waste management practices, this can initiate infringement proceedings before the European Court. If the Court finds proof that a Member State has failed to fulfill its obligations, the Member State will be required to take the necessary measures to comply with the judgment, pursuant to Article 228 of the EC Treaty. Otherwise, heavy fines will be imposed.
- Proper implementation of the above legislation and Directive 1999/31 / EC of 26 April 1999 by setting stricter requirements for the landfill of waste, so as to ensure a high level of environmental protection in the Member States renders other legislation –i.e to limit the illegal disposal of waste such as burning in the open space- not necessary.
- Under EU waste legislation, regional administrations can take responsibility for the collection and disposal of waste. At the same time, however, Member States should take into account the general principle that “the polluter pays” in Article 15 of Directive 75/442 / EEC on waste, whereby the cost of disposing of waste is generated by the holder, the previous holder or producer of this waste.
- In the area of policy on agricultural plastic waste, which is the interest of this project, there is no further specific legislation, specifically for such waste, at the time being.
- Biodegradable plastics could fulfill the criteria for biomass.
ECONOMIC ENVIRONMENT ANALYSIS

Greece has a mixed capitalist economy, with the public sector to contribute about half of GDP. Tourism is a very important industry, and it contributes to a large percentage of the GDP, and also as a source of foreign exchange. In 2004, the largest industry in Greece with revenue of around 12 billion euros was shipping. In present, the major challenges are the reduction of unemployment and the further reconstruction of the economy, through either privatization or modernization and reform of several large state-owned companies, the reform of social security, the restructuring of the tax system and minimizing bureaucratic shortcomings in the state administration.

Greece's economy depends increasingly on the service sector, which forms 68.3% of GDP (2009). The largest shares are retail, tourism and transport, storage and communications services, while knowledge-intensive services account for only 6.1% of the total value added in the economy.

The contribution of agriculture to GDP corresponds to a rate of 3.6%, which is among the highest rates in the EU Member States, despite a significant reduction during recent years, and employs about 12% of the total workforce.

A main problem for business development is considered to be the illiquidity of financial institutions, leading to inability to finance plant operations and in addition very high interest rates. Equally problematic is considered to be the instability of the tax system and bureaucratic state administration issues.

About the eligible area:

Ilia has among the lowest per capita incomes in Greece at an average price of EUR 11 711 or 55.8% of the Greek average. Correspondingly unemployment is at 29.9% (Q2 2014) with an average ratio of 26.6% nationwide. The Western Greece Region represents 9.16% of the value of agricultural production in Greece (2011). Ilia produces 0.8% of Gross Domestic Product. Regarding the composition of the Gross Value Added (GVA) produced in the prefecture of Ilia the primary sector produced 15.8%, the secondary 11.2% and the tertiary sector 73% (2010) (data source Hellenic Statistical Authority EL.STAT).
In the field of recycling of agricultural plastic waste in the Ilia region, only one factory operates, recycles APW and produces bags, as well as about 6 APW licensed collectors. There are collectors who work illegally and without the relevant licenses. Quantities of the APW are diverted to other recycling factories in the country. There is no incineration station in the area of Ilida. The nearest incineration possibility for APW could be the cement factory in Patras and the electricity factory in Megalopoli.

SOCIAL ANALYSIS

The project implementation team traveled to the eligible area repeatedly to talk and draw information from those directly involved, such as to form in situ view of the situation in relation to the APW. After field investigations, interviews and general exchange of views and positions of stakeholders, we consider that the situation is as follows:

The Ministry of Agriculture has informed the regional and local rural cooperatives that all agricultural waste should be managed by farmers. Especially farmers, who grow certified fruits and vegetables, are informed by the agronomists for what is required for a proper and comprehensive management of agricultural produce and waste.

The certification bodies regarding the APW accept that in case of burning them, this must be done on a concrete base and at some distance from the field to be certified. It is generally considered that if the APW management is handled at a little further away distance from the farm to be certified, this meets the requirements in order to be certified. If an APW collection document is presented for some quantities of agricultural plastic waste, then it will not be checked further, whether the amounts correspond to the entire production or part of it. So the certification of good management is given without any particular attention to the management of APW. Simultaneously, no concrete platforms for burning APW fields were found. Clearly there is no focus on the subject of APW by organizations certifying agricultural products.

The law applies for universal prohibition of uncontrolled burning of plastic in outdoor areas, according to the principle "the polluter pays". Therefore, responsible for the management of waste is the producer of it; however, there is not any organized management system. Furthermore, as the APW is not municipal solid waste, it is not allowed to be deposited in organized municipal dump for example. Municipalities are not responsible
to manage such waste. The region also has no organized system of management. Similarly, the EOAN (National Recycling Organization) has not a certified recycler of such waste. In addition, the code of plastic agricultural use is exempted from payment to the waste management authority.

So there is not an official state funding system or institutions specializing in the management of APW.

As a result effective controls for the implementation of legislation do not take place. All stakeholders are not and cannot be effective because there is no staff in agronomy, the police cannot allocate human resources, has large staff shortages in rural areas and there are other burning issues of competence to handle. Finally municipalities cannot control the situation due to staff shortage, lack of reliable waste management proposal and underfunding. In fact, local authorities do not wish to get involved in a dispute with their citizens, especially as they cannot give any collection solution and disposal of APW. Corresponding regions, although they have jurisdiction over the matter, they claim insufficient resources and inability to find efficient collection and management solutions.

The producers of plastics, collectors and recyclers can exploit, using their own resources, only a small part of APW. So they are only interested in gathering specific APW material, meeting certain standards. Through interviews we found out that only thick plastic is of financial interest. Although theoretically the APW can be regenerated to an extent up to 99% - agricultural plastic made from PP (polyethylene) and PE (polypropylene) - the bacteria contamination with dirt and humidity reach up to 70%. If the film is very thin then the transfection levels are increased. The cost of transport and collection can be enormous, as well as the cleaning and deposition costs from soil leftovers, during the cleaning process. The plastics’ industries are positive in finding some solutions and are aware of waste problems. But it is not feasible to use their own equity and without any support to fully undertake the entire recycling of the APW on their own. We noticed that large industries especially, were highly sensitized and willing to assist in the investigation. We believe that by this part there is full cooperation, awareness and knowledge of the problem.

Farmers manage the APW at their own will. Their primary consideration is how to get rid of, in any way, useless for them plastic agricultural waste. If someone does not appear to collect the waste, who will collect as much waste is marketable, the solutions used are uncontrolled burning or burying them in the field. Although many respondents are aware of the existing environmental issues, for the fields themselves, their crops and
their own health, nevertheless they insist that there are no alternative solutions. Farmers mentioned that they often find plastic pieces to planted roots when taking them out of the soil and that it worries them. However, they believe that if they do not burn the APW, by only ploughing the field, they can get rid of it. It is also known that when a field has over time accumulated much plastic in the soil, productivity is reduced, because natural ventilation and water flow is decreased.

Farmers who used the so-called biodegradable plastics were unsatisfied, both for their technical characteristics and for the way that they dissolved in the soil. Not all farmers were aware of the law and because neither fines nor certification problems of the products are created, they consider that the situation is acceptable. Producers having problems with the sales of their products due to ingress of gaseous combustion pollutants were more sensitive. This was clear to growers of certified organic olive groves and producers who export to the US, where stricter safety food standards are valid. It is obvious that there is a difference in approach for the issue of plastic waste, depending on the age of farmers. Older ones are significantly less sensitive. Also they were negative for the adoption of practices such as shaking the waste plastics to have less soil when collected from the fields, or collecting the plastics at midday, so as to limit contamination in soil and moisture and therefore render the recycling process more advantageous. Compensation issues for waste plastics were also discussed, although the management of APW by law lies within the farmers.

In general we can say that there is lack of information and different ways of approaching the issue, according to the age of the farmers and type of the crop. Research shows that farmers who cultivate larger areas are more informed and more eager to find a way of managing waste plastics. The general feeling though is that a more systematic waste management will cost more in production and hence one should be asked to pay this cost. Farmers believe that further increase in production costs is problematic because already their production costs are high.

We found essentially no refusal by the farmers to participate in an organized waste management system. We neither found total refusal to accept the problem. It is noteworthy that the cooperation in data collection was impeccable and the interviews were at very satisfactory levels. We believe that the vast majority of farmers is mature, in case they are proposed a system that would ensure some reasonable and economical solutions. Farmers understand the environmental dimensions of the problem, but also the new requirements of the market for agricultural
products. But they cannot by themselves provide a solution and solve the problem of APW management.

**TECHNICAL ANALYSIS**

The plastic collection procedure, as well as the installation process at large areas is mainly done mechanically. The APW is non-toxic waste and because of its composition can be regenerated at a very large percentage. Also, if used for energy recovery, plastics are equivalent to oil, they do not emit particularly dangerous pollutants and are therefore ideal fuel. The films used on the roofs of tall greenhouses, can be reused at the side of greenhouses, after used for ceilings.

Biodegradable plastics seem not to have the technical characteristics that meet the agricultural work, and not being able to solve the problem, because in order to biodegrade they need air and sun, something unattainable when ploughed into the field and mixed with soil.

The basic problems of waste collection and processing are:

1. **Collection and handling:**
   When the agricultural plastics are sent to the field for use, they are suitably packed to occupy the least possible volume. When they become waste they cannot be packaged by farmers to take up little volume. The volume multiplies. Furthermore, the thinner the plastic film, the greater the contamination with dirt and moisture. The contamination can reach up to 70% of the weight of the collected waste. So the collection of waste must manage large amounts of aggregates and large volume/weight of cargos. In practice the collectors of APW, collect waste with a contamination of no more than 30% - 35%. Only the thick and relatively clear APW is selected. It is not cost effective to manage the rest. With proper practices when collecting APW, farmers can reduce the degree of contamination with soil and moisture. This is essential in order to reduce transport costs and cleaning.

2. **Cleaning and recycling / regeneration:**
   Technological recycling / regeneration is feasible up to 4-5 times. The resulting product will have inferior properties, compared with the virgin feedstock. If the contamination of the waste is low then the process is advantageous and successfully applied.

3. **Energy recovery:**
   Unfortunately, this technology does not apply in Greece. In Western Greece, where the eligible area lies, it is prohibited by FODSA.
The reasons, according to FODSA, for this ban are:

a. Environmental reasons (no further explanations are provided).

b. Social reasons (no further explanations are provided).

Actually, the local FODSA can reconsider this ban at any time. It is noteworthy that the Greek laws nevertheless allow the energy recovery of solid waste and are compatible to the EU legislation. Experimentally the technique has been applied in cement industry and in central Macedonia area in northern Greece. Also in this case the contamination of waste with soil and humidity play a decisive role for the quality of combustion and the use of the products.

We believe that the focus on reducing the contamination of APW with soil and moisture, when collected, and the search for techniques that will best utilize the contaminated waste, is the key to the management of such waste.

**SUMMARY**

In summary, the situation in the eligible area requires immediate treatment, because the problem extends to a considerable rate. After evaluating the data from all stakeholders, it is clear that without a comprehensive APW management system, it is almost impossible to apply the law, as well as have effective control of these waste streams and therefore provide a viable and functional solution to the problem. None of those involved are negative in finding a workable solution to the issue and all the parties, either to a lesser or a greater degree, have knowledge of the situation. Finally none of the parties involved can carry out a functional project management APW by themselves.
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