"GREEN" EMPLOYMENT IN THE MANAGEMENT OF BIOWASTES

PROJECT ACRONYM: Green_Crew

https://www.serres.gr/greencrew/el/green-crew/

WP 3: Exploring the social contribution of bio-waste utilization

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S.W.O.T analysis report
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SUMMARY

The current study was prepared under the project "Green –Crew" which is implemented within the context of the Interred V-A Cooperation Programme ''Greece – Bulgaria 2014-2020''.
The main objective of the study is to present an adequate SWOT analysis concerning the topics of entrepreneurship and employment prospects deriving from the current and immediate future status of bio-wastes production & management, within the administrative boundaries of the Prefectures of Serres and Nestos situated in the Northern Regions of Greece.

More specifically, the study covers the following topics:

A solid description of the existing socio-economic development characteristics in the areas of Serres and Nestos (Chapter1)
Analytical presentation of the current and near future local waste management status, especially its organic proportion (Chapter 2)
Elaboration of a SWOT analysis for pinpointing the key factors for "greening" the bio-wastes management in the area (Chapter 3)
Clarifying and defining green economy, green entrepreneurship, green jobs and professions as well as the skills required (Chapter 4)
Presentation of good practices on the development of green entrepreneurship in all sectors of the economy for the emergence of green jobs in European and National climax (Chapter 5)
Identification of the "Green Skills Needs" in the Greek Economy (Chapter 6)
Indication of the conditions and key factors of success and transferability in the intervention area and suggestions for the two areas covered by the study: Serres & Nestos - Green economy and employment at the Municipalities of the study area ("Serres" & "Nestos") opportunities and prospects (Chapter 7)

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Contents

Το έργο υλοποιείται στο πλαίσιο του Προγράμματος Συνεργασίας INTERREG V-A «Ελλάδα - Βουλγαρία 2014-2020» και συγχρηματοδοτείται από το Ευρωπαϊκό Ταμείο Περιφερειακής Ανάπτυξης (ΕΤΠΑ) και εθνικούς πόρους των χωρών που συμμετέχουν στο Πρόγραμμα"

At the Municipality of Nestos there are 12 classical hotels of small type mainly from four stars to one star, and in furnished rooms - studios and furnished houses. In the river Nestos Delta area there are two Visitor Reception and Information Centers, which have as their main concern the proper management and service of the tourist visitors. They facilitate their access and sightseeing in the area but also help them to fully "get acquainted" with the river in order to have the opportunity to enjoy in depth the

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Preamble

The current study was prepared under the project “Green –Crew” which is fulfilled within the context of the Interreg Greece - Bulgaria programme.

Main objective purpose of the study is to present an adequate SWOT analysis concerning the topics of entrepreneurship and employment prospects deriving from the current and immediate future status of bio-wastes production & management, within the administrative boundaries of the Prefectures of Serres and Nestos situated in the Northern Regions of Greece.

Over the last nine years (2009-2018), the current economic downturn has affected the entire productive and economic activity of the country, significantly reducing the levels of private investment, employment, and entrepreneurship. At the same time, both the domestic and the international economy are in a transient situation, to which contributes the ever-growing recognition that global competitiveness and sustainable economic growth can come from sustainable economic and business practices that respect the environment and resource-rich, make good use of natural resources and create sustainable jobs and sustainability.

In other words, today the importance of the **green economy** and **green jobs** is emerging as opportunities for economic recovery, innovation, and sustainable jobs. Particularly in areas with increased participation of the agricultural sector in economic activity, such as the municipality of ‘Serres”, or in areas with a range of natural and environmental resources, the shift towards green entrepreneurship and the creation of green professions can accelerate the return to economic development with a long-term horizon.

However, the development of the green economy is diverse and is determined not only by the development of green jobs and green products, but also by the relative private and public investment as well as by government policies that will promote the transition to green forms of entrepreneurship and will support the emergence young, green professions (OECD, 2012). In this context, this deliverable aims at highlighting good practices in developing green entrepreneurship in the "green" economy for green jobs.

More specifically, the ultimate goal of the study is to highlight the development of green entrepreneurship particularly in the sector of the local economy that is involved in wastes management for the emergence of green jobs through innovative approaches and through tools that ensure sustainability and competitive advantage. In addition, this study highlights the conditions and key success factors of good practice to transfer fertile, effective and targeted to the intervention area. At the same time, the problems and challenges that innovative entrepreneurs have faced and continue to face. Finally, the results are recorded and presented in order to draw conclusions and make suggestions resulting from the recorded good practices.

More specifically, the specific objectives of the study concern the following:

- Brief presentation of the study area and its predominant socio-economic characteristics (Chapter 1)
- Analytical presentation of the current and near future local waste management status, especially its organic proportion (Chapter 2)
- Elaboration of a SWOT analysis for pinpointing the key factors for "greening" the bio-wastes management in the area (Chapter 3)
- Clarifying and defining green economy, green entrepreneurship, green jobs and professions as well as the skills required (Chapter 4).
- Presenting good practices on the development of green entrepreneurship in all sectors of the economy for the emergence of green jobs in European and National climax (Chapter 5)
- Identifying the "Green Skills Needs" in the Greek Economy (Chapter 6)
- Indication of the conditions and key factors of success and transferability in the intervention area (Chapter 7)
- Making proposals (Chapter 8)

Methodology used for this study

The identification, recording and highlighting of good practices in the development of green entrepreneurship is based on the collection of secondary data, mainly through the use of online desk research based on the already established and widely accepted relevant methodological approaches such as Kaye & Johnson (1999) and Dul & Huk (2008) for researching and recording best practice in business research. For this reason, a clear wording of the research question was made and the criteria for entry and exclusion of good practices were defined. Then, on the basis of these criteria, data was recorded and analyzed and the results were interpreted.

Data retrieve sources for this study were the following:

1. Hellenic Agency for Local Development And Local Government
2. Operational Program of Region of Central Macedonia
3. Operational Program of Region East Macedonia-Thrace
4. National Waste Management Plan
5. Review of the Central Macedonia Regional Solid Waste Management Plan & Strategic Study of Environmental Implications
6. East Macedonia – Thrace Solid Waste Management Plan
7. Operational Program of the Municipality of Serres 2014-2019
8. Operational Program of the Municipality of Nestos 2014-2019
9. National Institute of Labor and Human Resources
10. Directorate of Rural Economy and Veterinary of the Regional Unit of Serres
11. Hellenic Statistical Authority (http://www.statistics.gr/)
12. Eurostat (http://ec.europa.eu/eurostat/web/main/home)

13. Enterprise Greece- Invest & Trade (http://www.investingreece.gov.gr/default.asp?pid=36&la=2)
14. Ministry of Environment & Energy (http://www.ypeka.gr/)
15. Geo-data of Greece (http://geodata.gov.gr/geodata/)
16. Chamber of Serres (http://www.eves.gr/)
17. Hellenic National Meteorological Service (http://www.hnms.gr/hnms/greek/climatology/climatology_region_diagrams_html?dr_city=Serres)
18. Ministry of Rural Development and Food (http://www.minagric.gr/)
19. Public Central Library of Serres (http://www.serrelib.gr/serres_nova.html)
20. European Union (https://europa.eu/european-union/index_en)
21. European Commission (https://ec.europa.eu/)
22. Regional Information Centre for Western Europe (https://www.unric.org/en/)
23. International Labour Organization (www.ilo.org)

The metadata of this analysis could be utilized for the forwarding of the sustainable development of the Local Economy pursuing the following goals:

a) Protecting and upgrading the natural and built environment of the area and ensuring the quality of life by:
    - Protection and sustainable management of the natural environment
    - Improvement and management of the anthropogenic environment
    - Technical infrastructure and service networks
b) To improve the social and economic well-being of local residents by intervening in the following fields:
    - Social Policy and Social Inclusion
    - Social health improvement
    - Equality of Gender and Opportunities
c) Improving the local economy and employment:
    - Innovative synergies between local actors
    - Stimulating the development of circular economy
    - Supporting the local primary sector
d) Advocating regional synergies for cyclical economy development:
    - Local & regional key actors of economy (private enterprises, collective carriers, non-government bodies)
    - The neighboring and associated Municipalities
    - The rest bodies of the administrative structure of the country (regional authorities & central government)

Bio wastes and its update and effective management within the spectrum of the search for "new", "innovation", "new policy" and more generally "substantial" and "realistic approach to the new reality" summarize the identity and political demand for both the local government and the citizens.

The broader area of the Municipality of Serres is an area that has long been plagued by the harsh recent economic and social crisis that is tormenting the entire country since 2008.

The present study is being drafted at a time when everything that has been assumed to date in the economy, in society and in the environment has been under serious reconsideration.

Within this conceptual framework, the great challenge for the local society is to manage the conditions that this multifaceted crisis shapes and to develop a realistic strategy for the future of the broader cross border area, focusing on the man and his needs.

CHAPTER 1 - Summary description & evaluation of the current socio-economic status of the municipalities of “Serres” and “Nestos”

1.1 Summary presentation of the study area

A) Administrative Structure at “Serres”

The current Local Authorities Organization called “Municipality of Serres”, as it stands is established by the Law 3852/2010 "New Architecture of Local Government and Decentralized Administration - Program Kallikratis" (published at Government Gazette 87 / T.A. / 07-7-2010). The municipal capital is based in the town Serres and consists of the fusion of the former municipalities of “Serres”, “Capetan Mitrousis”, “Lefkonas”, “Skoutareos” as well as the communities of “Ano Vrontou” & “Orini”.

The derivative municipality of the above-mentioned fusion has a total area of 601.49 sq. km and borders at North with the Municipality of “Sintiki”, Northeast with the Municipality of “Emmanouil Papas”, Northwest with the Municipality of “Herakleia” and at South with the Municipality of “Visaltia”.

The table below presents the current administrative division of the Municipality of Serres.

Table 1: Administrative structure of the Municipality of Serres

Municipal Section	Municipal Section subdivisions
A1 “Capetan Mitrousis”	A.2. Local community “Anaggeniseos” A.3. Local community “Ano Kamila” A.4. Local Community “Provatas” A.5. Local community “Monoklissias”
B1 “Skoutareos”	B.2. Local community “Agias Elenis” B.3. Local community “Adelfiko” B.4. Local community “Vamvakousa” B.5. Local community “Kato Kamila” B.6. Local community “Kovouklia” B.4. Local community “Koumaria” B.8. Local community “Konstantinato” B.9. Local community “Peponia”
C1 “Lefkonas”	C.2. Local community “Kala Dentra” C.3. Local community “Christos”
D1 “Serres”	D.2. Local community “Eleonas” D.3. Local community “Eptamila” D.4. Local community “Inousa”
E	E.1. Local community “Ano Vrontou”
F	E.2. Local community “Orini”

The capital of the Municipality is the City of Serres, which has a population of 60.642 people (census 2011). The sum represents 79.34% of the total population of the Municipality or 34.28% of the total population living in the Prefecture of Serres. According to the provisional results of the 2011 census, the total population of the Municipality of Serres amounts to 76,430 people and the whole of the Prefecture of Serres to 176.881 people.

The two maps bellow indicates the boundaries of the Municipality of Serres and its position in relevance to the administrative boundaries of the Region of Central Macedonia in Northern Greece.

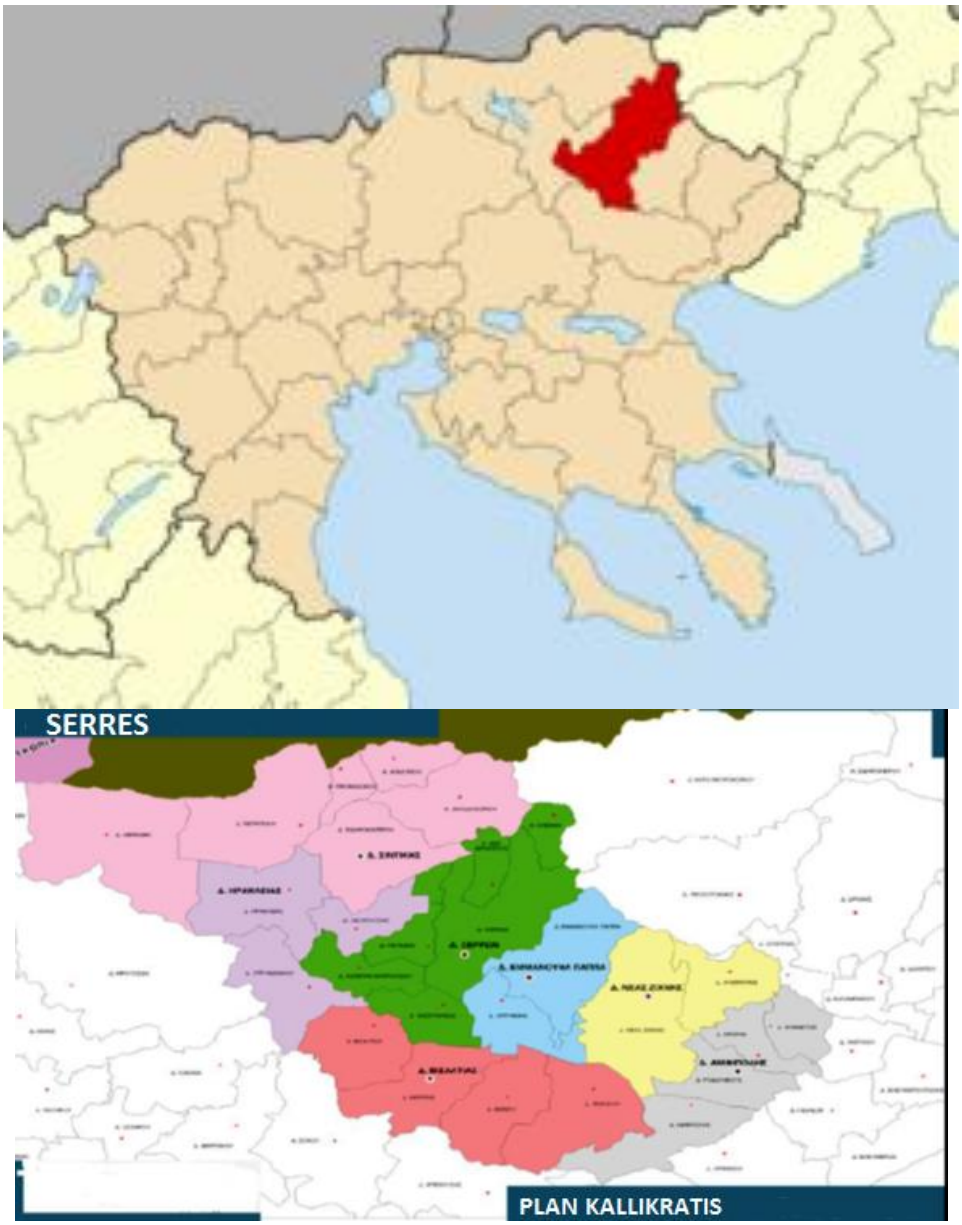

Figure 1: Maps of Serres and its position in relevance to the administrative boundaries of the Region of Central Macedonia in Northern Greece.

B) Administrative Structure at "Nestos"

The current Local Authorities Organization called 'Municipality of Nestos", was also established by the same Law 3852/2010 "New Architecture of Local Government and Decentralized Administration - Program Kallikratis" (published at Government Gazette 87 / T.A. / 07-7-2010). The municipal capital is based in the town of "Chrisoupolis" and it came up from the fusion of the former municipalities of "Chrisoupolis", 'Orinou", and "Keramotis".

The derivative municipality of the fusion has a total area of 678.70 sq. Km and borders at North with the Municipality of "Xanthi", Northwest with the Municipality of "Paranesti", West with the Municipality of "Kavala", East with the Municipality of "Topiros" and finally to South it shares the shoreline of North Aegean Sea.

The table below presents the current administrative division of the Municipality of "Nestos"

Table 2: Administrative structure of the Municipality of "Nestos"

Municipal Section	Municipal Section subdivisions
A1 "Chrisoupoli"	A.2. Local community "Eratinos" A.3. Local community "Perni" A.4. Local Community "Petropigi" A.5. Local community "Pontolivado" A.6. Local community "Avramila" A.7. Local community "Geronta" A.8. Local community "Gravouni" A.9. Local community "Dialektou" A.10. Local community "Zarkadias" A.11. Local community "Xeria" A.12. Local community "Paradisou" A.13. Local community "Crisohoriou"
B1 "keramoti"	B.2. Local community "Agiasmatos" B.3. Local community "Pigon" B.4. Local community "Neas karias"
C "Orino"	C.1. Local community "Lekanis" C.2. Local community "Agios Kosmas" C.3. Local community "Dipotamos" C.4. Local community "Disvato" C.5. Local community "Elafohori" C.6. Local community "Kehrokampos" C.7. Local community "Makrihori" C.8. Local community "Platamonas"

According to the 2011 census the total population of the municipality is 22.200 inhabitants and population density is 32.71 people/ Km^2.

The following map displays the administrative area of the Municipality of "Nestos" and also its allocation in relevance to the country.

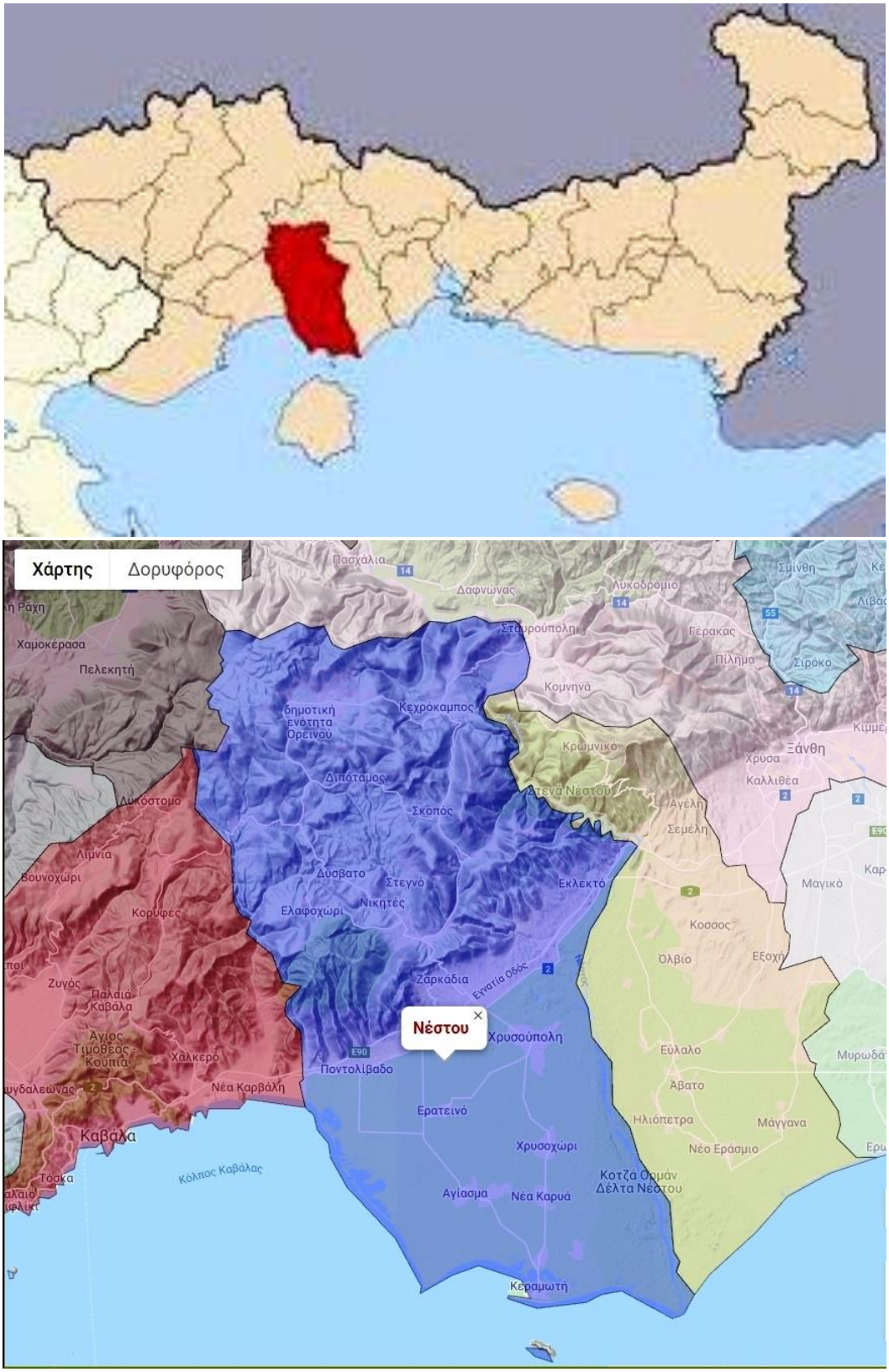

Figure 2: Maps of "Nestos" Municipality and its positon in relevance to the administrative boundaries of the Region of East Macedonia - Thrace

C) Geographic Characteristics of "Serres"

The morphology of the municipality's area leads to an obvious classification of the area in 4 entities based on the prevailing similarities of the landscape.

1ST ZONE

This zone occupies the northern side of the municipality with the highest altitudes and in the absence of residential formations. It is the most mountainous area of the municipality, the most inaccessible with ravines and steep slopes. There is no industrial or craft activity. There are livestock farms and small farms in a non-intensive form and at low capacity at the border of the zone with the next lower altitude zone. Thus, the particular zone, environmentally, does not suffer any anthropogenic pressure and its function as an ecosystem is regulated and governed by natural processes.

2ND ZONE

This zone is located directly under the 1st zone and is defined by the settlements of "Eleonas", "Metochi", "Xiropotopos" and "Chionohori" to the boundaries of the city of Serres. In this zone, there is a residential development and it is that of the settlements mentioned earlier. In addition, there has been pressure for residential development in "Chrisopigi" and along the road leading from Serres to "Chrisopigi". There are no industrial-craft activities in this area. Also, there is non-intensive agriculture, i.e. irrigation and mass use of pesticides and fertilizers. Livestock farming in the region is much more developed than the area's ability to support. Intensive livestock farming causes pressure on the environment mainly due to overgrazing. Overgrazing, in turn, leads to the disappearance of low vegetation and the desertification of the area.

3RD ZONE

This area includes the Local Communities of "Serres", "Eptamila" and "Inousa". It is a typical urban area with the largest concentration of population. In this zone is situated the prefectures sugar factory which, has notable effects on the air quality of the whole municipality of Serres due to the seasonal intensity of its works. This zone hosts also other craft activities which are scattered around the town of Serres and the settlements of "Eptamila" and "Inousa". There are also craft activities within the city of Serres. In this zone, there are abandoned quarries and some units for the production of various asphalt mixtures. Also this area is located both the Wastes Landfill Site as well as the wastewater treatment plant for the city of "Serres".

4TH ZONE

The 4th zone includes the southern part of the municipality. This part could be described as the rural area of the municipality of Serres. It is characterized by intensive agricultural crops. That is, there are irrigation networks and wells for the exploitation of groundwater. The use of chemicals (pesticides and fertilizers) and the systematic pumping of groundwater causes severe

pressure on the aquifer of the area with a high risk of contamination and reduction of available water quantities.

The use of chemicals (pesticides and fertilizers) and the systematic pumping of groundwater cause severe pressure on the aquifer of the area with a high risk of contamination and reduction of available water quantities.

The 3-dimensional map below displays a perspective of the entire Prefecture of Serres whilst the area of the municipality occupies the central part of it.

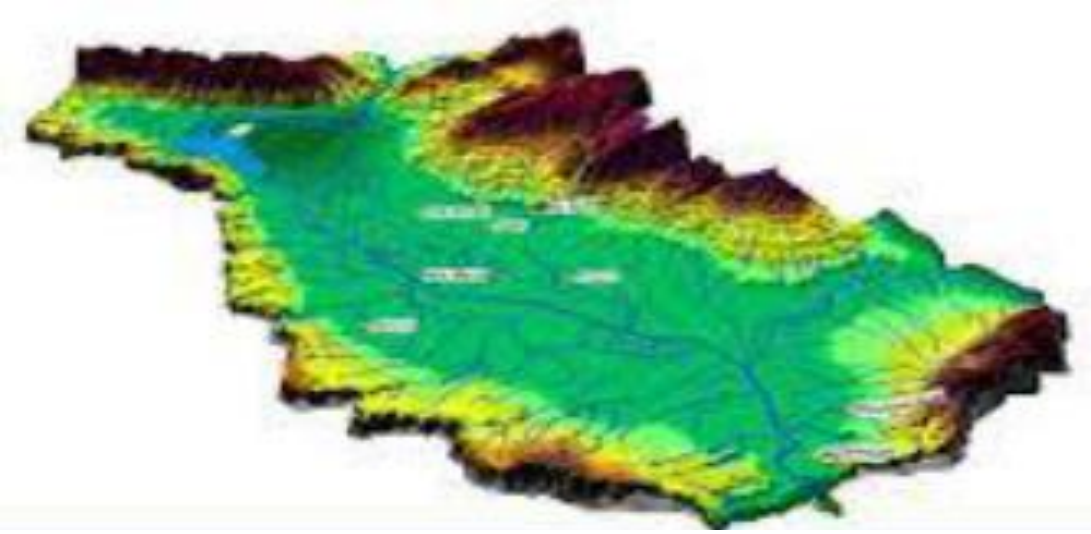

Figure 3: A 3-dimentional map of Serres

D) Geographic Characteristics of "Nestos"

The morphology of the municipality's area leads to an obvious classification of the area in 2 clearly district zones based on the prevailing similarities of the landscape.

1ST ZONE

This zone occupies the northern side of the municipality with the highest altitudes and in the scarce presence of residential formations. Locally it is referred as the mountainous dry area of the municipality. There are livestock farms and small farms in a non-intensive form and at low capacity at the border of the zone with the next lower altitude zone. Thus, the particular zone, environmentally, does not suffer any anthropogenic pressure and its function as an ecosystem is regulated and governed by natural processes.

2ND ZONE

The second zone consists of the low slope plains and flat plains that cover the central and southern sections of the municipality ending on the shoreline to the South and limited by the

river “Nestos” to the East. The whole area is characterized by the river Nestos. Nestos originates in Bulgaria, on the “Rila” Mountains, about 70 km south of Sofia at an altitude of 2,716 meters above sea level, called "Mesta". Nestling in the Aegean, the Nestos Delta is created. The river has a total length of 234 kilometers; and 135 kilometers are crossing Greek territory. The rivers basin is 6178 square kilometers in size, 40% of which is in Greece. The southern part of Nestos riverbed forms the administrative border between the districts of Macedonia and Thrace. The Nestos Delta, expands approximately for 27 kilometers of its ending flow, has an area of 550 square kilometers. The river Delta includes also two lakes “Vistonida” and “Ismarida”, a number of small lakes that lay to the East of the city “Chrisoupolis” and to the transitional shoreline buffet zone the lagoon of “Keramoti” as well as a grate number of smaller lagoons.

Figure 4: A 3-dimentional map of Nestos

E) Population Characteristics of "Serres"

The table below displays the populations' distribution into the various settlements of the Municipality of "Serres".

A proper way to understand the demographic evolution of the Municipality is to calculate and assess the relative indexes: dependency, aging and replacement.

The **population dependency** index reveals the proportion of people who are dependent on demographics (due to age) for people who need to maintain them with their activity. In other words, the dependence ratio shows how many children and elderly (population dependent) correspond to 100 economically active people.

The **population aging** index allows clarifying the aging level reached by the population. It gives us the percentage of the elderly population (over 65) in relation to the children population (0-14 years) in a proportion of 100. The higher the index value, the higher the level of aging is.

The **population replacement** index is the inverse of the aging index, i.e. it shows the dynamics of the replacement (renewal) of the population.

Table 3: Population distribution of the Municipality of "Serres", census 2011

N	M.S.	Settlement	De facto population
1.	A1	Kato Mitrousi	**459**
2.	A2	Mitrousi	**1489**
3.	A3	Anaggenisi	**765**
4.	A4	Ano Kamila	**684**
5.	A5	Vamvakia	**529**
6.	A6	Monoklissia	**312**
7.	A7	Provatas	**1097**
8.	B1	Skoutari	**2144**
9.	B2	Agia Eleni	**476**
10.	B3	Adelfiko	**248**
11.	B4	Vamvakousa	**241**
12.	B5	Kato Kamila	**1138**
13.	B6	Kouvouklia	**223**
14.	B7	Koumaria	**379**
15.	B8	Konstantinato	**339**
16.	B9	Peponia	**430**
17.	C1	Lefkonas	**2374**
18.	C2	Kala Dendra	**1131**
19.	C3	Christos	**384**
20.	D1	Serres	**57878**
21.	D2	Eleonas	**337**
22.	D4	Inousa	**519**
23.	D5	Chionohori	**42**
24.	D6	Agios Ioannis	**719**

25.	D7	Kato Metochi	**188**
26.	D8	Krinos	**28**
27.	D9	Xirotopos	**147**
28.	D10	Marmaras	**14**
29.	D11	Chrisopigi	**27**
30.	D12	Monastery of Timiou Prodromou	**40**
31.	D13	Eptamiloi	**704**
32.	E1	Ano Vrontou	**196**
33.	F1	Orini	**750**
		TOTAL	**76.430**

The Table 4 gives the calculation of the above indexes for the Municipality of Serres.

Table 4: Calculation of basic demographic characteristics for the Municipal population (Source: Greek Statistics Service)

DEMOGRAPHIC CHARACTERISTICS OF THE MUNICIPALITY								
Area (sq. Km):			601,490					
Verified population:	1991		70.889	2001	75.233	2011	76.430	
Population density:	1991		117,856	2001	125,078	2011	127,06778	
Age Distribution of the Population (2011):								
Total	0-4	5-14	15-24	25-39	40-54	55-64	65-79	80 years & above
75.233	3.908	8.433	10.815	16.090	15.372	9.018	10.378	1.575
Demographic Indexes (2011)								
Population dependency index					**47,36**			
Population aging index					**96,86**			
Population replacement index					**119,93**			

By thorough analysis of the above calculated demographic indexes the following is been notice concerning the structural characteristics of the population that inhabits the municipality:

- The population dependency index is high (47.36%). This means that 47 dependent people (children and elderly people) account for 100 economically active persons, or about half.
- The population aging index is also very high (96.86%). This practically means that 96 people belonging to the cluster (aged over 65) are matched for every 100 people belonging to the cluster aged up to 14. It is worth mentioning here that, based on Greek Statistic Service analysis, of the year 1991, the Municipality of Serres has long been considered, since then, very likely to show an increase in the number of annual deaths over the number of annual births.
- The population replacement index (the ratio of people aged 15-24 to people aged 55-64) expresses the interchange between the ages, those preparing to enter the production

process and those expected to leave the production process and who for the Municipality of Serres is 119.93% (above the unit).

- The aging index of the municipality of Serres is very close to that of the whole country (110, 06%) and that of the Region of Central Macedonia (101, 49%).
- During the 1991-2001 period, the number of older people increased by over 45%. During the same period, the dependency index remained constant. There is also an increase in the population of the 15-64 age clusters (economically active group) that stabilizes the value of the dependency index despite the fact that the population of the municipality seems to be aging. There is a transfer of gravity between the two dependent groups.

Another worth noting characteristic is that the municipal capital (city of Serres) has the 10th place among the largest cities in Greece and in total the municipality includes 33 settlements meaning that a small fraction of the municipal total population (almost 20%) is dispersed at 32 different small settlements.

E) Population Characteristics of "Nestos"

The table below displays the populations' distribution into the various settlements of the Municipality of "Nestos".

A proper way to understand the demographic evolution of the Municipality is to calculate and assess the relative indexes: **dependency**, **aging** and **replacement**. The explanation of those indexes has been given previously on this document (*Chapter 1.1. paragraph E Population characteristics of "Serres"*).

Table 5: Population distribution of the Municipality of "Nestos", census 2011

No	M.S.	Settlement	De facto population
1.	A1	Chrisoupoli	**8885**
2.	A2	Eratinos	**649**
3.	A3	Perni	**897**
4.	A4	Petropigi	**522**
5.	A5	Pontolivado	**465**
6.	A6	Avramila	**65**
7.	A7	Geronta	**468**
8.	A8	Gravouni	**737**
9.	A9	Dialektou	**143**
10.	A10	Zarkadias	**671**
11.	A11	Xeria	**468**
12.	A12	Paradisou	**216**
13.	A13	Crisohoriou	**1818**
14.	B1	keramoti	**2056**
15.	B2	Agiasmatos	**863**
16.	B3	Pigon	**770**

17.	B4	Neas karia	**1426**
18.	C1	Lekani	**485**
19.	C2	Agios Kosmas	**35**
20.	C3	Dipotamos	**45**
21.	C4	Disvato	**28**
22.	C5	Elafohori	**62**
23.	C6	Kechrokampos	**359**
24.	C7	Makrihori	**120**
25.	C8	Platamonas	**78**
		TOTAL	**22331**

The following Table 6 gives the calculation of the above indexes for the Municipality of "Nestos"

Table 6: Calculation of basic demographic characteristics for the Municipal population (Source: Greek Statistics Service)

DEMOGRAPHIC CHARACTERISTICS OF THE MUNICIPALITY								
Area (sq. Km):		678,70						
Verified population:	1991	21.924	2001	23.486	2011	22.331		
Population density:	1991	32,30	2001	34,60	2011	32,70		
Age Distribution of the Population (2011):								
Total	0-5	6-14	15-24	25-39	40-54	55-64	65-79	80 years & above
23.486	3.908	2.438	2.979	4.912	4.489	2.977	3.903	637
Demographic Indexes (2011)								
Population dependency index				**126,50**				
Population aging index				**52,93**				
Population replacement index				**100,07**				

By thorough analysis of the above calculated demographic indexes the following is been notice concerning the structural characteristics of the population that inhabits the municipality:

- The aging index of the Municipality of Nestos is 126.50, which means that 160.96 people belonging to the cluster (aged over 65) are matched for every 100 people belonging to the cluster aged up to 14.
- The population dependency Index stands at 52.93, which means that for 100 economically active people (cluster of ages 15-64), there are 59.46 dependent people (sum of ages clusters 0-14 and 64+).
- The replacement index is 100.07 which mean that 100 people belonging to the age cluster 55-64, are matched by 86.64 people belonging to the age cluster 15-24.

- People of the age cluster 0-14 make up the 15.28% of the total population of the Municipality.
- People of the age cluster 15-65 make up the 65.39% of the total population of the Municipality.
- People of the age cluster 64 + make up the 19.33% of the total population of the Municipality.
- The Municipal unit of "Keramoti" displays the higher amounts of the economically active people.
- The Municipal unit of "Orino" shows the higher consecration of the age's cluster 65+.

Natural environment

F) Climate at "Serres"

The climatic type of the area (based on the Koeppen climatic classification) is a transitory intermediate between the Mediterranean medium and the Median patient. The climate of the region is characterized as dry with deviation to semi-humid and with surplus water in the winter. The average annual temperature is 15.2 °C, the mean upper temperature is 24.7 °C and the mean lower 5.6 °C. In August, the absolute maximum temperature and the lowest rainfall are observed, while in January the absolute minimum temperature. The area is characterized by relatively low rainfall, mild winter and long dry periods. Rainfall distribution shows two absolute peak values, the main one in November and the secondary in May. In particular, for the city of Serres, we must emphasize that in the southern part of the island, which is more strongly affected by the "Belitsa" ditch and the river "Strymonas", the climate is wetter, as opposed to the northern one, which has a drier climate.

G) Climate at "Nestos"

The plains region of the municipality has a climate that can be described as Mediterranean with warm and dry summers (but less warm than other neighboring areas, up to 3-4 degrees) and mild and rainy winters. The average annual rainfall is 580.00 mm, frosts appear mainly in January and February, and snowfall is not common.

The Northern mountainous part of the municipality has a clear continental climate type. Rains and snow are often a phenomenon, with winters characterized as severe.

The wetlands – delta shoreline areas display a Mediterranean climate type, with relatively high temperatures, frequent rains and cold winters.

PROTECTED AREAS

A) Protected areas at “Serres”

In the Municipality of Serres, the Sites of Community Importance SCI - Directive 92/43 / EC are as follows:

1. The area that stretches from “Agios Ioannis to “Eptamiloi”, it has code (GR1260003). The protection status at national and regional level is a “Fauna reproduction site”
2. The summits of Mounts “Menikiou: & “Kouskouras”. The areas code is (GR1260004) and the protection status at national and regional level is “Fauna reproduction site”, while at an international level it is an important area for birds.
3. Mountains of “Vrondos – Lailias” - with area code (GR1260007). The protection status at a national and regional level is nature preservation monument and controlled hunting area.
4. The broad surrounding area of the valley of: ”Timios Prodromos” & “Menikio” that is registered to the Natura 2000 network with code GR1260009 and it has the protection status of Zone of Special Protection.

In the Municipality of ‘Serres” up to the year 2000 were established the following permanent wildlife reproduction sires:

1. The site at ‘Viros” that is located at the sector “Eptmiloi”
2. The site at “Skopia” located at the sector of “Serres”
3. The site “Sfagnonas” at the forest complex of “Lailias”

Also, in the region “Chrisopigi” there is a state owned games breeding site accompanied by a controlled hunting area.

The image below displays the protected nature sites that lay within the administrative borders of the Municipality of “Serres”.

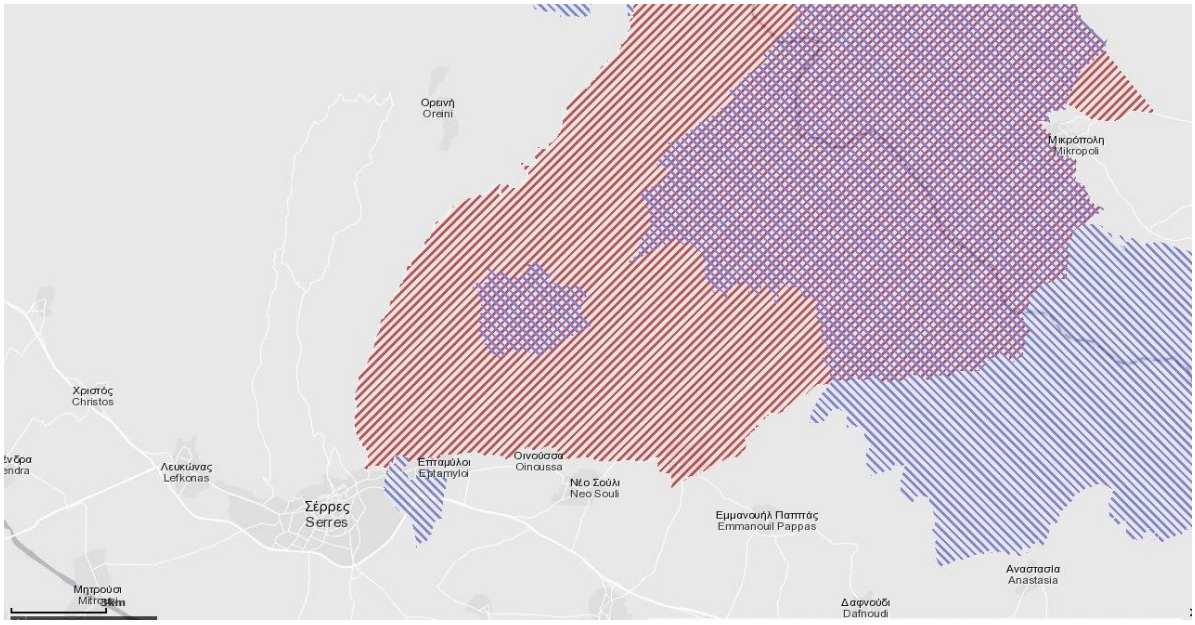

Figure 5: Protected nature sites that lay with the administrative borders of the Municipality of "Serres". (Source: NATURE 2000 viewer tool provided by the E.U).

A) Protected areas at "Nestos"

The Municipality of Nestos has four protected areas that belong to the Natura 2000 Network. These are:

- The "Nestos" river Delta (GR 1150001)
- The "Keramoti: Lagoon (GR 1150002)
- The "Nestos" Delta & "Keramoti" Lagoons (GR 1150010)
- Aesthetic "Nestos" Forest (GR 1120004)

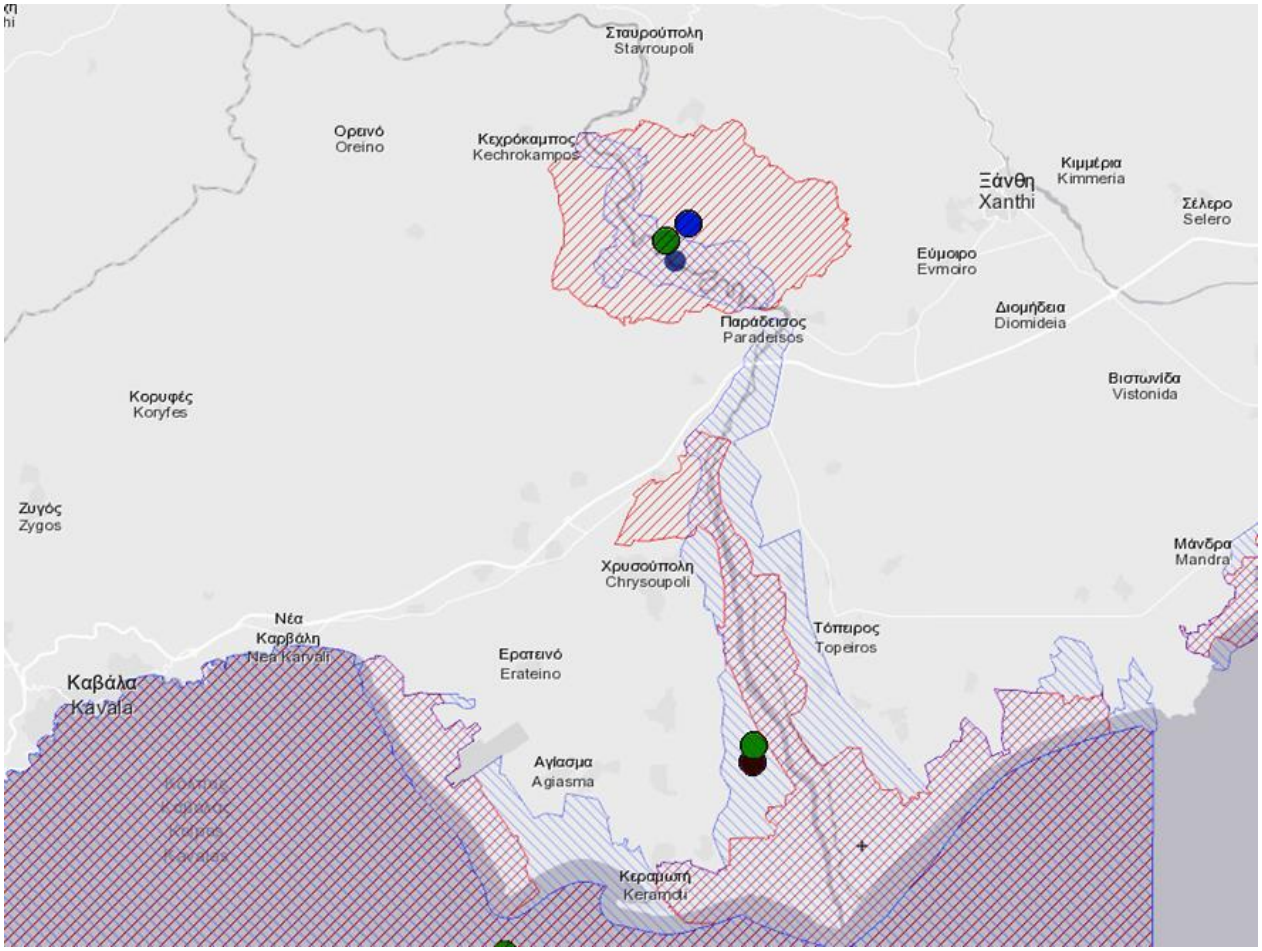

Figure 6: Protected nature sites that lay with the administrative borders of the Municipality of "Nestos". (Source: NATURE 2000 viewer tool provided by the E.U).

Two Environment centres - Visitor centres have been established in the Municipality of Nestos. One is located at the west side of Nestos in the area of "Karia" settlement and the other on the opposite bank near the settlement of "Erasmus". These two centres were taken over by the Municipality with the concession by the Forestry Office. Student and tourist guided tours in the riverside forest of the Nestos Delta.

1.2 Summary presentation of the local economy of the study area

1.2.1 Economy characteristics of "Serres" Municipality.

The local economy of the "Serres" area is predominantly rural. Its fertile plain is cultivated with tobacco, cotton, rice, pulses, and cereals. Livestock breeding, especially that of dairy animals is also been developed. The subsoil of the prefecture is rich, so small mining units operate. The most important of the minerals is lignite, located in the area lying among the city of "Serres" and the mountain "Paggaio" at southeast of the city.

Below is the per capita Gross Domestic Product (GNP) per Region and Prefecture. The feasibility of the indicator lies in the fact that per capita GDP is counted as a basic component of the level of growth and prosperity of a region.

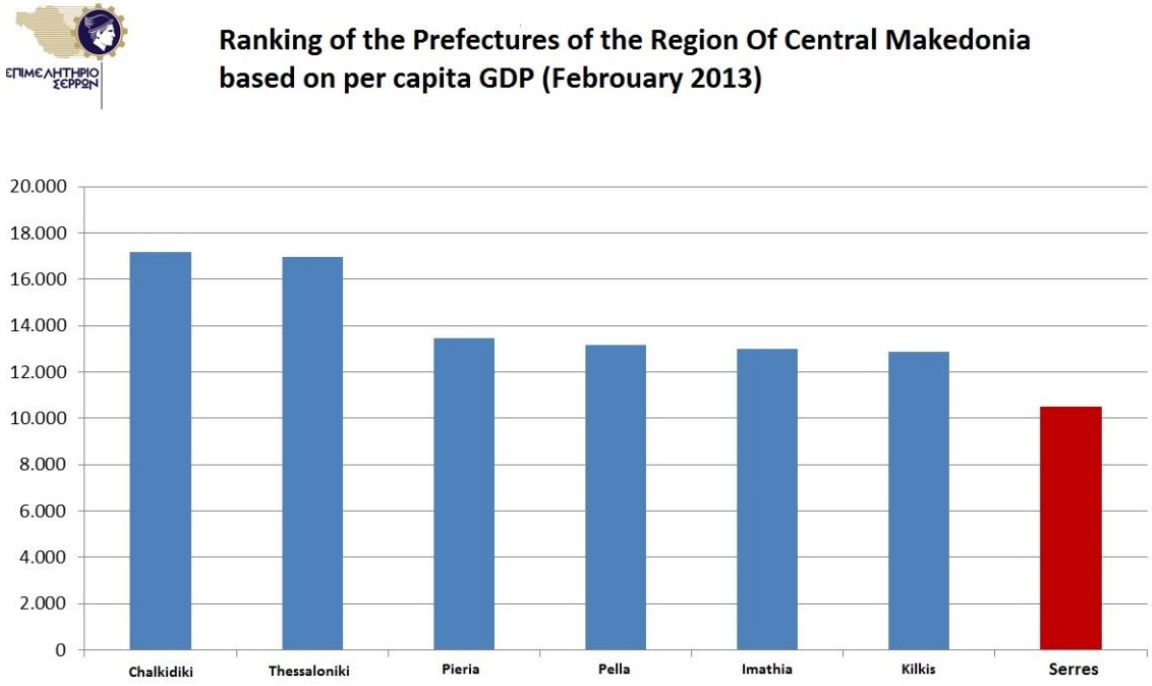

Figure 7: The per capita Gross Domestic Product per Region and Prefecture (Source Chamber of Serres)

For the year 2011, the per capita GDP of Zone IV1 (consisting of the 5 Regions: Eastern Macedonia and Thrace, Central Macedonia, Western Macedonia, Thessaly and Epirus) was 14.230 €. That is lower by 4.270 € from the average GDP of the Country which sums up to 18.500 €. In Purchasing Power Units (PPU), Zone IV GDP accounted for 56.69% of the average. GDP of E.U. of 28 nations.

Table 7: Level of growth and prosperity, purchasing power units, per capita Gross Domestic Product

NUTS	Prefecture	Purchasing Power Units €	Gross Domestic Product €	Percentage in relation to mean GDP of EU
EL111	Evros	15.700	14.500	58%
EL112	Xanthi	13.300	12.200	49%
EL113	Rodopi	13.500	12.500	50%
EL114	Drama	11.600	10.700	43%
EL115	Kavala	15.900	14.700	58%
EL121	Imathia	13.300	12.200	49%
EL122	Thessaloniki	17.200	15.900	63%
EL123	Kilkis	13.000	12.000	48%
EL124	Pella	13.500	12.500	50%

EL125	Pieria	13.600	12.500	50%
EL126	Serres	11.100	10.200	41%
EL127	Chalkidiki	16.200	15.000	60%
EL131	Grevena	12.600	11.600	46%
EL132	Kastoria	12.100	11.200	45%
EL133	Kozani	23.500	21.700	86%
EL134	Florina	22.200	20.500	82%
EL141	Karditsa	9.900	9.100	36%
EL142	Larisa	15.100	13.900	56%
EL143	Magnisia	16.500	15.200	61%
EL144	Trikala	12.000	11.100	44%
EL211	Arta	12.500	11.500	46%
EL212	Thesprotia	15.200	14.000	56%
EL213	Ioannina	14.100	13.000	52%
EL214	Preveza	13.400	12.400	49%
Zn-IV	Zone Iv	15.441	14.230	56,69%
EL	Greece Average	20.000	18.500	74,00%

Concerning the degree of convergence with the E.U. of 28 nations, the five Regions of Zone IV show small convergence rates of 51-57%, while the Region of Western Macedonia has a higher rate of 74% and equal to the country's convergence rate (74%). Compared to the other regions of the country, those of Zone IV, with the exception of Western Macedonia, appear to be among the five poorest at the national level, according to the data of 2011 (Messrs. GDP in 2011). In particular, the prefecture of Serres displays a rate of just 41%, meaning that local income is far below the nation's average and has an even greater distance from the average of E.U.

The following table shows the numerical evolution of the employed part of the workforce over the five-year period 2007-2011. The table clearly displays the fact that the main impact of the economic crisis in Greece is starting from the end of 2008 and has been steadily rising since then. Indeed, in 2008 there is an increase in employment of about 8370 people, but in 2009 the trend is reversing dramatically. In 2009, employment decreased by 28692, in 2010 by 29846 and by 69188 in 2011. The shrinking of employment is accelerated by a long time from year 2009 onwards, in fact, more than doubled each year. All the data, however, show that the decline in employment is continuing and at a rapid pace.

Table 8: Employment evolution at the Region of Central Macedonia from 2007 to 2011

Region of Central Macedonia	2007	2008	2009	2010	2011	Change for 2007 to 2011
Total workforce	759602	767972	739280	709434	640246	-119359 (-15.7 %)
Men employment	466101	468670	450002	431003	381908	-84193 (-18.1 %)
Women employment	293501	299302	289278	278431	258337	-35164 (-12.0 %)

It would also be useful to understand the trends of employment from the point of view of its internal differentiation, in "full" and "partial" employment. This will give a more general and qualitative image of its evolution during the crisis.

The table below shows the development of full-time and part-time employment in the region of Central Macedonia in the five-year period 2007-2011. The fact that partial employment shows a slight increase over the five year period whilst the full employment displays a decline of -16.8% is an indicator of the severe effects of the crisis for local employment at the region. The trend seems to continue with a slower pace up to year of 2016 and shows a week reverse trend during 2017.

Table 9: Full & partial time employment evolution to the Region of Central Macedonia from 2007 to 2011

Region of Central Macedonia	2007	2008	2009	2010	2011	Change for 2007 to 2011
Full employment	716227	717048	692126	661246	596258	-119969 (-16.8%)
Partial employment	43375	50923	47154	48188	43988	+613 (+1.4%)

At a prefecture-level, the number of registered unemployed for the years 2011, 2012, 2013 and 2014 is shown in the table below. What we observe is that the situation in the prefecture follows the unemployment trends of the Region of Central Macedonia. In particular, unemployment increased by 9.10% in the period 2011-2014. Especially remarkable is the female employment rate, which increased by 15.73% in the period 2011-2014, much more than that of the total, while at the same time the corresponding rate for men increased by 3.05%.

Table 10: Unemployment evolution and distribution among gender in Serres prefecture

Prefecture of Serres			
Year	Unemployed people for over 12 months seeking employment		
	Total	Men	Women
2011	4750	1365	3385
2012	4.622	1.562	3.060
2013	5.380	1.883	3.497

The participation of the agricultural sector in the local economy

The economy of the prefecture of Serres is predominantly rural. Its fertile plain is cultivated with tobacco, cotton, rice, pulses, and cereals. Animal breeding, especially that of dairy animals has also been developed. The agricultural sector has always been a structural feature of the prefecture of Serres as well as a component factor in the economy and development of the Prefecture. In general, it can be said that the intensive exploitation of the rural sector of the

Prefecture of Serres is relatively limited and characterized by small and scattered parcels. The agricultural land of the Prefecture is mainly cultivated with arable crops, which, according to the Greek Statistics Service data for 2013 account for 55% of the total agricultural land used. A smaller percentage of agricultural land is used for non-crop farming (27%) and 3% for vines covered. Major livestock sectors are cattle, including dairy cattle, dairy cows and meat production, cattle farming, the sheep, the goat and pig. Regarding the sheep breeding in the prefecture, the breeds "Chiotiki" and "Serraiki" exist in relatively large numbers.

In particular, concerning to employment to agricultural and livestock farms, since the prefecture of “Serres” shows a robust agricultural sector, we can assess the following available analytical data for the year 2009 per category of employed workforce.

Table 11: Employment characteristics of the agricultural sector

Prefecture	Holders and members of their family who worked on the farm	Permanent workers (regular employees)	Seasonal workers
Serres	31287	729	17576
Region of Central Macedonia	**166678**	**6419**	**134323**

The permanent workforce in the agricultural sector exceeds 32.000 people and the seasonal workers account for more than 55% of the permanent workforce. This indicates that agriculture has a great potential for growth and absorption of more permanent workers and that at is present status creates serious amounts of seasonal unemployment.

1.2.2 Economy characteristics of “Nestos” Municipality.

From the previously displayed Table 7 it is shown that the GDP of the Peripheral Unit of Kavala in which “Nestos” municipality is included, relates to 58% of the mean GDP of EU. At the Peripheral Unit level, despite the increased activity in the manufacturing sector and the important role played by the secondary sector, the tertiary sector has the largest contribution to the Gross Domestic Product (GDP) distribution and employs a significant proportion of the labor force but has a comparatively lower labor force from the national average. The secondary sector contributes to regional GDP at a level close to the corresponding national average, while the same is not true for the primary, although it is the most important in the region under consideration.

The primary production sector, and in particular the agricultural sector, the main sector of activity in the region, relies on the exploitation of significant and fixed or renewable natural resources (productive soils, water resources, natural vegetation), as well as good climatic

conditions and despite its limited participation in The regional economy, due to the shift of human resources to the other two productive sectors, is a key growth area in all prefectures in the long run.

The comparative advantages of the region in the secondary sector are based on the wide variety of raw materials (mineral wealth and agricultural products) and the particularly favorable economic and other incentives granted by the state for the development of productive activities. The main activity in this area is the intensive construction and manufacturing activity, as well as the exploitation of significant energy (hydroelectric dams, oil fields, geothermal fields, etc.) and mining stocks (aggregates, marbles, mixed sulphides, etc.) However, the sectoral structure of manufacturing presents problems of competitiveness. Traditional businesses dominate the sector, such as agro-processing, with a total capacity greater than local agricultural production, and the units are small and economies of scale cannot be ensured.

In the tertiary sector, trade plays a major role, followed by public services and catering. The overall picture of the region's tertiary sector is positive in terms of the involvement of traditional service sectors (mainly retail, real estate management, health-care, transport, public administration, education) in economic activity and employment. The tourism, financial intermediation and education sectors have the lowest concentration. However, the percentage share of the region in the gross value added of the tertiary sector is very low compared to the corresponding national average. The tertiary sector has expanded its share in recent years, with significant involvement of traditional sectors in economic activity and employment. However, the commercial activities are largely individual businesses of a low level of service and traditional nature, which are exclusively for the local market. Future exploitation of the region's geothermal fields is likely to contribute to the competitiveness of the area.

Particularly in the study area, the pressures on the Nestos Delta ecosystem mainly come from the primary sector, while one of the main uses of water in the catchment is the production of electricity from the two hydroelectric plants, “Thesaurus” (1996) and “Platanovrisi” (1998), designed to meet the high energy consumption and irrigation water needs. The economically active population of the area concerned is concerned with the primary sector, mainly agriculture and livestock. By 1985, land improvements and agricultural landfills had transformed the landscape into more and more anthropogenic. Fertile soils were relatively easy to cultivate. The trees of the “Kotza Orman” wetland were cut down and the forest was confined to a narrow strip of land on either side of the river. From then on the ponds and flowing waters, the swamps and reeds, were drained with drainage and irrigation canals, and the floods of the river were controlled, mainly through the upstream dams. The west plain of Nestos is administratively owned by the Peripheral Unit of Kavala and the east by the P.U. of Xanthi. In the western region, maize is almost exclusively cultivated, while in the east, besides corn, there is also an alfalfa crop. Also of interest is the fish-fishing industry, as it is practiced in

almost all the lagoons of the Delta. The brackish deep and nutrient-rich waters of the lagoons favor fish farming in many areas, constituting an important source of income for the inhabitants of these areas. A small port – fisheries refuge, exists in "Keramoti:, in an organic part of the Delta. However, the traffic from this port is limited to the connection with "Thassos" island. In the area of "Chrysoupoli", on the marshy areas of the coastal front, there is also the International Airport of "Kavala" "Megas Alexandos".

Table 12: Basic Characteristics of the Economy at Municipality of Nestos

ECONOMY FACTORS	EURO
GDP per capita in euro	11.000
GDP (% of mean average of Greece)	1,1
ECONOMY ACTIVITIES	%
GDP % PRIMARY SECTOR	23,4
GDP % SECONDARY SECTOS	13,4
GDP % TERTIARY SECTOR	63,2
INVESTMENT INCENTIVES	%
ZONE	C (40-50%)
Subsidizing investment projects for large companies	40%
Subsidizing investment projects for medium-sized enterprises	45%
Grants for small business investment projects	50%

The local economy of the municipality of "Nestos" area has a clear rural character, while the secondary and tertiary sectors of economy have a strong presence, as it is shown to the following table which displays the workforce distribution per economy sector.

Table 13: Basic employment characteristics per each economy sector at Municipality of Nestos

ECONOMICALLY ACTIVE PEOPLE					
Total	**Employed**				
	Total	**Primary sector NACE A-B**	**Secondary sector NACE C-F**	**Tertiary sector NACE G-Q**	**Non declared sector**
9.156	8.412	3.138	1.966	3.033	275
	Record year	**Total**	**Municipal unit 'Chrisoupoli"**	**Municipal unit "Keramoti"**	**Municipal unit "Orinou"**
Rural Activity	*2001*	*Arable land in acres*			
		159.339,70	93.178,20	59.115,60	7.045,90
	2008	*Agricultural Product Processing Companies*			
		18	14	4	0
Livestock breeding Activity	*2001*	*Farming Units*			
		702	290	186	226
	2001	*Animal Population*			
		95.338	32.112	37.231	25.995

	2008	*Livestock Products Processing Companies*			
		6	3	1	2
Fishery / Fish farming	2008	*Fishing boats*			
		43	0	43	0
	2011	*Fisheries auction facilities*			
		1	0	1	0
	2008	*Fish farm sites*			
		3	1	2	0
	2008	*Fisheries Processing Companies*			
		2	0	2	0
Employees –on Manufacturing-Production Activities	2004	*Business*			
		1687	1269	343	75
	2011	*Shipyards*			
		0	0	0	0
	2011	*Professional and Small Vessels Yards*			
		1	0	1	0
Employees on Tourism Activities-Services	2016	*Hotels-Accommodations 4*****			
		1	0	38	0
		*Hotels-Accommodations 3****			
		1		28	12
		*Hotels-Accommodations 2***			
		9	48	313	0
		*Hotels-Accommodations 1**			
		1	0	18	0
		Other Tourism Accommodations			
		11	0	274	1
		Camping			
		1	0	1	0
		Agro-tourism businesses			
		2	0	0	2
		Commercial enterprises			
		426	338	72	16
	2014	*Non-tourism Service Providers*			
		966	750	184	32

In the entire Region of Eastern Macedonia - Thrace, the economy's structural problems have not been systematically addressed to date and, despite the policies implemented in the past, inequalities persist as poverty and unemployment increase, especially after 2008. The following chart displays the evolution of the unemployment through the recent years and well into the economic crisis that has tormented Greece.

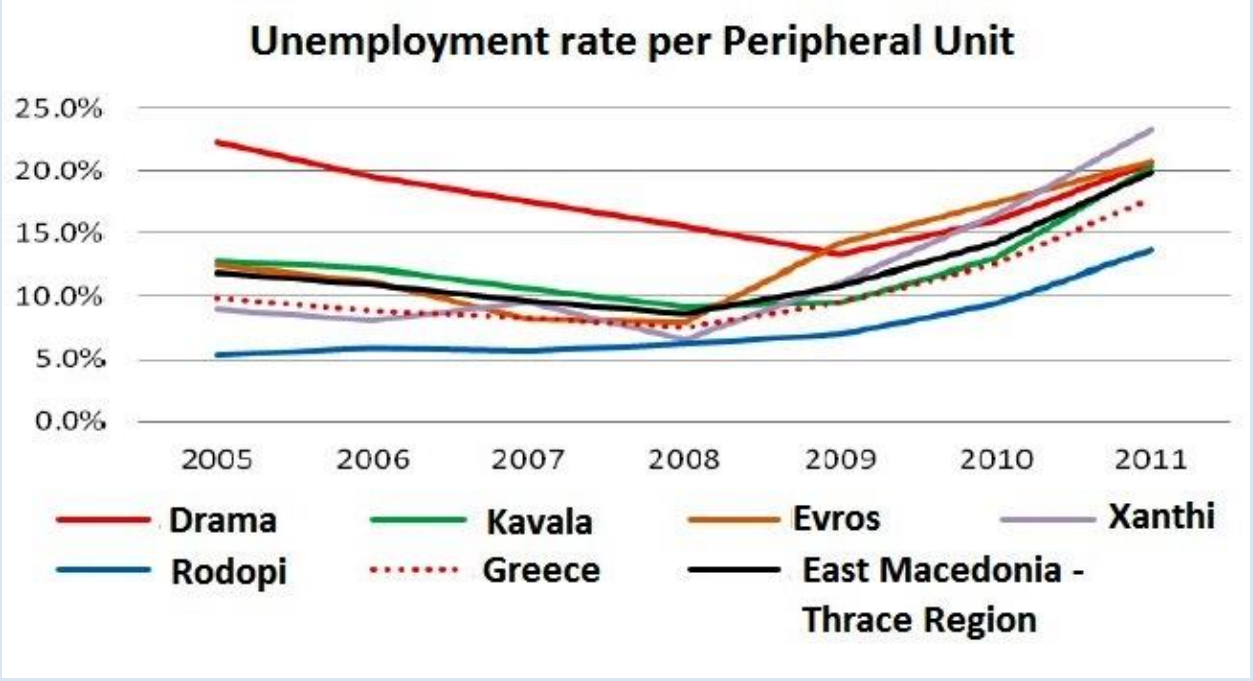

Figure 8: Unemployment evolution at East Macedonia – Thrace Region

The impact of the financial crisis is reflected in the loss of 34,205 jobs in the period 2008-2011 - with the secondary sector registering the largest decline (46.8%) and rising unemployment rate from 14.4% in 2010 to 26.4% % in 2013, with a higher intensity among young people (59.8% in 2013). Already in 2005, the Region's population (15-64 years) employment rates have been lagging behind the country's average (by 0.6%) and on average. of EU - 27 (by 4%). Following a dramatic downward trend since 2008, which lead in 2013 to marginal convergence with the national average (at 0.2 percentage points) and the largest ever deviation from the European average (by 15%). This is due to the sharp rise in unemployment - due to the effects of the economic crisis and fiscal adjustment - in Greece, which neither the country nor the Region of East Macedonia - Trace has managed to recover from.

High unemployment in the Region is directly related to the presence of vulnerable sectors in the local production system (such as the labor-intensive industry) and was mainly due to the large job losses (by 46.8%) in the secondary sector (de-industrialization and constructions) and secondarily in forestry; logging and fisheries, while it does not appear to be correlated with the low education level of the population (about 10% of the population was illiterate in 2001) as the largest proportion of this population is employed. is in the agricultural sector, which has restrained and marginally increased jobs.

1.3 Developmental characteristics of the Study area

1.3.1 Development characteristics of Municipality of "Serres".

The table that follows summarizes the main developmental characteristics of the Municipality of Serres.

Table 14: Development potential basis of Serres Municipality

Prevailing development characteristics at "Serres" municipality

ECONOMIC FACTORS:	
GDP In relation to mean GDP of E.U. 28	41%
GDP in relation to mean GDP of Greece	55.13%
ECONOMY SECTORS:	
Primary Sector	10.8%
Secondary Sector	15.7%
Tertiary Sector	73.6%
INVESTMENT INCENTIVES:	
Grant investment projects for large companies	30%
Grant investment projects for medium-sized enterprises	40%
Grant investment projects for small businesses	50%
TRANSPORT INFRASTRACTURES:	
Thessaloniki - Serres National Road	
Vertical interconnecting axis Via Egnatia - Bulgaria	
National railroad axis Thessaloniki - Ormenio	
ACADEMIA INFRASTRACTURES:	
Higher Technical Education Institute of Serres	
INDUSTRIAL INFRASTRACTURES:	
Industrial Area at "Lefkonas"	
Industrial park at "Serres"	
TOYRISM INFRASTRACTURES:	
Number of available beds in Hotels of all types	1924
HEALTH INFRASTRACTURES:	
Public & Private hospitals	3

The development model of the prefecture of "Serres" should comply with the following strategic priorities:

- Reconstruction of production base through targeted investments that leverage its comparative and competitive advantages by adopting and exploiting innovation and upgrading of human resources.

- Completion and modernization of business infrastructure and use of all large infrastructure projects implemented to develop complementary activities and mobilize the advantages expected from the construction of the projects.
- Development of entrepreneurship and linkage with the Region's businesses, producing integrated international product and service systems in each sector in order to promote the attraction of those foreign direct investments and economic activities that can lead to sectoral and technological integration and upgrading the productive system of the prefecture.
- Promotion if the independence of the agriculture sector from the EU subsidies and exploitation of the local comparative advantages and potential to produce new products that will contribute to the restructuring of rural areas, so as to operate permanent and stable farm income generating factors and treated permanently reducing the threat of welfare conditions in rural areas.
- The emergence of sectors and networks of excellence in industry and the reversal of deindustrialization, through its upgrading to higher value added industries.

1.3.2 Development characteristics of Municipality of "Nestos"

The development potential of the economy at the municipality of "Nestos" can be supported by actions that will pursue the following specific goals:

- The revitalization of the Industrial area of "Kavala" which is adjacent to the municipality of "Nestos" with the normalization of the economic incentives compared to those of the industrial area of "Xanthi" in order to attract more investors
- Promoting sectors related to exportable products, such as frozen and processed fisheries, aquaculture products as well as standard meat. In view of the above, there is a need for foundations or extensions of existing plants mainly in combination with the incorporation of new production technologies and the environmental dimension of production and HACCP certification of finished products to ensure the quality of the products produced.
- The creation of small capacity processing companies in the region, with basic criteria for the exploitation of fishery production, in order to maintain the added value in the region and the production of high quality and nutritional value products.
- Production of certified organic products of primary production constituting a productive and cultural activity for the region such as Organic olive oil and "Thrumba" olive, local sweets etc.
- Promoting sectors related to exportable products, such as standardized meat.

- The creation of low capacity manufacturing companies, with basic criteria for the utilization of raw material on-site, in order to maintain the added value in the region and the production of high quality products.
- The uniform development of tourism throughout the region, with the quality upgrading of the tourist infrastructure of its mountainous settlements.
- The development of agro tourism in terms of both its quantitative and qualitative characteristics.
- Exploiting the natural and historical tourist attractions, in conjunction with the organization and promotion of the tourist product of the area.
- The simultaneous development of infrastructure throughout the region.

CHAPTER 2 - Summary description of the current and near future wastes management status of the study area (Municipalities “Serres” & “Nestos”)

2.1 Solid waste management in the Municipality of “Serres” (current status)

The terms solid wastes or wastes describe mainly those of anthropogenic origin solids or semi-solid materials that lack immediate value and are undesirable for the owner who wishes to discard them. In the broadest sense, solid waste includes materials produced not only in urban areas but also due to agricultural, industrial and mining activities.

Alternative waste management in the European Union and in Greece is based on the waste management hierarchy as depicted in the pyramid. The higher an option for waste management is, the more desirable it is. The waste management pyramid is reflected in the Thematic Strategy of the EU on Prevention and Recycling of Waste which has been transposed into national law by Law 4042/2012.

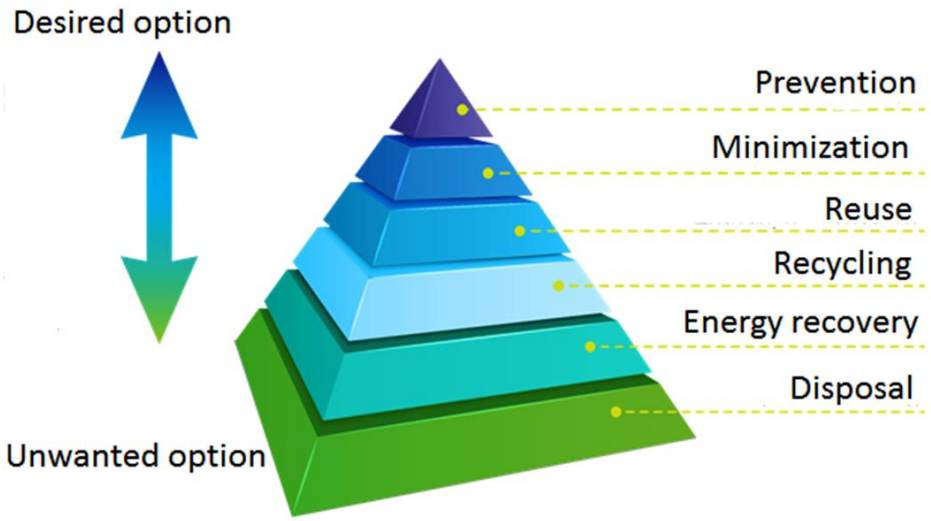

Figure 9: The waste management pyramid

According to the legislation on "alternative management" of waste, all managers (producers, importers) of products are obliged to organize the re-use of the products or their components as well as the waste management operations, i.e. collection, transport, storage, recovery organizing or participating in Alternative Management System.

In the above context, therefore, the management of solid waste in the Region of Central Macedonia is not a matter for a single municipality alone, but for the Regional Association of Solid Waste Management Bodies of Central Macedonia (ΦΟΔΣΑ ΠΚΜ), to which all the

Municipalities of the management units of the Region of Central Macedonia, with whom the former Solid Waste Company of the Prefecture of Serres (ΕΣΑΝΣ) merged.

The Waste management department of the Municipality of "Serres" provides services of waste collection & transportation for the city of "Serres" as well as for the rest scattered 23 settlement of the total municipal area. The total length of the waste collection network amount to 1,157 km. The total population served is well above the depot of the municipality of "Serres" and it is estimated at approximately 90,000 inhabitants. The machinery of the municipal waste management department includes 1 propeller 2 road sweepers, 3 bin washing machines, 5 road washing tanker trucks, 2 bulk waste carrier trucks, and 18 compressed waste trucks.

The Municipality of Serres has a total of 6,200 waste bins (4.028 with capacity of 1.100 L, 67 with capacity of 760 L and 2.105 with capacity of 360 L), 1.800 recycling bins (capacity 1.100 L), 150 compost bins and 35 recycling bins. This demonstrates the low density of bins for lightweight wastes.

The Table below shows the mass in tones of the wastes produced in the Municipality of Serres and their disposal at the Landfill per month and throughout the year for the years 2013and 2014.

Table 2 Wastes production at "Serres" and disposal at Landfill

Year	**Month**												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Joul.	Aug.	Sep.	Okt.	Nov.	Dec.	Annual
2013	1.946.070	1.860.810	2.003.170	2.225.880	2.169.150	1.926.300	2.259.390	2.060.660	2.008.300	2.113.400	1.895.300	1.933.180	**24.401.610**
2014	2.012.690	1.788.020	2.019.900	2.270.190	2.162.220	2.188.720	2.352.010	2.278.140	2.399.330	2.250.240	1.912.320	2.332.340	**25.966.120**

The Table 11 shows the recycle effort of the municipality of 'Serres" for the same period.

Table 3 Recycling performance of the Municipality of Serres during the period 2013 – 2014

Collection of wastes by sorting at source	2013	2014
Recover schedules that have been executed	1.162	1.165
Collected quantities (tones)	3.451,083	3.715,72
Recycled materials (tones)	2.970	3.190
Residue		
Return of residue (tones)	605,69	1.092,44
Storage of residue (tones)	**140,26**	**88,18**

The recycle containers (blue bins) and the recycle trucks that have been granted to the Municipality of “Serres” from the Greek Recovery Recycling Corporation (EEEA), based on official data of 12/2014, is 1.429 and 3 respectively, while the total capacity of the bins network is 1.572 m^3.

Base on the data provided in the Table 11, it can be observed that there is an increasing tendency of the collected recycling quantities of the Municipality of “Serres”, which is very encouraging for the future. Of course, the municipality's percentage of recovery presents great space for improvement. Raising citizens' awareness and raising awareness will play an important role in the development of the recycling network. Urgently, there is also a need for specialization of source recycling streams (composting- separate collection of glass, etc.) as well as optimization of the collection roots.

Moreover, in the Municipality of Serres there is a pilot program for the composting of organic waste with 150 bins, of which 75 bins are placed at the Municipality's headquarters and 75 bins in various settlements of the Municipality.

New Solid Waste Treatment Facilities

The Municipality of Serres, aiming at the energy recovery of organic wastes produced from agriculture, stock-breeding and processing in the area of “Eleonas”, as well as the absorption of some agricultural residues from other districts of the Municipality, has designed the installation and operation of a biogas plant at “Eleonas” with an output of 250 kW of electric power plus 295 kW of thermal power. The project is intended to be financed by the ongoing National Strategic Framework for Development. It will produce electric and thermal energy as well as liquid and solid organic fraction, (compost) suitable for use as an organic fertilizer. It is planned to be used in a Central Biogas Plant, using anaerobic fermentation technology.

Part of the generated electricity will cover the electricity needs of the Municipality of Serres, as well as the settlement of “Eleonas”. The provision of offering free heat will act as an incentive to relocate more livestock units inside the livestock-breeding park as well as other livestock breeding associated facilities and at least one greenhouse.

The procedure for the selection of the Private Partnership for the Project "IMPLEMENTATION OF THE WASTE TREATMENT PLANT OF SERRES" was carried out through a public international competition through the process of Competitive Dialogue and was completed with the Decision No 70/2013 of the Board of Directors of the administrative authorities for wastes management of “Serres: prefecture, with which the Interim Project Contractor was declared. The contractor will undertake the study, construction, maintenance and operation of the plant for a period of 27 years. The plant has a design capacity suitable for processing at least 45.000 tons of mixed and pre-treated bio-waste (initially up to 3.000 tons / year), while the maximum capacity of the unit is 63.000 tons / year of mixed and pre-treated bio-waste.

The technological solution proposed is Mechanical Recycling for the recovery of recyclable materials (paper, plastic, metal, glass) by at least 30% on the incoming. The remainder of the incoming mixed waste and the preformed organic matter will be composting (aerobic composting) in closed spaces with a negative vacuum so that after several days' stay it is promoted to the part of the refinery and the square maturity and then the compost produced is utilized for terrestrial use in appropriate applications such as quarry restorations, urban green and land use. The stabilized residue, which will not exceed 39.5%, will be driven to landfill. The construction cost of the Unit will be financed by 60% and a maximum eligible amount of 15.500.000 c, as the project has been incorporated with the 1834 Decision on the Public Investment Program for the year 2014. The construction time of the Unit, including the trial mode, is 22 months from the date of signing the Partnership Contract.

Center for Sorting & Recycling Materials

At the Regional Module of Serres operates the Center for Sorting and Recycling Materials (CSRM) (NIZAMI BROS, at "Neo Souli") serving the 7 Municipalities of the Prefecture of Serres. The total incoming quantity in the CSRM of Serres amounts to 6.672 tn (reference year 2014), of which the 4.831 tn (impurities 27,6%) are recovered. The total number of blue bins amounts to 3.773 and the total number of recycling vehicles is 9 (reference year 2014). Cover with blue bins network in area is ranging in 47 houses / bin average.

All the municipalities of regional module of Serres have signed a contract with Hellenic Company for Recycling Exploitation S.A (HCRE S.A) for the management of recyclable packaging materials through blue bins. In particular, the Municipality of "Emmanouil Papas" has concluded a contract with HCRE S.A since 2008, the municipality of "Amphipolis" since 2010 and the municipalities of "Sintiki" and "Nea Zihni" since 2011.

In summary, the key elements of the existing management of recyclable packaging materials per municipality of the regional module of "Serres" as well as the quantities collected are shown in the following summary table.

Table 4 Data for the management of recyclable materials-Blue Bucket per Municipality of the Prefecture of Serres

	Managing the blue bin packaging materials				
	Collection	Recover		Disposal	
Municipality	Quantities –blue bin (t)	CSRM	Recovered materials (t)	Residue (%)	Landfill
'Visaltia"	349	"Serres"	277	72	"Serres"
"Emanouil Papa"	1250		875	375	
"Iraklia"	405		321	84	

'Nea Zichni"	216		172	45
"Serres"	**3716**		**2.623**	**1.092**
"Sontiki"	387		307	80
"Amfipolis"	348		254	94
Total	**6.672**		**4831**	**1.841**

Other separate collection of wastes systems

The municipality of 'Serres" runs also a program for separate collection of glass using specially designed bell shaped blue bins. For the wear 2014 the system collected a total of 58,68 tons of glass.

The bulk waste is collected in containers of 9m^3 capacity and the quantities collected are estimated at 280 tn (2014). It is also noted that from 2015 a separate collection of bulky waste (rubble, branches, electric machinery, and furniture) is being carried out in a container depot in a depot area of the Municipality of Serres ('Green Point').

Other complementary measures, taken for wastes management, include the wide spreading of the in house composting by the free provision of the special type of bins required. The system comprises of a total of 150 specific bins 75 of whom are distributed in the city of "Serres" & 75 in the rest 32 surrounding settlements.

Figure 10: The green point for bulky wastes collection at "Serres"

Landfill at "Paleokastro"

The landfill at "Paleokastro" serves the entire prefecture of 'Serres". It has approval for environmental terms by the Common ministries Decision with protocol number 12899/16.05.2007, which was modified by the protocol number 9905/27.11.2014 renewal of approve of environmental terms. The responsibility of its operation belongs to the Regional Carrier for Management of Solid Wastes of the Region of Central Macedonia.

It is located at the site "Eripia Neraidas" of the local community of "Paleokastro" of the municipality of "Iraklia". The landfill site covers an area of 619.454 acres and started operation in 2013.

2.2 Solid waste management in the Municipality of "Nestos" (current status)

The Municipality of Nestos has a well-organized waste collection and transportation network which it has created in recent years in an effort to protect the environment and at the same time to implement national and European legislation.

In addition, through the implementation of programming contracts with the WASTE MANAGEMENT COMPANY OF EASTERN MACEDONIA – THRAKIS S.A. (W.M.C.E.M.T. S.A.) and the final abolition of landfills that existed within the administrative boundaries of the Municipality has permanently eliminated the uncontrolled waste disposal by implementing a recycling, collection and transportation program. Since 2014, the Municipality of Nestos collects and transports its household waste to the Waste Management Association of Xanthi, in collaboration with the Municipality of Xanthi. Also in collaboration with the (W.M.C.E.M.T. S.A.) recyclable waste is being collected. However, even more attention should be paid to this area in order to make waste management even better by introducing innovative systems such as vehicle fleet mapping tracking, etc. The municipality has already started the implementation of a recycling program with the placement of blue recycling bins, educational workshops for pupils, distribution of an appropriate recycling bag.

The municipality of Nestos has 3200 waste bins, 200 recycling bins dispersed accordingly to all its settlements. The total length of the waste collection network amounts to 115 km. The machinery of the municipal waste management department includes 1 road sweeper, 9 compressed waste trucks, 4 bulk waste carrier trucks, 1 bin washing machine and 2 compressed recycle trucks.

The Table below shows the mass in tones of the wastes produced in the Municipality of Serres and their disposal at the Landfill and in other alternatives for the 2015

Table 18: Synopsis of waste production & management status at municipality of Nestos 2015

Waste Production in tons	Industrial waste production in tons	Recyclables in tons	Glass in tons	Recycling of Packages in tons	Recycling of electrical appliances in tons	Recycling of light appliances in tons	Recycling of batteries in tons	Composting of organic in tons	Share of% in total production of Region wastes
7.490	161	91	22	451	88	0.43	0.94	324	3,5%
Total wastes production in tons = 8,628									

The municipality of Nestos has programmed the creation of two small Green Spots for collection of recyclables of all categories until 2018.

All its recyclables collections though the blue bin are transported to the Recyclables Center of Kavala. The municipality's mixed wastes are all directed to the Landfill of Xanthi.

2.3 Estimation of the evolution of municipal solid wastes production to the study area (Serres & Nestos)

The following Table shows the estimation of the evolution of the wastes production volumes, referred as Municipal Solid Wastes (MSW) in the prefecture of "Serres" taken from the Revised Regional Plan for Management of Wastes.

Table 19: Analysis of the evolution of municipal solid wastes (MSW) production for the regional module of "Serres"

	Municipal Solid Wastes (t)						
Year	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Regional Unit of "Serres"							
Permanent Population	176,642	176,712	176,783	176,854	176,925	176,995	177,066
Seasonal population	932	932	932	932	932	932	932
Total annual production of MSW (t)	**68,395**	**68,682**	**68,970**	**69,260**	**69,551**	**69,843**	**70,136**
Production of MSW by permanent population	68.000	68.286	68.573	68.861	69.150	69.441	69.732
Production of MSW by seasonal population	394	396	397	399	400	402	404
Mean daily production of permanent population (kg/person/day)	**1.055**	**1.059**	**1.063**	**1.067**	**1.071**	**1.075**	**1.079**
Mean daily production of seasonal population (kg/person/day)	**1.160**	**1.165**	**1.169**	**1.173**	**1.178**	**1.182**	**1.187**

The following table presents the estimation of the future MSW production for Nestos municipality by 2020, where for the years 2016 to 2020 the average annual incremental coefficient of 1.46% is taken into account based on the ETC / SCP methodological approach (basic trends scenario on the evolution of Municipal Solid Waste production.

Table 20: Analysis of the evolution of municipal solid wastes (MSW) production for the municipality of Nestos in tons

	2015	2016	2017	2018	2019	2020
Nestos Municipality	8,628	8,754	8,882	9,012	9,143	9,277
Kavala Prefecture	52,118	52,879	53,651	54,434	55,229	56,035

2.4 Basic plan and its provisions for infrastructure and actions for solid wastes management in prefecture of "Serres"

The adopted and under implementation basic script for the midterm evolution of the management of solid wastes by the Regional Management Plan is as follows:

1. Plants for processing biodegradable wastes

One (1) bio waste treatment facility (it will be considered its location within the Solid Wastes Procession Plant of "Serres"), for the service of all Municipalities of the prefecture, with a capacity of approximately 12.400 tn / year. If this siting is chosen, given the SWPP design capacity (3,000 tn / year bio wastes), consideration should be given to exploiting the composting component of mixed MSWs to gradually cover incoming quantities of pre-selected bio wastes.

2. Sanitary Residues Landfill

Use of existing landfill at "Paleokastro" and its conversion into residues landfill site. It will be receiving the wastes from the treatment of SMWs of the entire "Serres" prefecture. In particular, phase A has already been constructed and is operated and expansion works will not be required by 2020.

3. New types of Waste Transfer Stations

Preservation of the two existing Waste Transfer Stations (WTS) of "Nigrita" & "Nea Zichni" for mixed, sortied and bio wastes.

- WTS of "Nigrita" that will serve the municipality of "Visaltia" with a total capacity of 7.500 tn / year
- WTS of "Nea Zichni" that will serve the municipalities of "Nea Zichni" & "Amfipoli" with a total capacity of 8.000 tn / year.

For the four Municipalities of the Regional Module that don't have WTS, it is possible in the context of the implementation of green points to provide equipment for the transshipment of bio wastes and recyclables within the same area. It is also foreseen a flexibility to create a new WTS at the municipality of "Sintiki"

4. New types of Recyclables Sorting Centers

Preservation of the existing plant that is located at the municipality of "Emanouil Papas", upgrading of its facilities in order to be capable for servicing the entire prefecture reaching a capacity of 23.800 ton/ year.

5. Green Spots

Establishment of 7 central green spots one per municipality or less in case that intra-municipal cooperation developed and several more peripheral small green spots at neighborhood area and in relation to the actual sites of the central green spots. Provision for procurement of one mobile green spot for the prefecture.

6. Waste sorting at source

Procurement and installation of the appropriate type and numbers of bins for collecting 4-6 material streams (paper - cardboard, glass, plastic, metals, printed paper, bio - waste) in each Municipality of the prefecture based on Local Plans. Indicative total number of bins to cover the entire prefecture: for recyclables 6.197, for printed paper 248 and for bio-wastes 620.

Additional procurement of specific waste trucks for the collection – transportation of bio-wastes. The trucks will operate with no or small compression, Indicative numbers required: 2 trucks with capacity of 10 m^3, and 6 trucks with capacity of 6 m^3.

7. House hold composting

Indicative total number of home compost bins that are requires for procurement in order to cover the prefecture of "Serres" is 8.171.

The diagram on the next page displays the flow of the various types of solid waste among the proposed waste treatment plants for the prefecture of "Serres"

Table 14 provides the estimated cost for the implementation of all scheduled investments needed to fulfill the approved scenario for waste management in prefecture of "Serres".

Table 21: Estimated investment costs for solid wastes management

Infrastructures / Actions	Prefecture of 'Serres"
Waste sorting at source for recyclables	1.118.888 €
Waste sorting at source for bio wastes	876.385 €
Green Spots	6.283.403 €
Domestic composting	506.623 €
Awareness and publicity actions	265.599 €
Plans for actions of prevention / reduction of waste production	446.264 €

Waste Transfer Stations	1.490.000 €
Processing of the sortied bio wastes	
Disposal of solid wastes to landfills	1.116.000 €
Management of waste water treatment slimes	
Disposal of non-hazards' industrial wastes at landfill	
Disposal of construction wastes at landfill	
Construction of the Waste Treatment Plant	195.719.262 €
Total	**207.822.424 €**

2.5 Basic plan and its provisions for infrastructure and actions for solid wastes management in prefecture of "Nestos"

The management strategy of the MSW of the Region of East Macedonia – Thrace is divided into two phases. The first period relates to the years 2016 - 2017 and the second period after 2018 relates to waste management after all planned infrastructure has been constructed.

The waste management strategy includes:

- ✓ The diverting of as much as possible of MSW by source sorting (recyclable, organic),
- ✓ The treatment of the total waste load and the burial of only the residual the waste (reduction of waste volume driven to landfill),
- ✓ The rational incorporation of secondary produced products like compost to economy (agriculture, etc.).

During Phase B of the MSW planning (Integrated Management Period, 2018-2020), the MSW management is planned for: (1) one baseline scenario and (2) two alternative scenarios.

In the baseline scenario, the Waste Treatment Plant (WTP) of Drama will only manage pre-selected organics while the mixed wastes will be processed mechanically in the Kavala WTP. Three major WTP at Kavala, Alexandroupoli and northern Evros will be operational as well as two smaller ones at the islands of Thasos and Samothraki. A Composting Plant will be operative at the peripheral unit of Rodopi, situated at Komotini. Also a small WTP will be operational ta Xanthi AE for all types of NSW (mixed and pre-selected) provided that the objectives of the National Plan for Management of Wastes are achieved.

In the 1st alternative scenario, the quantities of the mixed solid wastes of the Peripheral Unit of Xanthi are driven to the Kavala Solid Wastes Treatment Plant. Composting Plants are created for the separately collected organic wastes in all Regional Units.

The 2nd alternative scenario takes into account the possibility of a failure of the integrated management of MSW in the islands of Thasos and Samothrace.

Provisions of the Baseline Scenario for the Transitional Period 2016-2017

During the transition period in the Kavala P.U., three major issues need to be addressed: (a) the licensing of the landfill and its extension, (b) the construction of the landfill extension, and (c) the establishment of a central Waste Treatment Plant (West Sector WTP), as well as other issues such as the installation of green spots in the municipalities of the regional unit, the installation of local composting units, the awareness-raising of the citizens, the expansion of the bin networks and the gradual separation of the blue bin into four streams in order for the year 2020 to reach the goal of establishing a collection network of four distinct containers (glass, paper / cardboard, plastic, metal).

Specifically, the environmental licensing of the Kavala Landfill extension project is expected to be completed by the end of 2016 and the completion of its construction works within 2018. Intensification of procedures for planning, licensing and financing is required for the project for the construction of the Central Wastewater Treatment Plant (Western Sector WTP), to be installed in 2018. In any case, before any other processing line, a pre-selected organic composting line will be installed in the Kavala landfill site by December 2017. In case of delayed installation of the central WTP, a small organic sorting and composting unit will be installed in Kavala at the beginning of 2018 with leased equipment.

Finally, it is envisaged to install a large Green Spot and a small one in the Municipality of Kavala for the collection of waste of all special streams, bulky, garden waste, greenery etc., as well as a workshop. At the same time, two small GSs will be installed in the municipality of Nestos and three small ones in the municipality of “Pangaio” because it is a large municipality.

Throughout the transitional period, pre-selection of wastes should be emphasized through continuous updating - raising awareness among residents and professionals about the recycling of packaging, glass, specialty materials, and the supply of more bins to increase their recovery significantly. The “Kavala’s” recyclable materials will be driven to the Recycling Materials Sorting Center (RMSC) of Xanthi until the launch of the relative plant at Kavala in the site of the WTP. The collection of glass in blue bells has started since April 2015. Great effort will be made to supply the Kavala IP coffee bins on time with the installation of composting units.

The transshipment of both the mixed wastes and the recyclable materials is currently carried out at the Wastes Transfer Stations (WTS) of Kavala, Chrisoupoli and Eleftheroupoli. The recyclables of all municipalities are taken to the RMSC of Xanthi, while the mixed wastes of the municipalities of “Pangaio” and “Kavala” are transferred to the Kavala Landfill for burial. The Municipality of “Nestos” transports the mixed waste to the “Xanthi” landfill until the extension of the Kavala landfill is operational. To the coastal part of municipality of “Pangaio” is foreseen the construction of a WTS because the distance from the coastal section to WTS of “Eleftheroupoli” is extremely high and the loads, especially in summer, are considerable.

Provisions of the Baseline Scenario for the integrated period 2018-2020

The baseline scenario for the integrated management of the MSW in the Region of East Macedonia – Thrace foresees the following:

- ⇒ The Integrated Waste Treatment Plants (IWTP) of kaval and Alexandroupoli will be operational (including 1WTP and 1 Landfill). The Kavala Landfill will secure its operational extension and the Alexandroupoli Landfill is planned to be built on the site of the restored Alexandroupoli Uncontrolled Waste Disposal Site. The Kavala and Alexandroupoli WTPs will be designed to be able to handle larger loads, apply more complex but also more efficient treatment methods (such as anaerobic digestion of biogas production) while their main difference with small decentralized WTPs it will be about achieving the goals because they will achieve much higher recovery rates. The mixed MSW will be driven to the Kavala and Alexandroupoli WTPs to achieve the highest recovery targets set at national level.
- ⇒ Construction of a Waste Treatment Plant at Northern "Evros," combined with the construction of a landfill in the area.
- ⇒ After the construction of the Kavala WTP, the small Drama WTP will continue to operate with the pre-selected organic wastes of "Drama", and "Doxato".
- ⇒ The organic wastes composting plant in Komotini will serve the entire "Rodopi" Peripheral Unit.
- ⇒ Expansion of the landfill has been made in the Xanthi Peripheral Unit and the small WTP will remain operational as long as the objectives of the National Plan are achieved overall.
- ⇒ The two insular WTPs will remain operational to achieve the objective of minimizing maritime transport of wastes.
- ⇒ The recovery - treatment - final disposal rates will be:
    - 53% of MSW will be collected at source by pre-screening
    - 47% of the MSW will be processed to WTPs
    - 25,8% of the MSW will be buried at landfills

Specifically for the peripheral unit of Kavala the baseline scenario of the integrated period anticipates the following:

- ➢ The Kavala WTP will manage the mixed MSWs of the Municipalities of Kavala, Pagaio, Nestos and the Municipalities of Drama Region.
- ➢ The pre-selected organic wastes fraction of the Municipalities of Kavala and Nestos will be manages at a separate composting line at Kavala WTP and the pre-selected organic fraction of the Municipality of Pagaio will be managed at a local composting unit.
- ➢ At the site of the WTP of Kaval there will be constructed also a Recycling Materials Sorting Center that will process the recyclables of all the municipalities of the PU
- ➢ The Kavala landfill will receive all the left over from all the facilities of the PU

The following tables show the expected results in quantities and quality of the baseline scenario.

Table 22: Management of recyclables

no	Recycling Materials Sorting Center	2018 ton	2019 ton	2020 ton
1	Dramaç	12,735	12,921	13,109
2	Kavala	16,330	16,569	16,811
3	Xanthi	13,362	13,557	13,755
4	Komotini	4,663	4,732	4,801
5	Alexandroupoli	23,651	23,996	24,346
6	Didimoticho	2,515	2,552	2,589
7	Thasos	3,401	3,451	3,501
8	Samothraki	410	416	422

Table 23: Management of wastes at Waste Treatment Plants

		2018		2019		2020	
	Waste Treatment Plant	**Pre-selected organic**	**Mechanical processed**	**Pre-selected organic**	**Mechanical processed**	**Pre-selected organic**	**Mechanical processed**
1	Drama	4,865	-	4,936	-	5,008	-
2	Kavala	5,786	45,535	5,871	46,200	5,957	46,875
3	Thassos	1,701	5,329	1,725	5,406	1,751	5,485
4	XaNTHI	6,681	20,934	6,778	21,239	6,877	21,549
5	Komotini	6,246	-	6,337	-	6,429	-
6	Samothraki	205	642	208	652	211	661
7	Alexandroupoli	5,801	37,745	5,885	38,296	5,971	38,855
8	Evros	3,368	10,554	3,417	10,708	3,467	10,864

Table 24: Quantities' of waste directed to landfills

	Landfill	**2018**	**2019**	**2020**	**Served Municipalities**
1	Kavala	25,015	25,381	25,751	Nevrokopi, Prosotsani, Drama, Paranesti, Doxato, Pangaio, Kavala, Nestos
2	Alexandroupoli	20,736	21,038	21,345	Alexandroupoli, Soufli, Komotini, Iasmos, Maronia-Sapes, Arriana
3	Xanthi	11,500	11,668	11,838	Miki, Avdira, Topiros,Xanthi
4	Thassos	2,927	2,970	3,013	Thassos
5	Samothraki	353	358	363	Samothraki
6	Northern Evros	5,798	5,883	5,968	Didimoticho, Orestiada

To the following table the anticipated investment cost is shown for all the foreseen infrastructures and action to the integrated wastes management baseline scenario for the peripheral unit of Kavala

Table 25: Infrastructures and actions for management of the MSW at Kavala PU

Infrastructure type	Estimated Cost in euro
Green Spots	2,300,000
Composting Plant for pre-screened Organic wastes	2,300,000
Landfill	8,000,000
Waste Treatment Plant (West Sector)	20,000,000
Wastes Transfer Stations	1,400,000
Sludge Processing Plants	2,000,000
Centre for Training in Pre-screening of wastes	300,000
Total	38,300,000

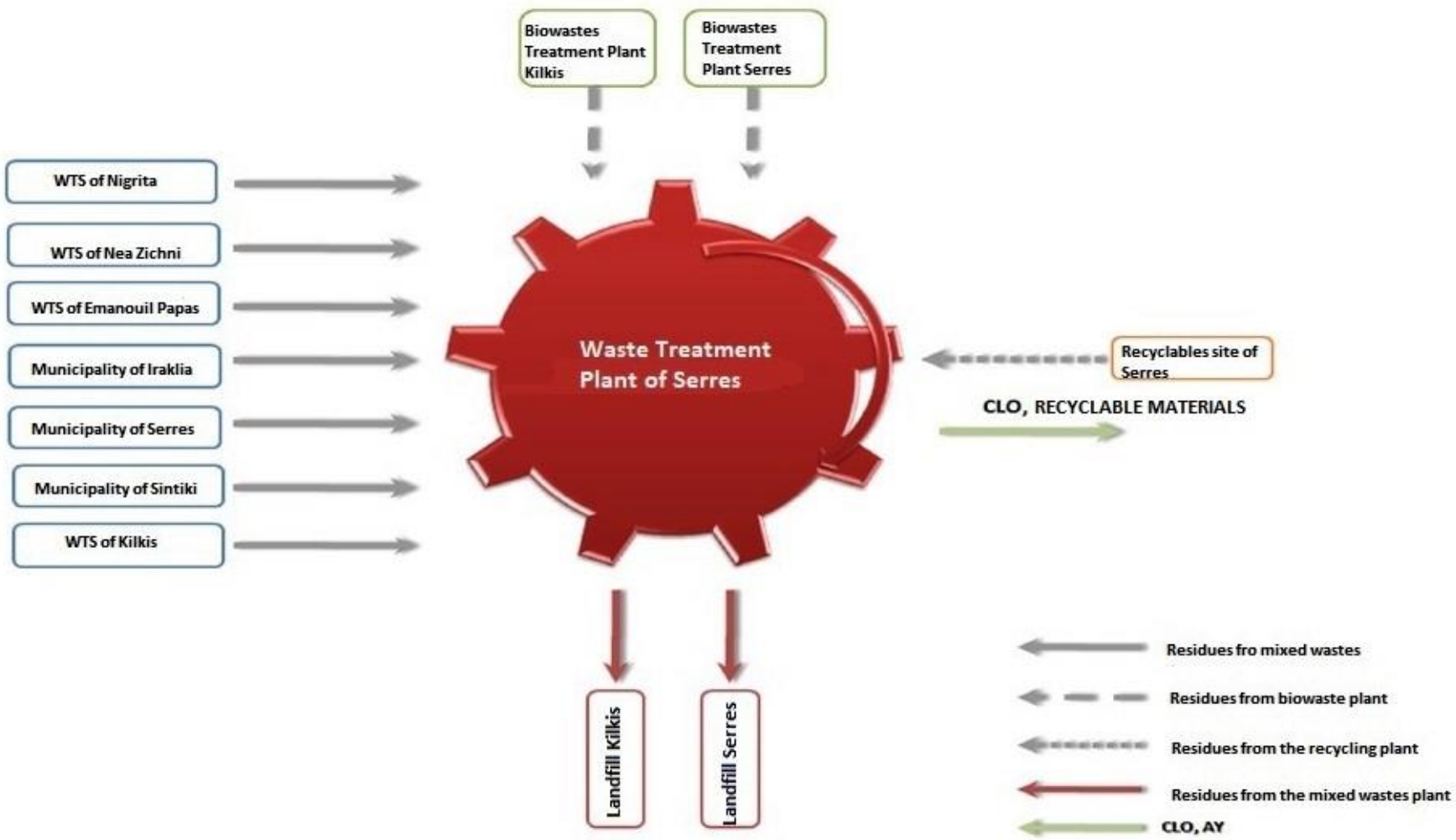

Figure11: Flowchart of the Future Waste Treatment plant of Serres

CHAPTER 3 - Strengths Weaknesses Threats Opportunities analysis for the implemented management model for wastes

3.1. The Logic frame of the Strengths Weaknesses Threats Opportunities analysis

The assessment of the situation to the intervention area will be carried out using the method of the Strengths Weaknesses Threats Opportunities (SWOT) analysis. This method helps to better understand the current situation and to make rational decisions for the implementation of integrated development plans, as it identifies and records the internal weaknesses and strengths of the object under consideration (organization, geographical area, etc.). Identifying strengths and weaknesses, opportunities and threats is a key tool for strategically designing the development of the "object" as it defines categories of possible goals:

- Exploiting the strengths and opportunities to create a comparative advantage,
- Tackle weaknesses and threats to avoid a comparative disadvantage.

The most important element of every SWOT analysis is that the decision-making process must be based on real facts that our scientific projection in the future gives us the tomorrow of the reference region. In this way the planned interventions are based on real advantages, exploit opportunities, minimize weaknesses and seek to eliminate threats.

Based on the data presented in the previous chapters (1st & 2nd), the current local socio-economic situation, and the wastes management plan under implementation at the Municipality of Serres, the recognition of the advantages and disadvantages and the examination of prospects and threats, as presented in the following tables with focus given on the aspects of:

1. Environment protection & quality of life
2. Local economy & employment.

Each of the two above development aspects includes local development issues that correspond to the responsibilities of the Local Authorities, which identify problems and constraints, potential and opportunities and thus help to pinpoint and highlight the **crucial issues of local development.**

In general, the implementation of the analysis attempts to answer, as quantified as possible, questions for the region such as:

Strengths: ▪ What are the advantages; ▪ What is the most competitive product / service? ▪ What are the resources available that are unique or have the least comparative cost? ▪ What do local economic operators consider as an endogenous force in the region?	**Opportunities:** ▪ What are the good opportunities they put forward? ▪ What are the interesting trends in the region?
Weaknesses: ▪ What could be improved? ▪ What should be avoided? ▪ What do local economic operators regard as endogenous weakness?	**Threats:** ▪ Which obstacles usually appear? ▪ What do competitors do? ▪ Are changes in specifications for products or services already provided? ▪ Are technological changes threatening or canceling the existing economy of the region? ▪ Are there financial or financial problems? ▪ Are any of the Weaknesses a real threat to the economy of the region?

Environment protection - quality of life & local economy - employment

Strengths	Weaknesses	Opportunities	Threats
1. Favorable geographical location especially for cross-border collaboration (regions of Europe). 2. Rich natural & cultural heritage with numerous protected sites & significant religious cultural stock. 3. Environmental climatic conditions that allow the production of agricultural products and the development of livestock farming. 4. Presents significant areas of fertile & well irrigated plain.	1. Land use conflicts in the fertile plain areas. 2. High density of concentrated urban functions inside the settlements web. 3. Absence of a fully organized system for management of the container packages of the used agrochemicals in agriculture. 4. Historic overuse / misuse of fertilizers created farm areas with excessive presence on Nitrogen. 5. Significant proportion of the roads	1. Schedule and application of a general land use plan for the entire municipal area. 2. Exploitation of the Municipalities natural resources, aiming at the creation of new development sites and the attraction of visitors. 3. Utilization of available E.U. & national funds for creation and modernization of environmental infrastructure, as well as implementation of enterprise management systems. 4. Utilization of non-potable water for green	1. Absence of integrated spatial planning and development planning. 2. Uncoordinated management and inadequate transnational co-operation in the field of integrated management, collection, treatment and disposal of waste water endangering water bodies. 3. Pressure is exerted on the aquifer of the rural areas of the Municipalities due to the existence of

5. Satisfying roads & railroads web that offers convenient traffic of products and services.

6. Two sites with full infrastructures for industries installation covering a wide variety of activities.

7. Satisfying infrastructure in what concerns electricity and communication networks.

8. Satisfying facilities & infrastructure for management of waste water & municipal solid wastes.

9. Rich mineral wealth of the region (uranium, lignite, gold, geothermal field, mineral water).

10. Significant amount of available free urban space for green development.

11. Brand name of the area for eco-tourism and winter sports tourism, with continuous raising tourist activity.

13. Strong agricultural specializations by regions: fruit growing areas, cotton crops, rice crops, energy crops.

14. Gradual increase in the economically active population over the last two decades.

15. Significant production of forestry products.

16. A critical mass of scientific and research potential, and significant investments and RTD activities are being

infrastructure needs maintenance works.

6. Low offer of modern premises and technological infrastructure within the cities web hinders the development of new business functions.

7. Illegal construction of buildings at the surrounding edges of the municipal settlements.

8. Absence of specific programs for risk management and specific group for the task.

9. Need for training of existing staff and absorption of new staff for the municipal waste management service

10 Need for important procurement of equipment for the municipal waste management service.

11. Delay in the restructuring of the agricultural sector and the exploitation of secondary raw materials (blue economy).

12. Lack of mechanisms to support business and development activity.

irrigation.
5. Implementation of energy saving programs in municipalities and municipal services and the expansion of the use of renewable energy sources.
6. Training of the wastes management service staff on environment, recycling, hygiene-safety and material hazards.
7. Implementation of new green, redevelopment and new communal projects
8. Completion of the national forest land catalog and general land classification.
9. Implementation and exploitation of the management plan for a peripheral urban green zone and the development of new environmental activities.
10 Installation and operation of the first optical fiber network.
11. Strengthening citizens' environmental awareness through awareness - raising programs.
12. Promotion and exploitation of “Lailias” ski center.
13. Promotion and exploitation of Nestos river delta
14. Integration of the Technological Educational Institute of Serres as a social partner for the development and implementation of research, technology, innovation and information programs aiming at the development of new sectors of economic

intensive crops.

4. Uncontrolled spatial development with linear form alongside the newly constructed road axis (vertical connectors with the main axis “ViA EGNATIA”).

5. Increased floods risks from degradation of water management at mountainous watersheds to the North.

7. Increased traffic conjunction problems into the settlements web.

8. Increase in long-term unemployment rates.

9. Limited capabilities of SMEs to monitor and exploit technological developments.

10. Limited interconnection of active employment policies with labor market needs.

made. 17. The largest share of employees is concentrated in the tertiary sector of production and mainly in the wholesale and retail trade.		activity. 15. Creation of a Geothermal Fluid Management carrier. 16. Increasing for the demand for local and ecological products. 17. Proper utilization of the available funds of the 2014-2020 programming period. 18. Investment opportunities in the wider Balkan area through the strengthening of inter-Balkan cooperation through national and EU programs

3.2. Critical local development issues for the study area

From the above-categorized conclusions of the SWOT analysis on the basic aspects of environment preservation and economic development for the local economy at the municipality of “Serres” it follows that the crucial local development issues that needs to be short- and / or long-term planning are:

- Need to exploit the advantages of the geographical location of the Municipalities and address the problems.
- Implementation of important interventions of the rural settlements of the Municipalities for the promotion and improvement of their quality of life.
- Integrated interventions that will promote and improve the quality of life of weaker citizens.
- Exploitation of the full potential of the new NSRF 2014-2020 and the new financial instruments.
- Integrated interventions for environmental upgrading of the site.
- Need to upgrade the facilities & equipment of the wastes management service.
- Need to raise citizens' awareness of environmental issues and increase the percentage and volume of recycled household and municipal waste.
- Development of new environmental activities while enhancing the environmental awareness of citizens.

- Need to create new communal spaces, enhance and improve existing and new developments in all agglomerations.
- Development of partnerships with other municipal authorities and set up inter-municipal action plans to achieve development goals and goals.
- Need to undertake actions to boost local employment, particularly for sensitive population groups (women, young people).
- Support and promote local entrepreneurship.
- Reorientation of activities and production directions / developmental queries.
- Further development of the tourists' attraction in the area.

CHAPTER 4 - Definitions on "green economy", "green entrepreneurship", "green jobs" and the associated skills required for the desired development.

4.1. Economic activity and green economy

According to the United Nations Environment Program (UNEP, 2008), the green economy is defined as the economy:

> *"...which leads to improvement of human well-being and social justice while greatly reducing environmental risks and ecological deficiencies."*

In other words, green economy is considered as an economy based on an ecological economic growth model and characterized by low carbon consumption, resource efficiency, and social inclusion. On a practical level, in the green economy, the growth of income and employment stems from private and public investment which:

- Enhance the efficient use of energy and resources.
- Reduce environmental pollution.
- Reduce carbon dioxide emissions.
- Prevent the loss of biodiversity and ecosystems.

This developmental economic model must maintain, strengthen and, where necessary, restore physical capital as the most critical economic resource and as a source of public benefit.

In order to ensure an organized and effective transition of a country to greener forms of economy, it is necessary to have and use a user-friendly and commonly accepted system of classification of sectors of activity and professions which are significantly affected by this transition. This system will allow continuous and systematic monitoring of the green economy, the quantification of its effects on the labor market, the extraction of useful conclusions for strategic decision making and policy design as well as comparison with other countries.

4.2. Green Business and Green Entrepreneurship

Green entrepreneurship is defined in the bibliography as that form of economic activity that puts environmental protection and respect for natural resources at the heart of its strategy and actions (OECD, 2011). In other words, green entrepreneurship is positive in terms of protecting and respecting the environment, both through its production processes and the end products/services it offers.

As most production systems and business and economic practices have developed in times when natural and economic resources are considered to be inexhaustible, it is clear that green entrepreneurship requires and promotes a radical rapprochement and redeployment of economic activities to the environment.

Therefore, green entrepreneurship is based on the following **three pillars of values**:

- The **business environment is an integral part of the natural environment**, stems from it and works in full harmony with it. Besides, the majority of the main productive factors are parts of the natural environment (land, energy, air, water, etc.) and their reduction or extinction at the global level brings about the inevitable decline of business and economic activity
- Global production systems and consumer patterns today are based on the waste of natural resources and the depreciation of the environment, as they are based on the perception of abundance of oil and other mineral wealth. On the other hand, the most modern, "smart" production systems rely on **effective and well-performing utilization of all productive resources** (physical, intangible, human), reducing the overall environmental footprint and depreciation of the environment
- Given the perception of abundance, the prevailing trend considered that customer satisfaction and improved quality of life stemmed from the increased quantity and wide range of products and services provided. Green entrepreneurship considers that the **provision of quality products and services improves** quality of life with a dual benefit to consumers and the environment

Therefore, for the implementation of the above-mentioned pillar values, it is necessary to design and implement a green business strategy, which at least foresees the following actions:

1. Effectively increase the efficiency of the use of environmental resources (e.g. water, energy, etc.), ensuring their long-term existence and economic benefit for the enterprise.
2. Full and efficient use of any waste or waste of the production process through various methods (e.g. recycling, re-use in other processes, etc.)
3. More efficient and targeted coverage of consumer needs, focusing on providing quality services and products. For green entrepreneurship, the key to customer satisfaction lies in effectively meeting their real needs rather than creating new ones.
4. In the longer term, the outcome of green business activities should focus, inter alia, on preserving and restoring the natural environment by protecting existing ecosystems and creating new ones where this is necessary.

Taking into account the definition and approach of green entrepreneurship, it is appropriate to clarify what is **not** green entrepreneurship so as to avoid any misinterpretation of the term. Green entrepreneurship **is not:**

⇒ **Simple compliance with environmental legislation.** Compliance with this legislation is considered to be the case for the green undertaking, which takes actions and measures to overcome legal requirements by constantly setting new standards.

⇒ **Public relations on environmental issues.** Green entrepreneurship focuses on the production of green products and on the realization of environmentally friendly production activities and is not used in simple communication actions that are not accompanied by corresponding content.

In summary, green entrepreneurship today can help businesses not only to adapt to growing legislative, social, environmental and other requirements but also to improve their economic efficiency through the efficient use of natural, environmental and other resources, offering a valuable way out of challenges of the current economic climate.

4.3. Green employment and jobs in the green economy

From a broad conceptual point of view, the transition to a green economy and sustainable growth is expected to affect employment in at least four different ways (Scarpa, 2009):

1. In some sectors it is expected that additional jobs will be created. For example, the production of electronic devices that create reduced levels of contamination has extended the traditional electronics industry.
2. In some sectors traditional jobs will be replaced by other, more green ones. For example, the transition from the use of fossil fuels to the use of renewable energy, the transition from the construction of trucks to the construction of railway wagons or the transition from landfilling and incineration of waste to recycling and reuse.
3. Some jobs will disappear without an immediate replacement, for example the production of packaging materials for products that have been abolished or banned.
4. Finally, many of the existing jobs and many of the current professions (e.g. electricians, plumbers, craftsmen, etc.) will change their nature, redefining their daily work activity and using more green methods, materials and techniques.

In this context as it is described to the previous paragraphs, 'green employment ' is defined as any employment that:

- In the operation of characteristics of activities related to the environment or in sectors of providing environmental services, the final result of which directly causes the improvement of environmental conditions
- The production of environmental goods or the creation of infrastructures that support the provision of environmental services

A recent definition by the World Watch Institute (2008) considers green jobs as those in the primary, secondary and tertiary sectors that contribute to maintaining and/or restoring the environment. In other words, as Greenpeace (2009) states, green jobs are those that protect ecosystems and biodiversity, contributing to the rational use of energy and natural resources that reduce water consumption, leading to a low-cost economy and reduce the production of waste and pollutants.

4.4. Green jobs: recording and demarcation

According to the United Nations Environment Program (UNEP 2008), green professions concern those who:

"...work in agriculture, manufacturing, research and development (R & D), administrative support, and services that contribute substantially to maintaining or restoring environmental quality. In particular, but not exclusively, this includes jobs that help protect ecosystems and biodiversity, reduce energy, materials and water consumption through high-efficiency strategies, de-carbonize the economy and minimize or eliminate production of all forms waste and pollution. "

In view of the above definition, as well as the findings of the international literature (e.g. UNEP, 2008a, Forstater, 2004, US Bureau of Labor Statistics, 2013 etc.) and taking advantage of Table 1 of paragraph 2.1, this study recording and classifying the green professions or, in other words, the professions involved in the green economy.

Based on this classification, there were 55 professions participating in the green economy based on the European Classification of Work (ISCO 88 (COM)) system. It is clarified that the professions in the table below relate to professions of all branches of economic activity with a real contribution to the green economy, regardless of whether they are part of the green economy so as to ensure the holistic recording of the green professions.

Table 26: Presentation of the so called "green professions"

S/N	PROFESSION - Advanced Level
	Managers
1	Legislators and senior government officials

	Graduates (Universities or other same level educational institutions)
2	Meteorologists
3	Foresters
4	Agriculturists
5	Biologists, botanists, zoologists and environmentalists
6	Geologists and geophysicists
7	Architects and city planners
8	Topographers and cartographers
8	Spatial Planners
9	Civil Engineers
10	Electronic and telecommunications engineers
11	Mechanical Engineers
12	Chemical engineers and technologists for nutrition
13	Architects, engineers and similar specialists not classified elsewhere
14	Mining engineers, engineering engineers and similar specialists
15	Analysts, programme developers and other computer specialists
16	Electrical engineers
17	Chemists
18	Lawyers
19	Economists
20	Accountants
	Technical assistants and specialists
21	Technical assistants in agriculture and soil
22	Technical assistants in forestry
23	Technical assistants in biology
24	Technical assistants for electrical engineers
25	Technical assistants of electronic and telecommunication engineers
26	Technical assistants mechanical engineering
27	Technical assistants of chemical engineers
28	Technical assistants in physics and engineering not classified elsewhere
29	Technical assistance specialists for computers
30	Technical assistants of civil engineers

31	Technical Assistants of Chemistry and Natural Sciences
32	Consultants for farms and forests
	MEDIUM LEVEL
33	**Farmers, livestock farmers and fishermen**
	Technicians
34	Builders
35	Gardeners
36	Carpenters
37	Technicians in construction skeleton setup and other construction workers
38	Insulation technicians
39	Glass installers
40	Plumbing and pipe fitters
41	Building Electricians
42	Metal welders and cutters
43	Manufacturers, installers and repairers of metal sheets
44	Electricians, installers and repairers of electric machines and appliances
45	Apparatus and repairers of electronic equipment and devices
46	Installers-electrical line maintenance and cable connectors
47	Manufacturers, cutters, grinders, grinders and glass finishers
	Machine operators and assemblers
48	Metal working machine operators
49	Operators of pottery, ceramics and glassware
50	Operators of power generation machines
51	Operators of water treatment machines and heating and cooling systems
52	Earthmoving machinery operators
	LOWER LEVEL
	Unskilled workers
53	Garbage collectors, scavengers and health workers
54	Agricultural and fisheries workers
55	Green planting workers

The above Table highlights a range of professions that are related to the green economy and can be described as "green" occupations. The overwhelming majority of these professions are superior and medium-sized. In particular, the presence of green top-level professions in Table 15 is due to the high degree of specialization required by new green technologies (such as metrics and calculations), the organization and management required by green activities (flow management, project management) and services high value added in some areas (diagnosis, control, and counseling). In addition, this category includes professions which provide mainly auxiliary but essential services of high added value to green activities such as legal and accounting services.

Similarly, middle-level green jobs are mainly related to specialized construction work (such as thermal insulation), the installation of energy production and energy saving systems and the use of waste incineration, pumping and water treatment and heating and cooling equipment. In addition, the professions in this category include farmers, livestock farmers, and fishermen who are expected to be particularly affected by environmental changes and in particular by climate change. After all, global warming and increased incidents of extreme weather events are expected to significantly reduce agricultural output and farm income. It is therefore imperative to diversify farmers' income sources, shift to new sustainable practices such as organic farming and livestock farming, and sustainable fisheries, and to strengthen their skills for using new technologies and plantations.

4.5. Skills for green professions

Although there is no general, regarding the commonly accepted definition of "skills", the term is mainly used to mark the knowledge, skills and experience required to carry out a particular job or task, often by paying the minimum strong effort and / or energy (Whitley, 1988). In the European Union, the European Qualification Framework describes skills as gnostic (use of logical, intuitive and creative thinking) or practices (concerning manual skills and the use of methods, materials, tools and instruments) (European Commission, 2008).

The growing importance of the transition to the green economy has a significant impact on changing work patterns, establishing green professions and the need for new green skills. As the International Labor Organization (ILO, 2011) says, it is necessary to provide timely and qualitative skills (green skills) for a successful transition to a green economy that will increase productivity, stimulate employment and strengthen development.

In this context, the OECD (2010) states that:

"... Green skills are the specific skills needed to adapt products, services or processes to changes due to climate change and environmental requirements or regulations."

Therefore, the skills of the green professions are the skills required to carry out the work of green professions and for which there are different views from international bodies on their level and composition. Indicative is that the UN Environment Program states that green professions cover a wide range of vocational qualifications, skills and levels of education, with most professions relying on traditional occupations and jobs, however, with diversified work and skills (UNEP 2008).

It should be noted that despite the relatively recent definition of green skills, skills themselves are not just about new skills - such as knowledge of sustainable materials or environmental impact assessment - but also existing "traditional" skills but which are applied in the context of green professions and green activities. Indicative is the ability to assess environmental impacts which becomes "green" only if the result of the evaluation leads to more efficient products and production methods.

In this context, all skill classes are of particular importance for green jobs and the transition to the green economy. As a growing number of professions become green, basic and general skills are of particular importance. For example, basic skills in science, technology, engineering, and mathematics are important for the implementation of green technology and innovation. Additionally, leadership skills to promote change, risk analysis for options exploration, environmental awareness and consultation skills are of particular importance for the transition to the green economy.

CHAPTER 5 - Good practices of "green entrepreneurship" in European & Greek level.

5.1. European Union, green jobs and a green economy

The European Commission conducted a research regarding the economic outcomes of the Renewable Energy Sources (RES) promotion process, examining not only jobs in the RES sector but also in other sectors of the economy. According to the Commission Communication, if the target of 20% RES contribution to total energy consumption is reached by 2020, it will result in the creation of 410.000 additional jobs and a net increase in EU GDP by 0.24%. Moreover, according to this Communication, for the ambitious targets of combating climate change and reducing greenhouse gas emissions by 20% in the EU with a 20% share of renewable energies in EU energy consumption by 2020 (often referred to as 20/20/20 targets) the EU will allocate 48 billion euros. This funding line includes EUR 23 billion for railways, EUR 6 billion for clean urban transport, EUR 4.8 billion for renewables and EUR 4.2 billion for energy efficiency.

But also in the current situation, numbers are already impressive in the European Union: those working on environmental issues are over 3.5 million, accounting for 0.7% of total EU employment. Of these, a large portion is concerned with areas of so-called "clean" technologies. Clean technologies are considered those related to renewable energy, waste recycling, etc. Other areas that make a significant contribution to these figures are the protection of the natural environment and the ecological regeneration of urban areas. All these sectors reach 2 million people across the EU. The remaining 1.5 million jobs are for businesses that deal with environmental issues.

Considering that 0.7% is the European average, there is a variation in this percentage in the different countries. Larger than the average is in the following countries: Austria, France, Germany, Luxembourg, the Netherlands, and Sweden. Denmark and Ireland are among the European average, while Belgium, Italy, Portugal, England, Spain and Greece are "dropping". Greece has the lowest percentage in the EU, just 0.1%.

A recent study on behalf of the EU has shown that achieving the EU target of 20% of RES needs by 2020 will generate 2.76 million full-time jobs. Taking into account the loss of jobs in conventional energy, this shift entails a positive balance of 417,000 full-time jobs over the next decade. Moreover, according to a similar study by WWF (2009), 3.4 million jobs in the EU are already directly related to renewable energy, sustainable transport and energy efficiency. This figure goes well beyond the 2.8 million jobs covered by polluting industries such as lignite, cement, iron and steel. It is also estimated that the low-carbon

economy will continue to widen in the future, as opposed to employment in polluting industries.

Mr. Jason Anderson, Head of Energy Policy at WWF's European Office make the following statement:

> *"The report clearly shows the winners and proves that environmentally and climate-friendly policies and technologies make a positive contribution to the economy"*

The bases for developing the green economy have already been set. If politicians continue to support industries that contribute to greenhouse gas emissions, Europe risks to face a high cost in the future, both for the economy and for the environment, Mr. Anderson adds.

Table 27: Expected number of "green" jobs per economy sector at EU by 2020

Areas of Employment	Number of jobs created
Renewable Energy Sources (RES)	400.000
Sustainable transport	2.100.000
Energy efficiency area	900.000

Germany and Spain are becoming champions in green jobs in the solar and wind sectors, and impressive numbers are also recorded in Denmark, particularly in the field of wind power. Other countries are experiencing similar developments, but there is still room for improvement (WWF, 2009).

5.2. The green economy in Greece: key figures & features

Despite the launch of procedures for moving to the green economy and enhancing green employment from the European Union, Greece still lacks a structured social dialogue to link climate change to the labor market. This lack of public interest is a surprise to many experts in the field, as the Greeks see climate change as a major problem. For example, in a Eurobarometer survey on climate change (2009), respondents were asked to rate how serious the climate change problem is. The results showed that the Greeks consider it a very important problem at 84%, when the EU average of 27 reached 63%. In addition, the results showed that the majority of Europeans (62%) disagreed with the view that climate change is a phenomenon that cannot be halted. In Greece, the percentage of respondents who disagreed with this view stood at 81% (42% of the respondents stressed that they absolutely disagreed), the highest of any other Member State.

The lack of open public consultation on climate change can be attributed to a multitude of causes, the most important of which concern the prevailing tradition and the current economic crisis. As far as socio-economic actors are concerned, the issue of transition has just begun to concern the government, the political world and the social partners. Nevertheless, there are already concrete actions and initiatives undertaken by the social partners that have come up with joint actions on the wider issue of sustainable development and sustainability. For example, the Economic and Social Committee's opinion on nature and environment protection (2008) is moving in this direction. Moreover, in 2009 the Greek government set the target of 40% of total electricity to be produced from RES by 2020%.

Despite the ambitious targets set by the EU, there are doubts as to whether the country's emissions reduction target under the Kyoto Protocol can be achieved due to the economic crisis (WWF, 2009). Also, it has not yet been clarified how RES will enter the energy mix without burdening the protection of the natural environment, the credibility of investments and building a climate of trust with local communities. Finally, there has not been a consensus on the gradual elimination of lignite from the energy mix, and the economic crisis may be a good excuse for the premium for environmentally damaging investments.

The lack of clear political engagement and integrated open public dialogue make the country a breakthrough in the transition to the green economy, despite generous nature in the sun and air, resulting in countries like Austria, Denmark, Germany, Portugal and Spain perform better performance on RES adoption and other environmental indicators. For example, Eurostat's indicators for meeting the Lisbon targets have shown a disappointing picture in previous years. In 2008, Greece had the worst greenhouse gas output, to 125 units, when the European average was 92 units. At that time gross energy consumption in terms of GDP (kilograms of oil equivalent per 1,000 euro) was 182 points when the EU-15 members' average was just 152 and the EU-27 members' was 169. In 2007, the RES electricity production rate was 6.8% (about 8% today), while the EU-15 average was 16.6%, the EU-27 was 15.6%, while Italy was 13.7%, Spain was 20% and Portugal was 30%. It is worth noting that a significant part of the Greek 6.8% comes from older generation hydroelectric plants.

A recent study by the Athens University of Economics and Business and WWF in June 2010 attempts to calculate the costs and benefits of implementing specific RES and energy saving measures in Greece with a time horizon of 2020. In the context of the benefit assessment, the study attempts to calculate the jobs that could be created in the case of the proposed measures. The study estimates that in order to meet the 20% commitments on final energy consumption and 40% on electricity generation, 12,600

MW RES is required, which, based on the proposed RES mix, is translated into investments of 10.58 billion euros. These investments are estimated to create a total of 29,379 new jobs, assuming that part of the production will be made in the domestic market. More importantly, the contribution of energy saving interventions in the domestic and tertiary sectors to job creation is estimated. By estimating the total cost of investment in the savings sector by 2020 to 15.97 billion, it is estimated that about 180.471-215.606 new jobs will be created. Again, estimates are based on the assumption that much of the added value will be created domestically.

A Greenpeace report published in 2009 offers specific estimates of the evolution of green jobs in Greece. In particular, 256.000 – 403.500 new jobs (direct and indirect) are expected to be created in the energy, construction, recycling and agriculture sectors, if the right measures are taken at this stage, and at the same time one of the outlets the economic crisis. According to the report, green employment can be extended to other, less traditional sectors of the economy, while creating new infrastructure requirements and skilled personnel capable of responding to modern data.

Today, Greece has the lowest percentage of green jobs in the European Union, yet 3% of unemployment is already absorbed in 'green' professions. The optimistic side shows that the data will be improved as our country will have to integrate and implement Community directives on environmental protection in practice.

It is worth noting that in recent years the EU's financial policy it is heading towards environmental research, technology, investment and infrastructure. This action is expected to give significant impetus to green employment, increasing the proportion of people engaged in environmental activities. Moreover, through the shift of energy policy towards RES, there is growing investment in clean technologies, as well as anti-pollution and de-pollution technologies.

In Greece, there is also a strong need for sustainable management of natural resources. The Greek environment consists of a multitude of unique ecosystems that are not managed properly. All the areas under protection status require mild activity and protection that only qualified scholars can identify. It is another task where new and experienced scientists can be employed. Finally, the sector of organic farming is also in bloom, while this sector has found a remarkable response from the Greek market audience. Organic farming is a typical example of a business that belongs to green jobs: from the farmer who cultivates the land to the merchant who trades it, all contribute to a more sustainable world.

5.3. Prospects and Investments in the Poor Economy: Forecasts for the current decade (2010-2020)

The transition to green growth over the current decade is and must be a concern for all social and business players, including:

- Local-governments, producer groups, cooperatives and consumer organizations, thus creating a new framework of products and services offered in greener techniques and habits. In this context, there is also a new commodity relationship and dynamism that shapes a new market.
- Universities, non-governmental organizations and related companies active in the field of green entrepreneurship in various research areas and monitoring programs.
- In some other areas non-governmental organizations (themselves or in partnerships), managing bodies of protected areas and even the state itself is being activated. The state has a boom of green entrepreneurship, which acts as an activity that shapes economies of scale and strategic planning for sustainable development.
- The most crucial point for the transition to the green economy by 2020, the most critical momentum is shaped and shaped in a purely private-economic direction.

This is because it is a challenging area for young entrepreneurs, for women, as it is a privileged field and an outlet for mild activities or for existing businesses and for new partnerships. This challenge is highlighted in the search for new products and the identification and coverage of a new consumer demand that can fulfill the conditions of both sustainable development and the particular aspect of sustainable development that fulfills the terms of decoupling. Disconnection involves reducing material flows that burden nature in a way that does not reduce welfare indicators. Based on the above framework and the review of the international bibliography, the sectors and activities that are expected to represent an initial core for the transition of the country's productive system toward green growth are presented for the current decade:

1. Reducing industrial pollution by promoting Best Available Techniques (BAT), improving the Industrial Area Infrastructure (Industrial Areas)
2. Renewable Energy Sources (RES) in power generation.
3. Saving energy and promoting RES in the final consumption sectors (buildings, transport, industry, etc.).
4. **Solid waste management with emphasis on recycling and re-use.**
5. Sustainable management of water resources and their use.
6. Developing environmentally friendly combined transport.
7. Promoting sustainable tourism.
8. Organic farming.

In all the above areas it is possible to implement significant "green" investments over the next decade in Greece. These investments are expected to have a significant impact on growth and employment in a number of sectors of the economy, such as construction, power generation, electrical and mechanical equipment, services, etc.

However, in order to allow a quantitative analysis of the impact of green investments on the product and employment of the Greek economy over the period 2010-2020, a coherent methodological framework. As a first step, the annual demand for green investment by sector of economic activity over the period 2010-2020 should be estimated. More specifically, for quantitative estimation of green investments it is necessary to identify and specify:

(a) the nature and physical size of the investments expected to be realized in this context,

(b) the total economic size of such investments and the turnover related to their maintenance and operation,

(c) the proportion of investment to be spent within the country compared to what will be channeled for imports of equipment, services, products, etc. from abroad; and

(d) the analysis of investments to be carried out within the country by economic activity

In addition, the implementation of some of the above investments and actions may alter the structure and characteristics of specific sectors of economic activity and therefore part of the investments that would be expected to be realized in the context of economic development based on an expected growth scenario, be carried out. For example, the implementation of energy saving measures is likely to limit investment for the construction of new power generating units.

Secondly, given the annual demand for "green" investment over the period 2010-2020, it is necessary to analyze the impact it is expected to produce on the product and on employment in the economy. The sectors of the economy that appear to account for the bulk of these investments are:

- Machinery and equipment
- Electrical equipment and optical devices
- Construction works (infrastructure / landscaping)
- Wholesale and retail trade services
- Real estate services, rental services and business services.

Since the processing of data for the assessment of "green" investment and research into their effects in relation to the application of these methods, the period 2010-2020 shows:

1. Initial findings show that, on average, an average of € 7.76 billion per year is expected to be generated over the period 2010-2020, including the size of green investments. Similarly, the average annual employment expected to be created is 97,464 employees (full-time equivalent). In particular, the product expected to be produced directly is 54.35% of the total, 26.69% is the indirect one, while 18.96% is the one caused. Similarly, direct employment accounts for 55.14% of the total, while the remainder is due to 23.07% of indirectly generated employment and 21.79% of induced employment.
2. The sectors with the largest overall impact in relation to the product are: Construction work, Machinery and equipment, Real estate, renting and business services, Basic metals and metal products, Wholesale and retail trade services.
3. The sectors with the highest total employment impact are: Construction work, Machinery and equipment, Wholesale and retail trade services, Trade services, maintenance and repair of motor vehicles and motorcycles, Electrical equipment and optical appliances, and Real estate, renting and business services.
4. The top in list occupations, which account for approximately 50% of the additional employment, are: construction and construction technicians of construction and other construction works, with 13.82%, engineers, engineers and maintenance engineers and electrical & electronic equipment, with 10,11%, Managers and managers of small public or private enterprises employing up to 9 persons, with 9,14%, Office employees, with 7,90%, Sellers and related professionals, with 6,58% and Metal Castings, welders, rolling mills, craftsmen construction, blacksmith and related workers, with 4.37%.

Overall from the foregoing that there is a grid of sectors and professions for which there will be a significant increase in both demand and employment. Changes in product and employment are reported only in the period considered. In relation to employment, it is estimated that about 209.000 jobs will be created for each year of the period. The sectors with the most significant results are: Agriculture, Hunting and Forestry Products, Construction Work, and Transport, Storage and Communications.

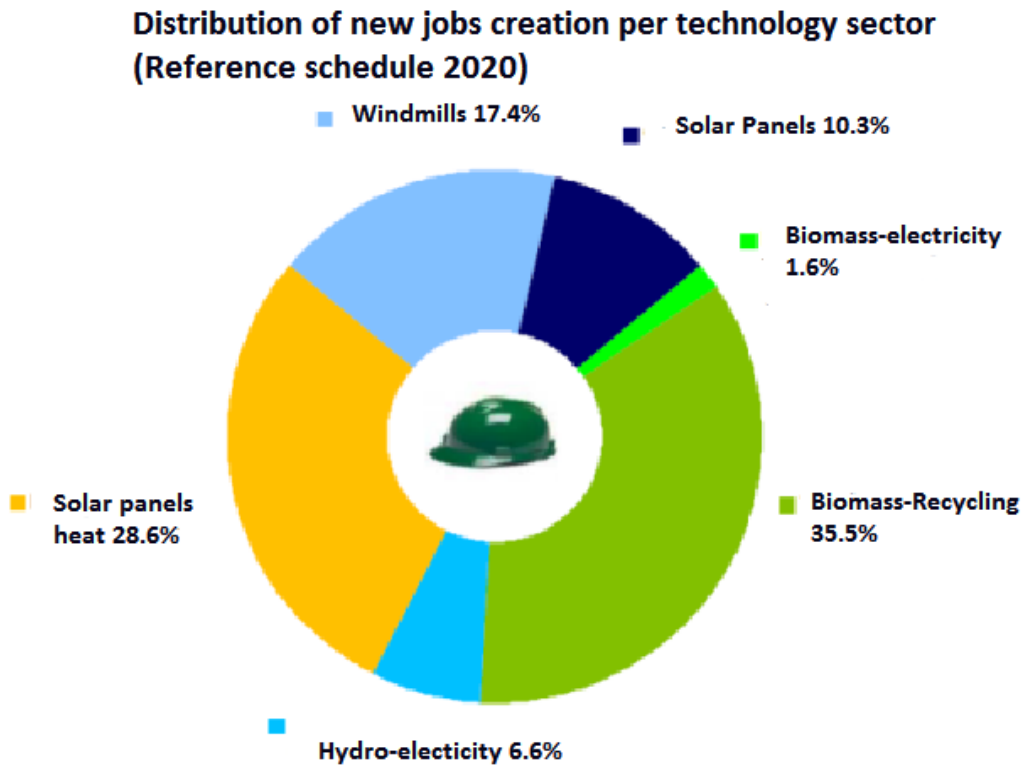

Figure 13: Distribution of expected “green jobs” in Greece by 2020 (source: Greenpeace 2009)

CHAPTER 6 - Green skills: analysis of needs in the Greek economy

6.1. New needs generate the emergence of new skills

As mentioned in Chapter 4, green employment is the one that develops in the areas of environmental protection and enhancement, environmental management, etc. From the foregoing analysis, it turns out that the range of green jobs is expanding, increasing the overall green economy's participation in all global economic activities. At the same time, the need for businesses and public institutions to adapt to new environmental conditions and to respond to the growing demand for green products and services intensifies. As a result, demand for green skills and qualifications related to environmental issues is increasing.

In this context, institutional and financial support for green jobs further enhances the environment as a field for the development of new skills and new job opportunities, which has already emerged as a priority for the European Union (Chapter 5, paragraph 5.1.). For example, one of the main pillars of the Europe 2020 strategy is sustainable growth, thanks to a decisive transition to a low-carbon economy and to a more competitive industry (European Commission, 2010). Moreover, in Greece, a network of training actions for the acquisition of green skills has been implemented since the B 'Community Support Framework (2nd CSF) (1994-1999), and through the emerging needs of the private, public and social sectors, green employment is expected to go even further. As a result, the availability of green skills plays a key role in the timely and successful transition to the green economy. More specifically, international practice shows that public sector policies combined with private sector initiatives can facilitate the transition to the green economy. However, this transition requires an important pool of skills, often called "Green Skills". The development of green skills should focus not only on adding new skills but also on adapting existing ones to greener forms (CEDEFOP, 2010).

It should be noted that it is generally accepted that environmental policies and related programs will not induce the creation of completely new professions that require new, innovative skills. On the contrary, green professions mainly require the conversion and adaptation of existing skills towards the transition of the profession into greener forms. Thus, professions evolve to green as some skills emerge to the top of the demands of professional outlines. Thus, as demand for products and services with improved efficiency and functionality that reduces inputs, waste and energy consumption (so-called "clean tech" products) is growing, new green jobs are created requiring green skills such as for example the RES management staff, the energy inspector, etc. The skills required for these professions are often not new but come from existing professions.

In a relative study, Brøndum & Fliess (2009) explored new business outcomes that emerged as a result of the new opportunities created in the Danish market by environmentally friendly solutions and resulted in twelve groups of green skills required in green jobs:

1. Knowledge of environment, climate, sustainability.
2. Information and Communication Technologies.
3. Programming and planning skills.
4. Control and documentation skills.
5. Automation knowledge.
6. Knowledge of materials technology: alternative materials, reuse of materials.
7. Innovation: in processes, products, business models.
8. Knowledge of production process: installation and maintenance of production systems.
9. Impact of globalization: competitive advantage, business models, partnerships.
10. Understanding market behavior and users: specializing in techniques and other solutions.
11. Basic vocational training: processes, technologies, materials, markets and market dynamics.
12. Communication skills: including English language knowledge and team spirit.

In a similar effort, the Human Resource Development Authority of Cyprus on 2010 identifies the following set of general green skills that are fully relevant to the specificities and needs of the Cypriot economy:

1. Strategic and leadership skills for policy makers and business executives to be able to provide the appropriate incentives and conditions for a shift towards sustainable development.
2. Adaptation skills and learning to learn, as they will enable the employees to learn and use new technologies and processes.
3. Environmental consciousness and willingness to be informed about sustainable development.
4. Coordination, management and management skills for integrating environmental objectives.
5. System and risk analysis to assess and understand the necessary changes and measures.
6. Business skills to exploit green opportunities.
7. Innovation for exploiting opportunities and creating new strategies to tackle green challenges.
8. Communication skills to promote the green economy.

9. Counseling skills for advice on green solutions and products.
10. Language skills and IT skills to work on international markets.

In addition, the transition to the green economy depends largely on the overall economic sector, owing to the social, legislative, etc. demand to increase the environmental sensitivity of producers and to improve resource efficiency through improved production methods and the use of new technologies.

6.2. Green Skills by Economic Sector

6.2.1. Primary sector

The primary sector of the economy has a significant share in the green economy and are directly affected and affected by the transition to it. Current environmental developments, including but not limited to temperature changes, prolonged drought and water scarcity, are expected to have a catalytic effect both on the quality and quantity of agricultural produce, which is why it is unavoidable to move towards a sustainable model agricultural production that respects and protects the environment.

In this context, the following skills are required:

- Administrative skills and business management skills.
- Skills and knowledge of livestock farming.
- Skills and knowledge of plant and animal nutrition.
- Knowledge and techniques of coal management.
- Skills and techniques to adapt to climate change.
- Knowledge of natural disaster management.
- Knowledge of agriculture and soil.
- Knowledge of design, operation and maintenance of facilities.
- Cultivation techniques.
- Knowledge and skills of carbon capture and storage.

However, in addition to the specialized green skills required for economic activities in the primary sector, all professions also require some general skills, especially in the field of business management, for example:

- Life cycle analysis skills.
- Knowledge of costing.
- Knowledge of coal for raw materials supplies.
- Design, impact assessment and risk management skills.
- Leadership and communication skills.

- Green supplies.
- Resource efficiency skills.
- Financial management, etc.

These skills are required for all three sectors of the economy and will not be repeated in the following paragraphs as their acquisition is considered to be given.

6.2.2 Secondary sector

From the analysis that was preceded by a previous chapter (4), it has become clear that the secondary sector plays the most dominant role in the transition to the green economy. The activities of this sector - in particular those of manufacturing - can ensure a successful and smooth transition to greener forms of economic activity, as they absorb large amounts of raw materials and natural resources and often have increased energy consumption accompanied by significant production of pollutants.

The transition of the secondary sector to more environmentally friendly forms in turn requires a set of green skills, the range of which varies according to economic activity. For example, in many cases, traditional manufacturing skills and knowledge can easily be adapted to save energy, with the result that extensive training is not required. On the other hand, it is often pointed out that the RES sector will benefit significantly from the acquisition of specialized construction skills. Thus, taking into account the extent of the secondary sector's involvement in the green economy, the following skills are needed on a case by case basis:

- Carbon valuation and management skills to apply greener practices with low carbon production and increased energy efficiency
- Skills to create business models based on green practices
- Knowledge and skills of chemical engineers
- Scientific skills and ability to understand a wide range of scientific issues
- Skills for adoption and use of new technologies oriented towards sustainability
- Lean manufacturing skills
- Skills for managing advanced construction systems
- Knowledge of design, operation and maintenance of facilities
- Skills to achieve legislative environmental objectives
- Ecosystem design and management skills
- Knowledge of multifunctional design and management
- Land use planning and management skills
- Skills and techniques for using computer-aided design and geographic information systems (GIS)

- Carbon and water impact detection skills
- Design skills for products geared to climate change
- Skills and knowledge of analyzing and forecasting economic, demographic, etc. changes
- Knowledge of underwater high voltage engineering (for RES design and management)
- Skills work in adverse environmental conditions
- Biomass raw material production skills
- Skills for efficient fuel distribution and storage
- Power management skills for carbon capture and storage
- Skills to reduce energy and water spills during the production process
- Green waste management skills
- Smart Insulation Installation Skills
- Skills to increase capacity
- Skills to modify and increase durability of materials
- Skills to produce new advanced materials
- Knowledge and techniques of manufacturing ultra-low-carbon vehicles
- Skills to distribute alternative fuel sources
- Skills, knowledge and techniques for the construction of hybrid / electric vehicles

6.2.3 Tertiary sector

The tertiary sector can support the transition to the green economy by offering a set of horizontal and / or specialized services such as consultancy services, legal services for environmental legislation, etc. Due to the nature of the sector, there is less need for green skills, compared to the other two areas. Indicatively, the following skills are listed:

- Skills to provide education and training in green specialties.
- Green financial management and green accounting skills.
- Data management skills.
- Skills for efficient equipment design and management.
- Green procurement skills.
- Skills and life-cycle knowledge.
- Skills for analyzing, estimating and managing energy sources.
- Human resource management skills and integration of green skills in human resources.

6.3. Promising areas for application of the “green” entrepreneurship in modern Greece.

Green entrepreneurship can be an important way out of the crisis and a key to long-term growth and job creation over the period 2010-2020. In the previous chapters, the views of various scholars and organizations have been presented on the sectors and categories of the green economy that are expected to show growth and strengthen green jobs. This chapter presents the areas where green entrepreneurship can be applied, taking advantage of current developments and emerging opportunities:

1. Agriculture

The services that green entrepreneurship can offer in the field of agriculture include technological solutions for greenhouse heating and agriculture in general with biomass and geothermic, but mainly include services in the form of studies and measurements for the assessment of different energy crops in specific areas, as well as the assessment of biomass potential in them. In addition, an integrated service on biofuel investment projects may be provided, including supply chain design of the most appropriate technology for the development of the unit, as well as measurements of the energy efficiency of crops and biofuels.

2. Environments

Green business activities can be implemented to provide advice on energy strategies and policies at national and European level on sustainable development and climate change. This can be achieved, inter alia, by promoting actions to improve energy efficiency and the environmental performance of energy technologies and the measurement of environmental pollutants. Also an important & promising field for both private and public entrepreneurship development is waste management and resources (materials & energy) recovery, alongside the development of circular economy.

3. Buildings

In the field of buildings, green entrepreneurship can also be involved in energy planning with architectural studies, lighting - ventilation - heating - cooling studies, as well as with integrated proposals for applications of RES systems in building facilities. For example, through green business applications, energy audits of existing buildings can be carried out and the possibility of measuring and calculating the energy performance characteristics and behavior of buildings can be carried out. In addition, it will also examine solutions for the implementation of energy management systems for buildings and propose measures for their E / M equipment. Integrated proposals for the development of sustainable

residential complexes can also be included in the applications of green entrepreneurship and the services it can provide to Local Authorities and housing development companies.

4. Industry

The services offered to the industry are mainly focused on energy saving and costs related to the requirements and consumption of industrial plants and include both active and passive applications to them. In addition, opportunities are presented to conduct comprehensive and analytical measurements on the energy needs of these plants and on the design of specific energy saving systems and solutions.

5. Transportation

There are several opportunities for green entrepreneurship in this area, which can for example provide advice and technical services on economic and eco-driving, mobility management and the development of alternative fuel market. In addition, green entrepreneurship can exploit the funding of European programs but also provide advisory and technical services to actions to improve the management and energy-environmental performance of transport both at the level of measures and policy and at the level of implementation of new technologies.

6. Energy policy and planning

As green entrepreneurship builds up the necessary know-how and management expertise in the field of new energy technologies, it can aim to promote actions related to the design, analysis and information on energy production and consumption to all stakeholders. In particular, green entrepreneurship can develop studies and analyzes of energy data, develop energy models, design and carry out specialized information campaigns and relevant education and training programs, ultimately contributing to effective investor information and decision making in the policy formulation and programming investments in RES & Energy Saving.

7. Energy production

Green entrepreneurship can offer businesses and investors wishing to develop renewable energy projects integrated services in terms of both the assessment of the potential of different technologies and the development of a complete technical and economic study on the development of a power station. For this purpose, field measurements of the area's potential characteristics as well as analyzes with computational tools will be carried out for the optimal siting and development of such a project. At the same time, combinational systems of different technologies and specific applications will be considered.

CHAPTER 7 - Green economy and employment at the Municipalities of the study area ("Serres" & "Nestos") opportunities and prospects

7.1. Envision for the development of Municipality of Serres

The Municipality of Serres is an area that has long been plagued by the economic and social crisis. The Business Plan of the Municipality of Serres is being drafted at a time when everything that has been assumed to date in the economy, in society and in the environment has been tested. Within this framework, the great challenge for our municipality is to manage the conditions that this multifaceted crisis is shaping and to develop a realistic strategy for the future of the Municipality, focusing on man and his needs. The transition period towards green growth will be marked by the development priorities of the Municipal Authority. But this developmental vision must:

- to assess the specific characteristics of the Municipality of local needs and priorities as well as the general trends and directions in the regional, national and wider environment,
- to exploit the opportunities and opportunities presented in order to achieve the region's future aspirations,
- to make effective use of local development potential (advantages and strong points of the Municipality, staffing potential, structures and property of the Municipality)

The vision of the Municipality of Serres, for the period 2015-2019, based on the European, national and local development priorities, the aims and commitments of the Municipality, concerns:

> "The creation of a strong, dynamic and modern Local Authority, which will be citizen friendly. A municipality which has: a human face, a distinct character, that pursues social prosperity, lasting economic growth and a high index of well-being".

Specifically, the vision of the Municipality of Serres focuses on:

- to improve the quality of life of the citizen, in order to solve the most immediate problems of his everyday life,
- the consolidation of social solidarity and cohesion, and the increase of employment of the population,
- in the implementation of the further consolidation of the Municipality of Serres with a view to its financial self-reliance,
- the stimulation of the local economy and the consolidation and constant expansion of the economic competitiveness of the region,

- the emergence of the comparative advantages of the region and in particular the support of the primary sector (agro-livestock sector) for the balanced development between the urban fabric and the municipal - local communities

The area of the Municipality of Serres has the prospects and the dynamics for the recovery and sustainable support of the endogenous and outward-looking development, but the basic condition is the thorough design and rational management and implementation of combined interventions in all productive sectors and the services that are always adapted to local needs and capabilities.

7.2. The planned development strategy of the Municipality of "Serres" – General objectives of its program

The strategy of a municipality is a coherent set of general objectives and action policies designed to fulfill the mission and to achieve the vision of the Municipality. The above-mentioned development vision of the Municipality of Serres is not an indefinite component of some general goals, but reflects a specific development strategy, perfectly adapted and compatible with the specialized physiognomy as well as with the particular needs of the new Municipality.

The difficult economic climate that has prevailed over recent years in Greece has created rising needs at every level of everyday life. The primary objective of the Municipality is to ensure social cohesion by strengthening and organizing its services for this purpose. The Municipality has to improve the daily life of the citizen, increasing its efficiency, both in administrative procedures and in actions that are related to its competencies and concern the society, the environment and the quality of life.

Criteria for the above development strategy of the Municipality of Serres are the following Strategic Objectives:

1. Enhancing the competitiveness of the local economy
2. Strengthening sustainable spatial planning and the protection of the natural environment
3. Upgrading and diversifying tourism and linking it to culture
4. Strengthening social cohesion by improving the infrastructures and services of lifelong learning, social welfare, health and sports
5. Satisfaction of the needs of the recipients of the services of the Municipality
6. Upgrading the administrative capacity of the Municipality
7. Improvement of the financial situation of the Municipality as an organization

The development priorities are expressed in the in force Operational Program in the form of axes. These axes concern:

- the protection of the environment and improvement of the quality of life,
- strengthening social care and health, education, culture and sport,
- securing economic growth and employment,
- to develop the Municipality and its legal entities as organizations and to improve their relations with citizens, other public and other local actors

Within the framework of the national and European development policies and directions and with the ultimate objective of realizing the vision of the Municipality of Serres, the Strategic Plan and, consequently, the Operational Program of the Municipality of 2015-2019 is formed, which includes the following axes:

Axis 1. "Environment and quality of life"
Axis 2. "Social policy, health, education, culture and sports"
Axis 3. "Local economy and employment"
Axis 4. "Improving the administrative capacity of the Municipality"

The above axes are specialized in Measures, which define integrated interventions, so that, with the identification of individual objectives, the priorities and the necessary projects and actions are identified. The Measures that respond to the stimulation of new forms of "greener" entrepreneurship, and the consequence types of jobs within the task of modern and adequate management of the biodegradable wastes are presented to the following table:

Table 5: Measures from the local operational plan that can stimulate "green" entrepreneurship and jobs on bio-waste management sector.

OBJECTIVES PER MEASURE AND AXIS	
Axis 1. "Environment and quality of life"	
Measure 1.1	**Natural environment**
1.1.2	Upgrading and utilization of urban green areas
1.1.6	Raising awareness of the population to protect the environment
Measure 1.2	**Urban Planning / Residential Environment**
1.2.2	Implementation of urban regeneration projects in the whole city and settlements
Measure 1.4	**Network Infrastructures / Environmental Infrastructures**
1.4.5	Promoting recycling - creating green recycling spots
1.4.6	Reduction of bio-waste disposal quantities
1.4.7	Promoting Renewable Energy Sources

1.4.8	Raising awareness on subject of Energy Savings & Renewable Energy
Axis 2. "Social policy, health, education, culture and sports"	
Measure 2.3	**Education – Training - Lifelong Learning**
2.3.2	Education, training and lifelong learning programs
2.3.3	Creating partnerships to upgrade vocational training
Axis 3. "Local economy and employment"	
Measure 3.1	**Employment - Development of Human Resources**
3.1.2	Support for the creation of Social Cooperative Enterprises
3.1.5	Participation in Local Action Plans for Employment
Measure 3.2	**Entrepreneurship and Economy**
3.2.1	Strengthening the cooperation of the Municipality of Serres with the entrepreneurship support organizations
3.2.3	Exploiting new technologies to improve the business environment
3.2.5	Development of agricultural and livestock sector
3.2.6	Stimulating local economy
Axis 4. "Improving the administrative capacity of the Municipality"	
Measure 4.1	**Administrative activities and procedures**
4.1.1	Increase citizen participation in decision making
Measure 4.3	**Human Resources and Logistics**
4.3.1	Strengthening staff training and training
4.3.2	Promote exchange of know-how with other municipalities
4.3.3	Employee reinforcement with new recruits
Measure 4.	**Economic Management and Municipal Property**
4.5.1	Rationalizing the cost of running the Municipality
4.5.3	Further exploitation of municipal property

The successful implementation of the above mentioned action measures of the in force operational program for the period 2015 – 2019 will generate a range of benefits from the transition of the existing local economy to a more “greener” economy, with an emphasis on cost-effective economic models and choices based on sustainable production and consumption patterns. These benefits for the local socio-economic pattern could be:

A. Financial

1. Increased and more even distribution of GDP - production of conventional products and services
2. Increased creation of ecosystems or avoidance of their reduction

3. Economic diversification through improved financial risk management
4. Innovation, access and adoption of green technologies
5. Improved market climate

B. Environmental

1. Increased productivity and efficiency in the use of natural resources
2. Exploitation of natural resources with ecological limits
3. Increase of other forms of capital through the use of non-renewable natural wealth
4. Reduce adverse environmental impacts and improve risk management

C. Social

1. Improving quality of life, income and sustainability, especially of the lower economic strata
2. Decent jobs with immediate and sustainable benefits especially for the lower economic strata.
3. Increased social, human and cognitive capital
4. Reduce inequalities

7.3. Envision for the development of Municipality of "Nestos"

The Municipality of Nestos, as programmed by its municipal authority, aims to create structures, conditions and develop actions to make it a dynamically developing Local Authority with high-quality services provided at all levels. Its vision is, therefore, to

> ''Become a pioneering City with a modern organization, with active citizen participation, which will be a center of development through the exploitation of its comparative advantages, namely the primary sector, tourism and culture. At the same time, the aim is to create those conditions in order for the Municipality to gain extroversion, to strengthen its social face and at the same time to promote volunteering."

The general guiding principles for action policies adopted by the municipal administration are as follows:

- **Economy - mobilizing resources:**
  - Exploiting development opportunities
  - Utilizing financial tools and participating in European programs
  - Addressing unemployment and promoting entrepreneurship
  - Development of Social Economy and Innovation Actions
  - Use of movable and immovable property of the Municipality
  - Strengthening support and modernization of Rural and Animal Production
- **Local Society and Anthropocentric Development:**

- Immediate response to citizens' requests
- Social justice and solidarity
- Equal service to citizens and promotion of two-way communication between the municipality and the citizens
- Supporting social protection and care structures
- Upgrading of infrastructures and programs - actions of Education, Lifelong Learning in Sport, Culture and Health
- Promotion of Volunteering and Social Offering

Environment

- Integrated interventions with respect to the environment
- Exploiting natural beauty and highlighting environmental policies
- Improve the level of cleanliness
- Improvement of transport infrastructure, traffic conditions, parking and road safety
- Improving and expanding infrastructure networks
- Energy saving and RES utilization

Developing extrovert action:

- Developing partnerships with other local authorities and bodies
- Development of actions with stakeholders, chambers, as well as activation of international collaborations, etc.
- Balanced development of municipal and local communities

Administrative improvement of the Municipality as an organization

- Internal organizational changes and reforms aimed at the efficient and effective functioning of the overall administrative action of the Municipality and its Legal Persons.
- Improve financial management
- Transparency and sound management

7.4. The planned development strategy of the Municipality of "Nestos" – General objectives of its program

The axes of the municipal Strategic Plan are as follows:

AXIS 1: Environment & Quality of Life

1. Protection, utilization and promotion of the urban, suburban and non-urban natural environment
2. Sustainable water management and use
3. Upgrading and expansion of urban and suburban green areas
4. Environmental awareness of residents, with emphasis on students

5. Protection and management of stray animals
6. Promotion of spatial planning issues and extensions
7. Highlighting the buildings and architectural patterns of the area
8. Restoration and demolition of degraded local municipal departments
9. Management, expropriations of public utilities and infrastructure creation
10. Improvement, maintenance and construction of sidewalks - walkways, cemeteries, municipal buildings and other municipal facilities
11. Reconstruction of the residential environment of the settlements
12. Maintenance, upgrading, expansion of infrastructures, networks and water services
13. Maintenance, upgrading, extension of infrastructure, networks and irrigation services
14. Maintenance, Upgrading, Expansion of Infrastructure, Sewer Networks and Services and Waste Water Treatment Plant
15. Improved accessibility and accessibility, including traffic regulation actions
16. Promoting actions to improve public transport by using public or municipal public transport, as well as utilizing bicycles as a means of transport and entertainment
17. Development / upgrading of ICT infrastructures
18. Energy upgrading of municipal buildings and municipal lighting
19. Promoting actions to exploit geothermal fields and renewable energy in general
20. Modern and comprehensive management and utilization of waste, solid and liquid waste and restoration of uncontrolled landfills
21. Strengthening the municipal fleet of wastes management vehicles, machinery and equipment, and implementing a fleet monitoring and management system
22. Strengthening the program for the collection and management of recyclable materials, including the application of home composting methods
23. Information - raising public awareness on cleanliness and recycling
24. Development of flood and fire protection infrastructure
25. Protection of residents from radiation
26. Developing Disaster Response Action Plans

Axis 2: Social policy, health, education, culture and sport.

1. Maintenance - construction of educational infrastructure, as well as renovation and upgrading of school yards
2. Strengthen existing and create new creative employment infrastructures
3. Implementation of continuous learning programs
4. Use of multimedia technology in education
5. Design and implement student support policies, programs and actions

6. Strengthening initiatives, actions and programs aimed at improving the quality of life of young people and actively participating in local development issues
7. Transportation of students
8. Maintenance and upgrading of existing ones and creation of new social care, care and integration programs and structures
9. Improvement of health services
10. Record of the epidemiological and anosological identity of the Municipality
11. Implementation of a health education, prevention and information program
12. Enhancing the creative and cultural expression of residents and cultural associations
13. Utilizing existing and creating new cultural infrastructures
14. Organizing cultural events of local, national and international significance
15. Promoting the cultural identity of the Municipality
16. Support to volunteer groups and developing volunteering activities
17. Establishment, maintenance and upgrade sports infrastructure
18. Supporting and encouraging amateur and mass sports

Axis 3: Local Economy and Employment.

1. Exploiting comparative advantages and municipal infrastructure for the economic development of the region
2. Reorganization improvement and promotion of the tourist product, as well as promotion of the critical natural, cultural and other resources of the Municipality of Nestos
3. Formation of development plans (action plans) for the economic development of the Municipality, in cooperation with neighboring Municipalities
4. Empowering primary production and promoting organic farming and animal husbandry
5. Promote actions to create entrepreneurship infrastructure and organize secondary production
6. Enhance co-operation between Local Production System stakeholders and formulate - apply a local commercial label for primary production products and tourism services
7. Utilizing the academic and research potential of the wider municipality to develop and use innovations across the range of municipal functions, stakeholders and citizens
8. Collaborate with development agencies to inform and support local businesses and potential entrepreneurs
9. Exploitation programs to boost employment and combat unemployment
10. Utilization of human resources training programs

11. Working with development agencies to inform and support the unemployed
12. Utilization of Geothermal and Geothermal Energy Applications
13. Utilization of Solar Energy and Photovoltaic Applications
14. Exploitation of Hydroelectric Applications and Water Resources
15. Environmental awareness and protection of public hygiene

Axis 4: Improving the administrative capacity and financial standing of the Municipality.

1. Improving administrative capacity, efficiency and effectiveness and co-operation between municipal services and legal entities
2. Reorganization and improvement of the operation of the Legal Persons of the Municipality
3. Serving Citizens Using Information and Communication Technologies – e-Government & Communication Services
4. Creating a safe, healthy and functional work environment
5. Development of the Human Resources of the Municipality and its Legal Persons – Training
6. Improvement, maintenance and addition of mechanical, mechanical and other equipment and applications
7. Improvement, of the municipal financial management
8. Utilization of municipal property
9. Strengthen local, inter-municipal and regional partnerships
10. Strengthening cross-border and transnational cooperation

7.5. Local characteristics of the activities in the area favoring the green economy

Primary Sector

The activities of the primary sector and especially agriculture and livestock farming are the basis of the region's economy. As this includes a variety of sub-areas with particular geographic, bioclimatic and ecological characteristics, the above sectors exhibit strong variations and an equally rich variety in categories, types of production and ways of exploitation. The production composition varies according to the altitude, delivery and production means of each sub-region. In general, as far as agriculture is concerned, the arable crops (rice, cotton, corn, wheat, barley, etc.), horticulture and horticultural crops (olives and fruit trees) are the main sectors. Restructuring in the production sectors and changes in the map of agriculture were expected after the CAP reform. Significant areas of 'traditional' crops were abandoned (cotton, tobacco, sugar beet) and farmers turned to

high-yield crops that bring high profit. As is the case in the rest of the country, the big problem facing agriculture in the region is the small farm clerk or even the small size of farms, which leads to rising production costs, the inability to create economies of scale and ultimately uncompetitive crops.

Livestock farming is mainly based on cattle and sheep / goat farming and secondly on poultry and pig farming. The increase in livestock in the region, the high share of livestock production in per capita gross product of the primary sector in the region and the high percentage of mixed and pure livestock farms in the region are elements that characterize livestock production in the region and highlight its particular importance.

Both sections (agriculture & livestock breading) display an over mechanization character meaning that the farmers own more farming machinery than their farm requires. Advanced cultivation techniques are utilized to the fertile and well irrigated plains especially in crops like rice & corn.

The marketing of agricultural products in the region is mainly done through private traders. There are problems in the distribution of products due to the low bargaining power of individual producers (there are many producers in the region who are not generally aware of market conditions), the lack of well-informed traders, the lack of competition between them and the small involvement of cooperatives in marketing.

Forestry exploitation of the forests within the municipal area is done mainly for the production of firewood and secondarily for technical timber. The forests of the area are more valuable as an aesthetic asset for tourism development especially those of the area “Lailias” and “Lekani”

The primary sector displays a continuous shrinking over the last decades in what conserns the employment. The reduction of employment in the primary sector is considered to be normal, since the conditions for employment of the city's population in the other sectors have been created, with the result that the inhabitants of the city work with them by taking advantage of the possibility of proximity to the place of residence and work. Primary production in the Serres city area includes mainly fruits and vegetables.

Secondary sector

Processing in the area is limited to a few branches; it is family-run with small units, with an average employment of 1 to 2.5 people per enterprise and mainly covers basic needs of residents and summer tourists.

Few are the productive enterprises, of which only one, the Sugar Industry, has emerged from a State initiative and, like other processing agricultural and livestock products operate seasonally and have no direct dependence on consumers.

To the area there are some companies that are remarkable, but they employ a small number of workers in total and these companies are:

- "DROMEAS" company, which manufactures office furniture's, movable partitions and die-cast fittings on behalf of Mercedes Benz. It has more than 100 employees at the factory of the Industrial Area of Serres (where its headquarters are). It has been listed on the Athens Stock Exchange (ASE) parallel market
- "KRI-KRI SA" which began with ice cream production, and continues to produce, yogurts and pasteurized milk. It employs more than 200 employees at its factory on the outskirts of the city of Serres (where its headquarters). It has been listed on the ASE parallel market
- "FIBRAN SA", a company that produces insulating materials. It employs more than 100 employees at the plant in "Terpni" (Nigrita) of Serres, while its headquarters is not in Serres Prefecture. It has been listed on the ASE parallel market
- "ELVIPO SA", a company which produces copper knobs, at its factory and employs more than 50 employees
- "ACA SA", a company which produces industrial luminaires, and employs more than 30 employees at its factory in the Industrial Area of Serres
- "SERGAL SA", a company which produces dairy products and employs more than 30 employees
- "ROUPEL SA", a company which operates a slaughterhouse in the area of "Sidirokastro" and carries out process of meat products and employs more than 50 employees
- "FAETHON SA, a company which processes meat and employs more than 40 employees in the area of "Sidirokastro"
- There are three fish processing and freezing units at "Keramoti"
- There are 2 SME for processing flower and bran which are located in the district of "Chrysoupoli"

In addition to the aforementioned processing enterprises, another category of seasonal enterprises absorbs employment in the Prefecture of Serres. These companies also have stable staff in their administration, management and technical support and are mainly active in the food and clothing sectors (processing of industrial tomatoes, processing of rice, processing of sugar beet, cotton ginning, grinding of grain, processing of eel, wineries & spirits production, fabrics production).

In the construction sector, in the wider area of the Municipality of Serres, there are a number of companies whose activities cover all the building materials (ceramics, marbles, aggregates, ready-mixed concrete, asphalt etc.)

Tertiary sector

The trade business in the area is characterized by the domination of small & very small enterprises in abundant numbers. Tourism activity is concentrated to the areas of winter sports at “Lailias” mountain, eco-tourism & agro-tourism to the settlements surrounding lake “Kerkini”, to the visit able cage of “Alistrati”, to the Delta of river Nestos, and finally spa tourism at thermal springs of “Sidirokastro & “Agistro”. The main feature of these businesses is their small size, indicating family size, with an average work per business of 1up to 3 people, the main activities being in the sector of restaurants and related businesses, food trade, and other consumer goods. The sum of the local productive activity is flanked by the Cooperative Bank of Serres (with more than 25 employees).

At the Municipality of Nestos there are 12 classical hotels of small type mainly from four stars to one star, and in furnished rooms - studios and furnished houses. In the river Nestos Delta area there are two Visitor Reception and Information Centers, which have as their main concern the proper management and service of the tourist visitors. They facilitate their access and sightseeing in the area but also help them to fully "get acquainted" with the river in order to have the opportunity to enjoy in depth the unique natural beauty that nature has generously given to this place. The goal is to leave visitors full of images and experiences while ensuring the good condition of the riverine forest.

7.6. Local characteristics of the entrepreneurship culture

In the wider region, offspring of refugees from different regions, as well as other homogeneous groups, are preserved, maintaining their social cohesion and cultural distinctiveness. As a result of cultural diversity, other population groups, such as locals, Romans and economic migrants, are easily integrated. Besides, the Serres region has always been a cultural crossroads with the character of the integration of different cultural populations and this tradition continues. The distinctiveness of cultures is maintained and forms a conservative climate from which a resistance to change arises. This is confirmed by the lower percentage of divorces and the low crime rate of permanent residents.

The conservative attitude also leads to low entrepreneurship, very low innovation performance and an attempt to preserve incumbent activities and leads to a mockery of economic activity. The same social composition also shapes the way entrepreneurship is being pursued, which is oriented towards individual entrepreneurial action, much more intensely than the rest of the country. There is very little succession in local businesses and little collective entrepreneurial action. At the same time, as a result of a long past characterized by high agricultural and commercial incomes, money has accumulated,

much of which has been invested in real estate. The social phenomenon that results is the preference of jobs in the public sector, especially the more affluent.

7.5 Possibilities of green employment and development of green skills in the study area ("Serres" & "Nestos")

In the region there are a number of local agricultural products that have in the past been given a special place in the rural economy of the region and their name and quality became more widely known. Typical local products that could be promoted are:

- Production of Industrial plants & further exploitation of the crops residues
- Nuts production & further exploitation of the crops residues
- Energy crops
- Olive groves for production edible olives and olive oil
- Vegetables from the immediate southern plains of the area
- Local dairy production
- Local meat products (water buffaloes, ships, goats)

Bioclimatic conditions in the region also favor the introduction and exploitation of a range of new production sectors such as organic crops and aromatic plants that can avoid competition. The rational exploitation of forests offers opportunities to supplement the income of the inhabitants both with forest production and with the development of forest tourism and recreation services. At the same time, there is a strong need to link the primary sector with processing in the region, both for the ability to actively engage in the creation of new jobs and to increase the added value of the remarkable local agricultural products.

Finally, the prospects for the development and reinforcement of small-scale craft establishments in various sectors, related to the production of "characteristic" products (local and traditional products) and organic products - generally high added value products - are auspicious, as a growing demand. The main objective should be to seek new forms of investment with an emphasis on exploiting local natural resources (agriculture, livestock farming) and green entrepreneurship.

It is also worth noting that in the case of renewable energy sources, the wider region of the "Serres" municipality does not have a satisfactory level of exploitation of the rich geothermal fields. Also limited is the use of solar energy systems for own consumption by units in the area, while the use of biomass for the production of energy to substitute energy consumption already brings considerable know-how to the rest of the plain of Thessaloniki and makes the first steps of enlargement in use.

7.6 Suggestions for development of the "Social Economy" in relation to bio wastes management for the wider study area ('Serres" & "Nestos")

Based on the in-depth SWOT analysis the vision of the development of the social economy in the region focuses on creating an attractive area for living and working there, characterized by extroversion, innovation, competitive entrepreneurship, spirit of cooperation and social cohesion.

The field of social economy is first and foremost bound between state policy and private investment for economic activity. It is developed to meet those needs of society for which the private sector is not available due to the lack of high profit margin and the state sector cannot contribute due to the absence of financial and financial instruments. The term of the social economy is attributed to a number of alternative concepts such as the third sector, the non-profit sector, the solidarity economy, the alternative economy and the non-profit economy. Both when using the term social economy as when using alternative terms does not automatically mean a single meaning. The content of the social economy and its demarcation differs between the writers who deal with it both between Europe and the United States and between different countries. The variety of concepts is due, in addition, to the different scientific fields from which the writers who attempt to define the content of the term social economy come from. For example, the political dimension of the term is interpreted as "the social economy brings people together to work together freely and voluntarily for a common purpose". When the emphasis is on the economic dimension, then the social economy is defined as "economic activities carried out by enterprises, primarily collaborative, with mutual members and ethical values based on the following main principles:

(a) to provide services to their members or the community without aiming at profitability,
(b) be governed autonomously,
(c) have democratic governance procedures; and
(d) emphasis is placed on man over labor and capital "

The national legislation relating to the social economy and social entrepreneurship updated by Law no. 4430/2016 from which a new social enterprise form arises, the so-called Social Cooperative Enterprise (S. C. E.). In particular, this type of social enterprise can take the form of a civil partnership with a social mission and a commercial property. The members of a S.C.E. may be either natural persons or natural persons and legal persons. Some useful elements of Law no. 4430/2016 for the understanding of social enterprises are:

(a) the registration of established social enterprises in the Register of Social Entrepreneurship,

(b) the civil and cooperative nature of social enterprises governed by civil law and the signing of the statutes by seven persons, as required by urban cooperatives,
(c) the composition of the members may be at least 2/3 by natural persons and the remaining one third consists of legal persons,
(d) the participation of natural persons is not linked to insurance and tax obligations,
(e) the distribution of profits to members is considered a prohibited activity only if they are at the same time 37% of the company's employees, the remaining 5% is retained as a reserve and the remaining amount is shared as a motive to increase employee productivity,
(f) the funds resources of the social enterprise may be from the business activities of the enterprise, from third party donations and contributions from public organizations

Taking into consideration the basic legal frame for the operation of a social cooperative enterprise and all the highlighted elements spotted by the SWOT analysis of the local socio-economic prevailing conditions to the wider area of the municipality of “Serres”, we can make the following suggestions on promising sections of the local economic activity, on whom an array of potent entrepreneurs group could take initiatives for actions concerning bio-wastes management and utilization:

7.6.1. Creation of new or improvement and expansion of already existing, of small scale technical infrastructure for the management of organic Municipal Solid Wastes in the area

The need to improve the quality of life in the so-called "satellite" urban centers of the area has been explicitly found in the SWOT analysis for the intervention area. With regard to the findings of new needs for adaptation to the new Peripheral Plan for Solid Wastes management, the creation of new infrastructure to serve urban settlements with the form of setting up of Green Points for wastes pre-sorted collection of all types, which will start efficient sorting of waste and the creation of multiple streams of recyclable materials, the fertile ground for the creation of social enterprises that will collaborate with the municipality in order to cover those needs is present.

7.6.2. Collaborative actions among social enterprises and local authorities with the aim of crating and operating of Centers for training on recycling & presorting wastes.

A number of localized social enterprises could be activated to the field of the management of specific waste streams (e.g. organic composting, clothing recycling, furniture re-use, etc.) The expected result will be the creation of flexible structures to

serve the objectives set in the management of municipal solids wastes, while creating local business cells in the cyclical economy, which will at the same time have an undeniable social character. Active support and cooperation is required from the municipality of "Serres", which should summarize the following:

⇒ Secure the relevant planning provisions of the actions to the in force Municipal Plan for Wastes Management.

⇒ Provide active technical support by the municipal administration services to the social enterprises in order to obtain all the relevant permits.

⇒ Providing an appropriate economic environment for the operation of the social enterprises in the light of the relative savings achieved by the Municipality from avoiding its own costs of collecting and disposing of the waste to be managed by these bodies.

7.6.3. Social cooperative enterprises that will undertake the task of establish and operate small composting units for agro –wastes and pre-sorted urban bio-waste

One of the self-evident methods of managing the organic fraction of MSWs (urban & agricultural) is composting, which is obviously a management method that has advantages both technically and economically in the case of combined flow management (agricultural residues, green urban waste & pre-sorted organic urban waste). The solution to the combination of organic waste streams originating from both urban fabric and agricultural production in composting units requires the activation of both the public sector (in our case the municipalities) and the private (in our case the Social enterprises) for the creation of composting units that will:

⇒ Significantly decrease quantities of organic waste from burial

⇒ Produce appropriate soil improvers as a raw material for input into agriculture

In the case of the study area the potential case of creating co-treatment plants for the two organic waste sources is an innovative method of management since the broad view of the use of composting in the country has a small presence and absorbs a minimal amount of annual organic waste generated. The aim of the proposed composting units is to produce a product rich in humus that meets the requirements for various uses such as soil improvers, crop substrates, enrichment of problematic agricultural soils with organic matter, upgrading of leached - poor forest lands for rehabilitation, etc.

However, for an initiative to implement investments in the composting of agricultural residues and pre-packaged organic municipal solid wastes, a close and loyal co-operation between the investor (e.g. a social enterprise) and the Local Authorities that implements

the pre-sortied wastes collection method is required. This cooperation must be efficient in the following areas:

- Support/facilitation of the prospective investors by the Local Authorities in the procedures for issuing the necessary permits, for the construction and operation of the harvesting units
- Payment per ton of receiving of organic solid wastes at the level of the current landfill fee requested. The resulting revenue for the composting plant will be an incentive to absorb continuously larger quantities of pre-selected organic solid wastes, to strengthen the unit's economic viability and to optimize the wastes deflect objectives from burial and hence achieve the quantitative targets of the national plan. The municipality will have the direct financial benefit of avoiding the cost of transporting the solid wastes from the city to the landfill.
- Ensure collection of by-products from the processing of the organic solid wastes at the composting site (unsuitable materials - impurities from the pre-processing and refining process) and the cost of their further rational and legal management.
- Implementation of an information program for the local population, about the correct ways of separately sorting the organic fraction of the generated waste. These programs should include cooperation with the harvesting units for day-to-day school visits and information on the whole production process, with emphasis on the required indicator of civic responsibility and contribution in relation to environmental and economic benefits.