This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691874

SEEMLA

Sustainable exploitation of biomass for bioenergy

from marginal lands in Europe

SEEMLA Project Grant Agreement no. 691874

Report on Identification of specific exploitation practices

22 December, 2016

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I. About the SEEMLA project

The aim of the Horizon 2020-funded "Sustainable exploitation of biomass for bioenergy from marginal lands in Europe" (SEEMLA) project is the reliable and sustainable exploitation of biomass from marginal lands (MagL), which are used neither for food nor feed production and are not posing an environmental thread.

The initial challenge of the project is to define MagL in order to achieve high yields on the MagL the goal is to develop and optimize cropping systems for special sites. The project focuses both on existing plantations of energy crops on MagL and on the establishment of new plantations on MagLs. General guidelines and manuals shall attract and help relevant stakeholders as well as piloting shall prove the feasibility of SEEMLA results.The first scenario will enable the assessment of good practice and the refinement of current practices, making them more sustainable (environ-mental, economic, social). The second approach will transfer good practices to underused MagL.

The project will focus on three main objectives: (i) the promotion of re-conversion of MagLs for the production of bioenergy through the direct involvement of farmers and forester, (ii) the strengthen-ing of local small scale supply chains, and (iii) the promotion of plantations of bioenergy plants on MagLs.

The expected impacts are: Increasing the production of bioenergy, famers' incomes, investments in new technologies and the design of new policy measures.

The main target groups are regional authorities and public or private owners of MagLs, who can provide knowledge on land availability and are responsible for managing these. Furthermore foresters, farmers and the civil society affected by transformation of MagL into energy crop plantations are important cooperation partners for the project's success.

The project team is balanced between scientific and technical partners as well as national and re-gional organisations. FNR from Germany will coordinate the project with itsand will be supported by eight partners from Ukraine, Greece, Italy and Germany. By including partners from South-East, Eastern and Central Europe, the knowledge transfer between regions of different climatic and po-litical backgrounds can be established. FNR will coordinate the project with its eight partners from Ukraine, Greece, Italy and others from Germany.

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Project coordinator

Agency for Renewable Resources Fachagentur Nachwachsende Rohstoffe e.V.	FNR	Germany

Project partners

Salix Energy Ltd.	SALIX	Ukraine
Institute for Bioenergy Crops & Sugar Beet of the National Academy of Agricultural Science	IBC&SB	Ukraine
Legambiente	LEGABT	Italy
Democritus University of Thrace	DUTH	Greece
Decentralized Administration of Macedonia and Thrace	DAMT	Greece
Brandenburg Technical University Cottbus-Senftenberg	BTU CS	Germany
Institut für Energie- und Umweltforschung Heidelberg GmbH	IFEU	Germany

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II. About this document

This report corresponds to D 5.3 Report on Identification of specific exploitation practices. It has been prepared by:

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Lead contractor for this deliverable	Decentralized Administration of Macedonia and Thrace - D.A.M.T
Editor(s)	Kiourtsis Fotios -Dimitrios Keramitzis (D.A.M.T)
Author	Kiourtsis Fotios -Dimitrios Keramitzis (D.A.M.T)
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Version	Date	Author(s)	Reason for modification	Status
1.1	2016-11-24	Kiourtsis Fotios -Dimitrios Keramitzis (D.A.M.T)	Request for input from partners	finalised
1.2	2016-12-08	Reviewer: *Dr. Werner Gerwin / Dr. Frank Repmann (BTU CS); Vadym Ivanina, Oleksandr Hanzhenko (IBC&SB);* Roman Lysenko, Iryna Gnap (Salix Energy), Wibke Baumgarten (FNR) Authors: Kiourtsis Fotios -Dimitrios Keramitzis	Integration of input	finalised
1.3	2016-12-22	Kiourtsis Fotios -Dimitrios Keramitzis (D.A.M.T)	Final version	finalised

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III. Background

The deliverable "D 5.3-Report on Identification of specific exploitation practices" is mainly based on the task as described in the Grant Agreement Annex I of the Horizon 2020 project SEEMLA (GA no. 691874).

Task 5.3 Identification of specific exploitation practices (DAMT, M2 – M8)

The main objective of WP 5 is to exploit and perform experimental case studies for evaluating and optimizing biomass production tools for MagL under practical conditions.

This task will give an overview on specific exploitation practices of the selected potential SEEMLA case study sites. This is the third task of WP 5 and it is the last refinement of the plots before the establishment activities. At these selected case study sites and plots that have been chosen per country (see table 1) the most suitable practices in terms of site preparation, plantation, harvesting, and potential utilization pathways for each specific region will describe .

The identification of specific exploitation practices for MagL is based on the findings of the:

- WP 3 review on best practice for the sustainable use of MagL (task 3.3),
- the assessment tools developed by WP 4
- the information on site properties gathered in 5.2 for each case study
- the Catalogue for bioenergy crops and their suitability in the categories of MagLs(task 2.2).

The case study partners (SALIX, IBC &SB, BTU CS) supported the overall work of this task in order to collect and prepare the needed data and information for their respective cases. Also the IFEU contributed to sustainability issues.

Within this task the final assessment of the selected case study sites has been done.

Content

1. Location of sites

The locations of the selected case study sites have been already presented by task 5.1. The case study sites are located in the following regions (see Fig. 1):

- Lusatia (Germany),
- East Macedonia & Thrace (Greece) and
- Vinnitsa, Poltava, Volyn and Lviv (Ukraine).

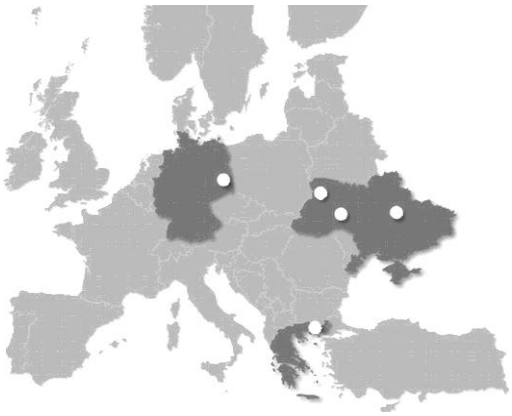

Fig. 1: Location of SEEMLA pilot areas .

Nine study cases were selected as shown in Tab. 1. This selection was done based on a literature overview before the submission of SEEMLA proposal, the definition of MagL that was introduced with the D2.1 report and the respective final SQR values of the case study sites(Report on D5.2).

All sites ,except the UA Pol 1, clearly exhibit marginal soil conditions. All soil profiles show clear different ecological limitations and constraints which impede traditional agriculture on these sites.The UA Pol 1 can be seen partly as marginal due to the limit plant growth (ecological & biological limitation). Thus, sites with a final soil fertility score between 35 and 40 can be seen as marginal particularly from an economic perspective.

Tab. 1: Overview of investigated case study sites

Country	SEEMLA Partner	Region	Local Name (village/town)	Name of the site
Germany	BTU	Brandenburg	Welzow	BTU 1 2
Germany	BTU	Brandenburg	Welzow	Cottbus BTU 2 2
Greece	DAMT	Thrace	Pelagia	DAMT 1 1
Greece	DAMT	Thrace	Drosia	DAMT 2 2

Greece	DAMT	Thrace	Sarakini	DAMT 3 1
Ukraine	IBC&SB	Poltava	Semeniwka	IBC&SB 1 2
Ukraine	IBC&SB	Vinnitsa	Yaltushkiv	IBC&SB 2 2
Ukraine	SALIX	Volyn	Zubylne/ Kysylyn	SALIX 1 (a-c)
Ukraine	SALIX	Lviv	Welyki Mosty	SALIX 2 (a-d)

The following terms have also been defined for use in WP5:

- **Pilot area:** whole area of the region/country with selected MagL
- **Study cases:** part of the area or the region that was selected for further analysis, it represents usually one type of MagL.
- **Plot:** small part of a study case where all actions will take place (planting, harvesting, supply chain measurements, LCA measurements). The size of the plot is related to the existing budget of each partner for these activities.

2. SEEMLA case study sites characteristics of specific exploitation practices

There are several further important qualitative characteristics of the case study sites which are required for a sustainable assessment.

It is one goal of the SEEMLA project to evaluate and to improve the biomass production on MagL for bioenergy. The project focuses on cultivated, lignocellulosic biomass.

Also SEEMLA project investigates various crops suitable for the cultivation on marginal lands under various growing conditions. Thus, several biomass use options are involved. It is clear from all the above mentions the SEEMLA system is a multi system.

The most important characteristics of the case study sites are summarized below:

Tab2: Qualitative characteristics of the case study sites

Characteristics	Description
Policy	Renewable Energy Directive (RED), National Policy
Sustainability	Directive 2009/28/EC
MagL approach	SEEMLA approach
S.Q.R values	score 20-40
Cultivation	Pre-treatment of the field, timely and quality planting of cuttings or seedlings, regular tending of plantation, including fertilization and protection against pests and diseases.
Planting material	Selection of species and varieties of trees suitable for a specific region
Harvesting	Direct cut and chip system, mow and bale system, traditional felling and skidding. 1
Transportation	Chips or logs
Warehousing and storage	wood chips, shoots, logs or pellets
Final biomass processing	treatment, burning
Final products	Biofuel, biomass products, electricity consuming
site re-preparation	basic soil tillage, seedbed preparation

Also the infertility of the sites is regarded as a clear obstacle for a profitable biomass production. Seemla definition of MagL doesn't conflict with other land use options because underused land selected for future biomass production purposes(**Tab 3**).

Tab 3 Overview on biomass production in the case study sites to be investigated [Ivanina & Hanzhenko 2016].

No	Country	Case study name	Cultivated crops	Alternative vegetation	Alternative land use
1	Germany	German Railways	Poplar, Black locust	Woody vegetation	No use
2	Germany	Welzow	Black locust	Poor grassy vegetation	No use
3	Greece	Fillyra	Black pine	Sparse grassy vege-tation	Extensive pasture
4	Greece	Ismaros	Calabrian pine	Mixed vegetation (forests, bushes, grassland)	No use
5	Greece	Kalhantas	Black locust	Sparse grassy vege-tation	Extensive pasture
6	Ukraine	Poltava	Willow, Miscanthus	Woody vegetation	Pasture and hay
7	Ukraine	Vinnitsa	Willow, Miscanthus	Woody vegetation	Waste dump
8	Ukraine	Volyn I	Willow, Poplar	Woody vegetation	No use
9	Ukraine	Volyn II	Willow, Poplar	Woody vegetation	No use
10	Ukraine	Volyn III	Willow, Poplar	Woody vegetation	No use
11	Ukraine	Lviv I	Willow	Woody vegetation	No use
12	Ukraine	Lviv II	Willow	Woody vegetation	No use
13	Ukraine	Lviv III	Willow	Woody vegetation	No use
14	Ukraine	Lviv IV	Willow	Woody vegetation	No use

3. Utilization pathways for each specific region

3.1. General

The 2030 Climate and Energy Policy Framework endorsed a binding EU target of 40 % reduction in GHG emissions by 2030 compared to those of 1990.

The new CAP reform of 2013 seeks to strengthen the competitiveness of the agricultural sector, promote innovation, combat climate change and support the development of rural areas.

Each country is following its distinctive paths in order to meet their individual obligations under the Renewable Energy Directive (RED), including their legally binding 2020 targets[1].

Each country's National Renewable Energy Action Plans (NREAP) that are submitted under Article 4 of Directive 2009/28/EC, is given and is taken as 'map' for practical implementation until 2030.

Sustainability assessment of the SEEMLA system takes into account the products' **entire value chain (life cycle) from cradle to grave** (Fig 1).

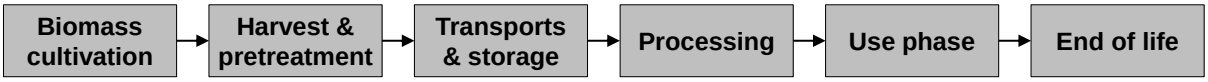

Fig. 1 System boundaries applied in the case of SEEMLA.

Marginal land according to the definition of SEEMLA includes sites which were affected by degradation processes most by anthropogenic impact. Also the economic inefficiencies with regard to agricultural usability and poor ecological site conditions,indicate the areas with reduced low soil fertility.

- ✓ To assess the **soil quality** and the relative yield expectation of selected sites the Muencheberg Soil Quality Rating system **(SQR),** was applied. The SQR is designed to quantify the soil quality by a single value– theoretically ranging from1 to 100 points. The final scores of sites are classified as follows:
  < 20 very poor
  20-40 poor
  40-60 moderate
  60-80 good
  80 very good
  Final soil fertility score between 0 and 40 can be seen as marginal while final soil fertility score between 35 and 40 can be seen as marginal particularly from an economic perspective.

Fig. 2 gives an overview of all investigated case study sites values of final scores.

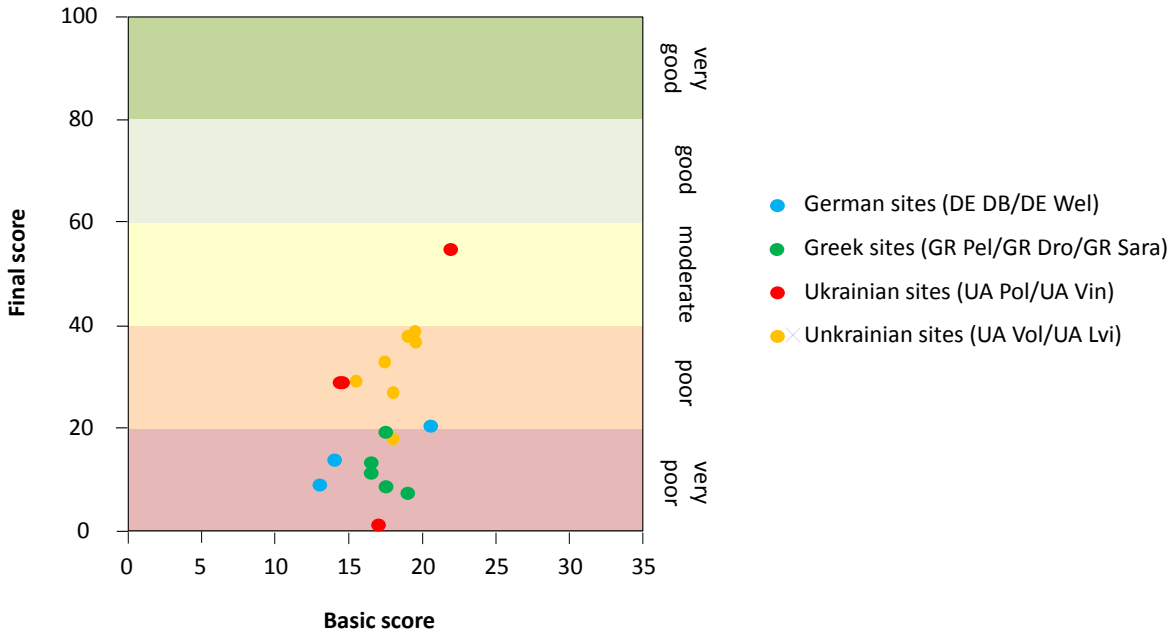

Fig. 2: Marginality/fertility of investigated case study sites: Results of SQR.

- ✓ Technology of **cultivation** is similar for most trees. The most important measures are the following: pre-treatment of the field (this involves careful basic soil tillage, seedbed preparation, selection of species and varieties of trees suitable for a specific region), timely and quality planting of cuttings (rhizomes, seedling), regular tending of plantation, including fertilization and protection against pests and diseases.
- ✓ Technology of **site re-preparation** is similar for most trees: clearing the area from forest residues, removal of underground stems, levelling the surface pre-treatment of the field (this involves careful basic soil tillage, seedbed preparation.
- ✓ Selection of **species** and varieties of trees suitable for a specific region includes woody and perennial crops that are allowed to grow in the territory of the EU and Ukraine. The high-productive woody and perennial crops can guarantee stable high yields of high-energy-capacity biomass on marginal lands of various categories of marginality(**Figure 3)**.
- ✓ Biomass of both bioenergy plants and trees can be **harvested** in two ways: direct cut and chip system; mow and bale system.Direct cut and chip system is used for harvesting biomass for both solid biofuels and biogas.

Figure 3. Catalogue of Energy Crops

- ✓ **Transport** of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use. Transport of harvest perennial grasses that have been are cut, open-air drying, baling, storage of bales at the field margin, include transport to conditioning unit for drying, pelleting, storage and delivery to destination of final use.
- ✓ The technology of fuel pellet and briquette production is based on the process of pressing crushed biomass.

The process of pellet production includes four stages:

- Shredding biomass
- Drying (moisturizing) biomass
- Granulation
- Cooling and packaging

The technology of biogas production includes five stages:

- Shredding biomass
- Drying (moisturizing) biomass
- Granulation
- Pyrolysis
- Liquid Products classification

The technology of electricity production includes four stages:

- Shredding biomass
- Drying (moisturizing) biomass
- Granulation
- Burning

3.2. Case study sites in Ukraine

The map in Fig. 4 gives an overview of the selected study cases with case study sites in Ukraine.

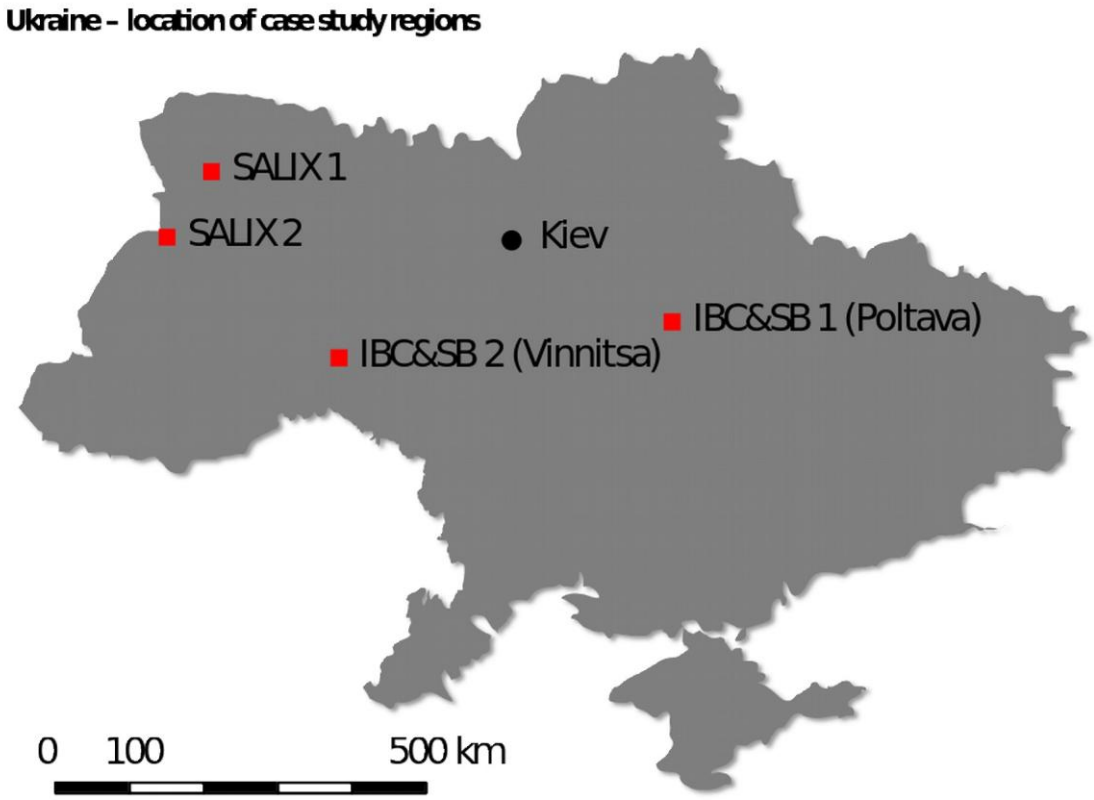

Fig. 4: Location of SEEMLA study cases in Ukraine

3.2.1 Study case IBC&SB 1 2

The study case IBC&SB 1 2 (Poltava region) represents the type of abandoned land. In this case study the site IBC&SB 1 is located in an area which was used over the past 40 years for grazing and for hay production. The pilot case site will be used for growing willow and miscanthus for energy.

3.2.2 Study case IBC&SB 2 2

The study case IBC&SB 2 2(Vinnitsa region) represents the type of low productive MagL. The pilot case site will be used for growing willow and miscanthus for energy.

3.2.3 Study case SALIX 1 (a-c)

The study case SALIX 1 (a-c) (Volyn region)" represents the type of abandoned lands which are used as pastures and hayfields. In this region three plots were selected with total land area of about 4.4 ha for growing energy willow and energy poplar.

3.2.4 Study case SALIX 2 (a-d)

The study case SALIX 2 (a-d) represents the type of abandoned former agricultural lands. In this region four pilot sites plots were selected with a total area of about 7.5 ha for growing willow for energy.

3.3. Case study sites in Greece

The map in Fig. 5 gives an overview of the selected study cases with case study sites in Greece.

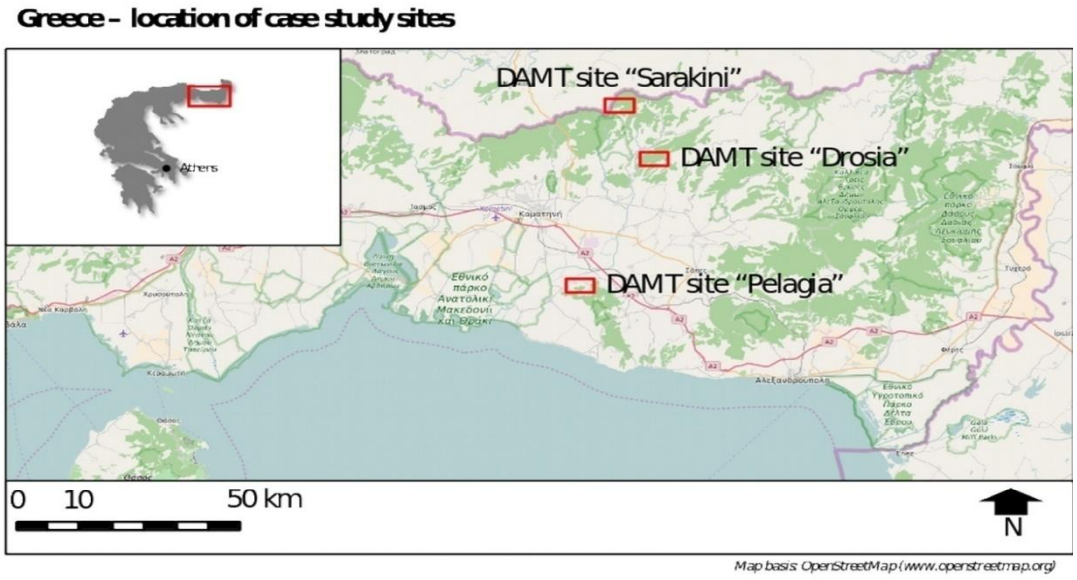

Fig. 5: Location of SEEMLA study cases in Greece

All sites will be used to establish new plantations with common forest tree species. For all case study sites nearby productive ecosystems (including forests etc.) or successional sites will be used as references for estimating the potentials of the MagL. Further existing plantations of energy crops on similar MagL will be used to assess potential crop yields.

3.3.1 Study case DAMT 1 1

The site DAMT 1 1 represents the type of abandoned land and the former land use was shrubs, bushes and grasslands. In this region one pilot site plot was selected with a total area of about 0.5 ha for growing Pine.

3.3.2 Study case DAMT 2 1

The study case DAMT 2 1 represents the type of abandoned land and the current land use is grassland and the former land use was grassland, pasture and occasional, limited cultivation. In this region one pilot site plot was selected with a total area of about 0.2 ha for growing Pine and Robinia. For biomass assessment, instead of just planting we will also proceed with woodcutting in nearby clusters of existing artificial forest plantation of *Pinus nigra.*

3.3.3 Study case DAMT 3 1

The study case DAMT 3 1 represents the type of abandoned land and the current land use is artificial plantation (Robinia pseudoacacia) and the former land use was grassland, pasture and occasional, limited cultivation. In this region one pilot site plot was selected with a total

area of about 0.1 ha for growing Robinia. For biomass assessment, we also will proceed with woodcutting of existing artificial forest plantation of black locust.

3.4 Case study sites in Germany

The map in Fig. 6 gives an overview of the selected cases study in Germany. All the study cases are located in the southeastern part of the State of Brandenburg (Lower Lusatia).

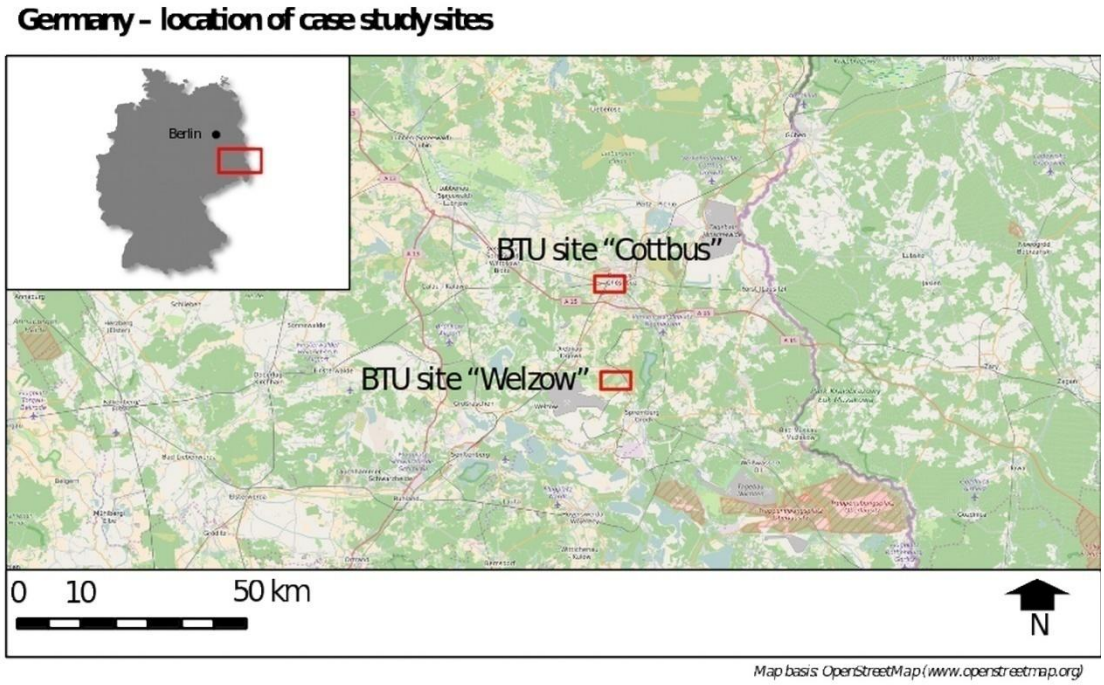

Fig. 6: SEEMLA study cases in Germany

3.4.2 **Study case** BTU 1 2
The study case BTU 1 2 represents the type of abandoned land The current and the former land use is a lignite mine. In this region one pilot site plot was selected with a total area of about 4.5 ha for growing black locust. For biomass assessment, we will also proceed with woodcutting at existing artificial plantation of black locust.

3.4.2 **Study case** Cottbus BTU 2 2
The study case Cottbus BTU 2 2 represents the type of abandoned land with anthropogenic substrates often with different types of contamination. The former land use was wagon repair and maintenance. In this region one pilot site plot was selected with a total area of about 1.0 ha for growing black locust and poplar. For biomass assessment, we will also proceed with woodcutting at existing artificial plantation of black locust and poplar.

3.5. Identification of specific exploitation practices

The Tab 5 give an overview on specific exploitation practices of the selected SEEMLA case study sites. This includes the most suitable practices in terms of site preparation, plantation, harvesting, and potential utilization pathways for each specific region.

No	Country	Case study name	Policy	S.Q.R values	Cultivation site re-preparation	Planting material	Harvesting Transportation Warehousing and storage	Final biomass processing	Final products
1	Germany	Cottbus BTU 2 2	RED , NBAP	9.1	basic soil tillage, seedbed preparation, selection of species , planting of, seedlings, regular tending, fertilization, irrigation	Poplar, Black locust	direct cut and chip system Transport into an adjacent vehicle to the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette / electricity
2	Germany	BTU 1 2	RED , NBAP	14.5-20.0	basic soil tillage, seedbed preparation, selection of species , planting of, seedlings, regular tending, fertilization.	Black locust	direct cut and chip system Transport into an adjacent vehicle to the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette / electricity
3	Greece	DAMT1 1	RED NREAP	7.6-11.6	basic soil tillage, seedbed preparation, planting of, seedlings, regular tending, fertilization, irrigation	Black pine	direct cut and chip system Transport into an adjacent vehicle to the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette
4	Greece	DAMT2 1	RED NREAP	8.8-13.2	No action	Calabrian pine	direct cut Transport into an adjacent vehicle to the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette

5	Greece	DAMT3 1	RED NREAP	19.2	No action	Black locust	direct cut Transport into an adjacent vehicle to the destination of final use.		fuel pellet and briquette
6	Ukraine	IBC&SB 1 2	RED , NREAP	55	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow, Miscanthus	direct cut and chip system; mow and bale system Transport into an adjacent vehicle to the destination of final use. Transport of grasses, open-air drying, baling, storage at the field margin, transport to conditioning unit for drying, pelleting, storage and delivery to destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette
7	Ukraine	IBC&SB 2 2	RED , NREAP	29	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow, Miscanthus	direct cut and chip system; mow and bale system Transport into an adjacent vehicle to the destination of final use. Transport of grasses, open-air drying, baling, storage at the field margin, transport to conditioning unit	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette

							for drying, pelleting, storage and delivery to destination of final use.		
8	Ukraine	SALIX 1a	RED , NREAP	37.1	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow, Poplar	direct cut and chip system; Transport of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette
9	Ukraine	SALIX 1b	RED , NREAP	39	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow, Poplar	direct cut and chip system; Transport of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette
10	Ukraine	SALIX 1c	RED , NREAP	27	Basic soil tillage, seedbed preparation,	Willow, Poplar	direct cut and chip system; Transport of	Shredding biomass Drying(moisturizing) biomass	fuel pellet and briquette

					selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.		harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.	Granulation Cooling &packaging	

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11	Ukraine	SALIX 2a	RED , NREAP	18	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow	direct cut and chip system; Transport of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette
12	Ukraine	SALIX 2b	RED , NREAP	38	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow	direct cut and chip system; Transport of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette
13	Ukraine	SALIX 2c	RED , NREAP	29.5	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings	Willow	direct cut and chip system; Transport of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette

					fertilization and protection against pests and diseases.		vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.		
14	Ukraine	SALIX 2d	RED , NREAP	33	Basic soil tillage, seedbed preparation, selection of species and varieties of trees, planting of cuttings fertilization and protection against pests and diseases.	Willow	direct cut and chip system; Transport of harvest woody crops stems that have been are cut, crushed, loaded into an adjacent vehicle and transported to the conditioning or storage unit for open-air drying or the destination of final use.	Shredding biomass Drying(moisturizing) biomass Granulation Cooling &packaging	fuel pellet and briquette

Tab 5 : Qualitative characteristics of the case study sites

Note :All plots use SEEMLA approach of MagL and Directive 2009/28/EC for sustainability assessment

4. Summary and Conclusions

- The three sites in the Komotini region of Greece, the two sites in the eastern part of Ukraine (Poltava and Vinnitsa region) and the two sites in the western part of Ukraine as well as the two sites in and around Cottbus, Germany that have been selected for the establishment of the necessary for the project plots and have been identified for specific exploitation practices.
- The identification of specific exploitation practices indicate that there SEEMLA system is a multi ysed system
- The Final selection of the pilot case sites is based on the SEEMLA approach for marginal lands with regards to the purpose of a profitable biomass production.

5. Outlook

The identification of specific exploitation practices (D5.3), have been used to identify the most suitable practices in terms of site preparation, plantation, harvesting, and potential utilization pathways for each specific region. The developement, the implementation and the monitoring of the pilot cases (D5.4), will improve the SEEMLA approach.

6. Reference

i. EU (2015). Grant agreement number 691874 – SEEMLA, European Commission, Innovation and Networks Executive Agency, 2015
ii. D2.1 Report of general understanding of MagL, , SEEMLA deliverable D2.1, 2016.
iii. D2.2 Catalogue for bioenergy crops and their suitability in the categories of MagLs, SEEMLA deliverable D2.2, 2016.
iv. D3.1 Report of overview of policy landscapes, SEEMLA deliverable D3.1, 2016.
v. D4.1: Report of environmental and Socio-economic assessment, SEEMLA deliverable D4.1, 2016
vi. D5.1 Report on site selection for case studies, SEEMLA deliverable D4.1, 2016
vii. D5.2 Report on characteristics of MagL in pilot areas, SEEMLA deliverable D5.2, 2016