ABSTRACT

The PhD thesis entitled "**Contributions to the design and implementation of marketing strategies for biodiesel, in the North-East Region**" includes an introduction, seven chapters and bibliography. The paper focused on preparing of some optimizing strategies for the biodiesel production and market in the North-East Region, given the current European legislation which stipulates the gradual replacement of conventional fuels with fuels from renewable sources.

The paper is divided into two parts.

The paper introduction presents current general status of energy from conventional sources, especially of transport fuels, with reference to the benefits of biofuels and biodiesel in particular.

Part I is entitled "**Bibliographic study regarding the current knowledge of the field**" and begins with **Chapter I**, entitled "**Current status of the research regarding the biodiesel production within the country and abroad**" through a global description of energy sources used currently, the importance and share of biodiesel within these sources. The chapter continues by the description of the context and emergence of biodiesel on large-scale, advantages of its use, research and results on the environmental impacts by its use.

In the same chapter were also presented and analyzed:

- advantages of using alternative unconvetional energies or made from renewable sources to fossil fuels, where it is presented the current situation of energy sources used and the share of biodiesel within them;
- context of the wide emergence of biodiesel, biodiesel historic appearance, the first operation of a diesel engine on vegetable oil as fuel;
- technological features of biodiesel, physical and chemical features;

- raw materials for biodiesel production, globally, European and local, their peculiarities;
- theoretical considerations regarding the necessity and importance of biodiesel production in the European Union, description of the current market and production status of biodiesel in the European Union, Romania's position in this field;
- current status regarding the legislative and economical framework on the biodiesel production in the European Union;
- biodiesel production technology, technical aspects, compared results, material input into the technological flow, the ratio of the resulted products, convenience aspects of the technological flow;

IInd part of the paper, "**Results and their interpretation**" begins with **Chapter II** entitled "**Purpose of the research, objectives and methods of research**". This chapter aims:

- characterization of agriculture in the context of EU integration;
- characterization of the investigated area and of the factors influencing the production of raw materials for biodiesel;
- characterization of the current status of energies made from agricultural crops;
- analysis of the current situation of energy crops in the investigated region;
- identification of some marketing strategies for biodiesel production in North-East Development Region.

Next is a presentation of the research methodology, respectively research using secondary sources of information consisting of literature from Romania and abroad, and also research of primary data obtained through the application of an in-depth interview on a sample consisting of seventeen farmers for raw material for biodiesel in North-East Region, also specifying the sampling process.

For the interview it was used the interview guide attached to the paper and which includes questions on the structure of the farmer, its customers, the destination of agricultural products, estimates on the evolution of energy plants etc.

Chapter III refers to "**Characterization of the investigated area and of the raw materials influencing factors for the biodiesel production**" This chapter begins with a description of the economic features of the North East Region including:

- *the number and type of companies in the North-East Region, the number of companies per 1000 inhabitants, by counties;*
- *development of regional GDP values in relation to national GDP values;*
- *population structure by county and by category urban / rural;*

The paper continues with a description of the development status of the North-East Region, presentation of the investment facilities by county, presentation of the regional infrastructure and development in this matter since Romania's EU accession. In order to highlight the strengths and opportunities, but also the weaknesses and threats, a SWOT analysis was made of the region, highlighting the most important aspects regarding economic, agriculture, population, infrastructure, environment etc.

Although the North-East Region is the largest region of the country and has a high potential of agricultural production, the productivity is low for all crops due to the negative influence of the following factors:

- soil quality, with a high diversity and alternating types of soil;
- operation on small plots of agricultural land (1-3 ha);
- low level of mechanization (a profitable farm should run on lots of at least 50 ha / tractor);
- high degree of poverty of the owners, who have great difficulty in achieving crops and livestock;
- lack of capital for restructuring and modernization of agriculture.

Next are outlined the structure of land in the North-East Region, the share of cultivated areas with different field crops, especially sunflower and rapeseed as these are the main energetic plants, by counties.

Chapter III concludes by analyzing natural conditions influencing raw materials production for biodiesel:

- relief, which is found in North-East in all its forms as 30 % mountains, 30 % subcarpatic relief and 40% plateau;
- climate is described by county, so in the west of Suceava, Neamț, Bacău we have moderate continental climate with cool summers and winters rich in precipitation as snow; as comparison, in the eastern sides of Suceava, Neamț and Bacău counties and and throughout the counties of Botoșani Iași and Vaslui climate is continental with warm summers and cold dry winters most often without snow;

- hydrographic and hydrological network, which comprises eight major water courses, which are distributed from north to south, the largest basins being Siret and Prut rivers;
- soils, land distribution affected by limiting factors at regional level, by counties;

The chapter ends by graphically highlighting on counties the chemical fertilizers and pesticides concentrations in the soil.

Chapter IV presents "**The current status of biodiesel production in Romania and the North-East Region**" and begins by describing the current situation of the biodiesel production at regional level. In 2010, there are a total of four units of biodiesel production, the most important being S.C. ULEROM S.A. Vaslui.

The chapter continues by presenting the evolution of production capacity at regional level, where it is described the current status of biodiesel. It is shown that although there is natural potential for producing raw materials for biodiesel, and processing facilities, currently the majority of biodiesel consumed at regional level is imported, which lately affected biodiesel production structures.

Also in this chapter are presented the results of the questionnaire applied to the seventeen farmers. Analysis of the study results shows that an increase of the energy crops areas is expected – 50% of respondents estimating this for rapeseed, 35% for soybean and sunflower. It is also estimated an increase for the rapeseed prices (88% of respondents).

The chapter ends with the nomination of the critical aspects surveyed by the respondents.

Chapter V is entitled "**Analysis of the biodiesel production unit S.C. ULEROM S.A. Vaslui**". It starts by an overview of the RACOVA COM AGRO PAN Vaslui holding, from which the analyzed unit is a part of, and which is working in the production of crude and refined vegetable oil. It comprises four sections of production: crude oil department, department of refining, department of bottling, department of biodiesel production from vegetable oil, focusing on a detailed description of biodiesel production department.

Chapter V continues with the economic analysis of S.C. ULEROM S.A. Vaslui company focusing on the evolution of balance sheet indicators in recent years. There is a continuous interest of the company to invest in modernization and automation and also to increase productivity per employee.

Chapter VI, "**Strategies regarding market and production development of biodiesel for providing consumption requirements related to the current legislative**

framework" begins with an overview of the current status regarding the biodiesel requirements for partially replacing the conventional diesel.

It is shown that in accordance with European legislation, each Member State has to provide from 2011 a 5 % biodiesel in conventional diesel, percentage which will increase to 7 % from 1 January 2013.

In 2007, investments in units for biodiesel production began to appear, both due to the obligation of partial conventional diesel replacement, and also because of the existing tax incentives between 1 January 2007 – December 31, 2007.

However these incentives were removed from 1 January 2008, by the new Tax Code developed by the Ministry of Finance. In addition, since 2008 the major manufacturers of biodiesel in North America and South America have made massive exports of biodiesel in Europe and Romania at a price even lower than the price of soybean oil or rapeseed produced in Romania so that the Romanian traders purchased biodiesel for blending it with conventional diesel from America, at the expense of the romanian producers. Thus, the market and the production of biodiesel in Europe and in Romania have been affected and some productions units decreased their production, most of them ceasing production and going into preservation.

On the other hand, domestic production of rapeseed has been sold to export, as some countries have incentives for biodiesel production and require large quantities of raw materials, importing it into their countries.

Next, a series of arguments are made on the necessity to develop and implement strategies to increase market and production of biodiesel in North-East Region. The necessity of strategies is given by the fact that biofuels are more expensive than fossil fuels. Two of the instruments that are suggested are the subsidies and the prescription of a mandatory production. Biodiesel production subsidy existed in Romania, but was eliminated from 1 January 2008. Imposition of a mandatory production on the other hand causes additional costs which would be incurred by fuel suppliers and ultimately consumers.

It is shown that financial incentives were the most important revitalization tools for the biodiesel market, fact which was revealed by the experience of other states.

Given the favorable potential of biodiesel raw materials production met in the North East Region, there have been designed strategic options on areas of activity:

- *strategy of increasing the areas planted with rapeseed (by planting on areas of uncultivated land of the North-East Region and by the replacement of inefficient crops by crops of rapseed);*

- *strategy of productivity increase of the areas planted with rapeseed (the use of varieties or hybrids with higher production potential), better soil fertilization, increase of the irrigated areas;*
- *strategy of using modern techniques for processing biodiesel;*
- *price strategy, promoting a lower cost of market penetration, both for raw materials and for biodiesel;*
- *strategy of promotion the production of rapeseed by the Romanian state and the European Union;*
- *promotion strategy of biodiesel production and consumption by the European Union;*
- *promotion strategy of the beneficial effects for society through the use of biodiesel.*

Also there have been presented two specific scenarios in order to assess the potential of growth of biodiesel raw material and biodiesel production according to the agricultural areas of the North-East Region.

- **optimistic scenario (V_1)** – it was considered that from the uncultivated arable land in the North East Region 10 % will be cultivated with rapeseed, which means, an area of **22 745 ha**. To this there is an extra area of **26 237 ha** by replacing the nonperforming crops with rapeseed (replacing 85 % of areas cultivated with soybean and 15% of areas with nonperforming crops – the equivalent of 100% replacement of soybean crop). In addition, it is considered an increase of 0,5 tons / ha of average production per hectare of rapeeseed to 2114 t / ha. Increasing of the total area cultivated with rapeseed will thus be by **48 982 ha** of which will result an amount of **102 862,2 tonnes** of rapeseed, **36 001,77** tonnes of crude oil, of which it could be obtained ~ **33 842 tonnes** of biodiesel;
- **realistic scenario (V_2)** - involves a projection of additional biodiesel production taking into account the same factors as in the optimistic scenario, but with a lower level of favorability. In this case it is considered that from the uncultivated area of North-East Region will be cultivated with rapeseed a 5 %, of the area, meaning **11 372 ha**. More **13 118,5 ha** is obtained by the 50 % replacement of the areas cultivated with soybean and other nonperforming crops. It is also considered an increase of 0.3 tonnes / ha of

the average production per hectare of rapeseed to 1914 t / ha by introducing new varieties of rapeseed and irrigation. From the total additional **24 490,5 ha** may be obtained **46 531,95 tonnes** of rapeseed, **16 286,18 tonnes** of crude oil and **15 309 tonnes** of biodiesel.

Given the annual requirements of biodiesel in the North-East Region under the current legal framework of around **30 000 tonnes** of biodiesel, it is recommended the realistic scenario since its implementation is more rational and less risky having its forecasts more realistic.

Implementation of the second scenario would not only ensure the biodiesel requirements of the North-East Region, but would also provide quantities for export to other regions or countries that do not enjoy the same conditions for biodiesel production. This scenario, however, is conditioned by the implementation of other strategies of those suggested to prevent the export of domestic rapeseed to other states, as is currently made with the rapeseed production at regional and national level.

Chapter VII of the paper contains conclusions and recommendations resulting from the entire contents of the thesis.