



**MINISTRY OF NATIONAL EDUCATION
UNIVERSITY OF PETROȘANI
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**RESEARCH ON THE POSSIBILITIES OF SUSTAINABLE
DEVELOPMENT OF URBAN AND RURAL AREAS IN THE
CARBONIFER BASIN OF OLTENIA INFLUENCED BY
EXTRACTIVE INDUSTRY RESTRUCTURING**

Abstract

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Romania's energy policy considers balanced fuel consumption. Therefore, it seeks certain stability in the event of possible energy crises that may occur, due to the use of a limited number of fuels. It has been found that the production of wind or hydrological energy cannot ensure the energy security and independence of our country. Although it has many advantages, coal-fired power plants still pose many problems. Pollution of the components of the environment air, soil and water with different gases, powders, dust and other pollutants, which result from the combustion process of coal. In order for all of these benefits to be preserved, measures must be taken to reduce the effect of pollution.

The Introduction is motivated by the choice of theme, and the present paper addresses issues related to identifying the possibilities of sustainable development of the urban and rural areas influenced by the mining restructuring in the Oltenia basin. In our country, significant economic changes have taken place in the last 20 years, which have greatly influenced the mining activity. These led to layoffs and mass layoffs, and this resulted in a significant economic downturn of the areas with mainly extractive activity. According to Romania's energy strategy, regional and national decision-makers will not give up mining and coal-fired energy. Thus, it is necessary to analyze the current situation of the EC Oltenia, an analysis that could lead to the development of urban and rural areas under the conditions of applying the requirements of sustainable development. The purpose of the thesis is to analyze the connection between the urban and rural communities, which, through the specificity of the mining activity, can influence each other contributing to the sustainable development of the area.

In the first chapter entitled: „*General concepts regarding the Oltenia basin*”, the lignite deposits, the conditions of the deposit and the relief of the region, the geology, tectonics and hydrogeology of the deposit are presented. Making a brief description of the coal complexes and the distribution of reserves on mining basins but also the main geological-mining indicators that characterize the coal layers.

There were also presented the peculiarities of the lignite deposit in the Oltenia basin, briefly presenting the 6 mining basins that enter into its composition with the related reserves, expressed as a percentage and also the properties that have coal deposits in the area, with the purpose of highlight their importance, respectively the thermal and chemical properties, the calorific power, the content of volatile materials and the capacity of agglutination and coking. Subsequently, an attempt was made to highlight the economic and social importance of the exploitation of lignite from this mining basin, highlighting certain aspects related to the European and global strategy, the share of energy produced from fossil fuels worldwide and the strategic importance of this form of energy.

Presentation of the basic elements of the national energy strategy, specifying that about 40% of the total energy will be produced on the basis of solid fuel, and from the energy market estimates it is observed that coal has a strategic importance in the national energy strategy, This is why it was considered important to present the main objectives of developing the extractive activity in the mining perimeters of the Oltenia Basin.

In the second chapter entitled „*Description of the mining activity in the Oltenia basin*”, the current state of mining operations in this perimeter was described, the equipment used for the extraction and transport of lignite in the quarry, equipped with excavators, with haulers and conveyors, on constructive types. for each quarry, and at the end of the chapter were presented the exploitation methods used in the up-to-date exploits within this mining basin.

In chapter three entitled „*The current and prospective stage of the state of the areas affected by the exploitation in the Oltenia basin through the prism of the sustainable development*”, the first existing

situation was mentioned and described, the mining basins with the related up-to-date exploits that make up this mining basin with the surfaces that they have. each one occupies, the licenses obtained and the year in which the operation is expected to be stopped, for each individual career. The first up-to-date operation that will cease its activity is the Roșia quarry in the Rovinari mining basin, in 2019, and the last quarry that will end its activity is the Jilț Sud quarry in the Jilț mining basin, in 2028.

Each daily operation occupies a certain area of land, which at the end of the operation is returned to the economic circuit to be afforested, grassed, and cultivated or for other destinations. The total area of land occupied by the quarries is 13 900 ha, the largest areas being occupied by the daily exploitations Lupoaia, Jilț Sud, Roșiuța, Roșia, Pinoasa and Peșteana Nord, which have areas between 1000 ÷ 2000 ha, and the other exploitations. per day occupies smaller areas, under 1000 ha. Prior to their use to extract lignite, these areas had agricultural purpose, for grazing, as hay, orchards, vineyards, forests, for different crops or totally non-productive. The activity of extraction of lignite through daily works produces an impact on the environmental components: water, air, soil, impact that has been analyzed and presented in detail, noting that the most affected is the soil, less affected being water and air, but In all cases there are no exceedance of the parameters imposed, especially where the case was taken measures to reduce and reduce unwanted effects.

At the end of the chapter, an estimate was made regarding the perspective of the areas affected by the exploitation in the Oltenia basin, highlighting the objectives envisaged by the Oltenia Energy Complex for the period 2016 ÷ 2020, objectives that in order to be met must comply with the measures on which our country has proposed to be reached within this time frame.

These objectives are aimed both at the realization of a program of restructuring and reorganization of the activity, a program that involves reducing some jobs and closing some capacities, but also maintaining the current production, developing and modernizing the existing technology and bringing the power plants within the Oltenia Energy Complex to recommended environmental standards, all aiming at preserving the importance of coal in the national energy strategy.

In chapter four, entitled *„Theoretical and experimental research on quantifying the fundamental elements in the assessment of development strategies”*, the concept of sustainable development, its importance and the areas of activity with which it interacts was described.

Also described were the steps that led to the creation of the concept of sustainable development, the evolution over time, the basic principles that must be respected, but also how the effects of this concept can be quantified with the help of indicators. Sustainable development implies the fulfilments of certain requirements, namely: to realize the protection of the environment by taking measures that allow to separate the economic growth from a possible adverse impact on the environment; to respect cohesion and social equity by fulfilling basic rights and respecting cultural diversity, eliminating discrimination and providing equal opportunities for all; to pursue the economic well-being by supporting competitiveness, innovation and knowledge in order to guarantee increased living conditions and a large number of well-renowned jobs; respecting the international responsibilities of the European Union by promoting democratic institutions in the service of freedom, security and peace, basic ideas and ideas of sustainable development all over the world.

Based on a European strategy, each country has its own national strategy, a strategy that must comply with the requirements imposed at global and European level. National Strategy for Sustainable Development was presented to the European Union and with some minor modifications it was approved.

The monitoring of the implementation and application of the principles of sustainable development is based on indicators, indicators that are outside the economic activity and which are used in decision-making processes. Each domain has certain indicators that, if properly analyzed, accurately represent the results of implementing the concept of sustainable development. Among the indicators used we can list: the indicators of the economic field with which the evolution of the regional economy is determined; indicators of the social domain that help us to obtain data on the demographics of the area, the poverty level of the population, the sanitary equipment, the provision of the drinking water supply and the living conditions; ecological or environmental indicators with the help of which the quality of the environmental components is quantified and the indicators of the institutional domain that help determine the degree of urban development. Within this chapter, several considerations were reiterated regarding the implementation of sustainable development strategies at national and regional level.

Some considerations were raised regarding the reserves, production and demand of coal on the national and European market, the situation of the coal reserves, exploitable and estimated, was presented. There was a SWOT analysis of the lignite exploitation in the Oltenia basin, which revealed that by continuing the lignite exploitation, there would be certain advantages and opportunities, such as: there is the appropriate infrastructure in terms of surfaces, the opening works carried out and of the transport systems to the beneficiaries; the lignite obtained corresponds to the parameters of the combustion plants, to which the current thermal power plants, which are the main beneficiaries, were designed; the workers who are part of the complex are experienced, being qualified and with many years of work in the field; the lack of jobs as an alternative, for the workers from the three counties involved in the activity; the output achieved can be adjusted according to the national energy demand; current production capacities could be upgraded to those in other countries that are more developed and achieve higher productivity; capture and capitalization of the gases emitted by the coal mass; considering coal as a strategic source in order to ensure the country's energy independence and security, taking into account the climatic evolutions of the last years; creating new jobs for young people; important contribution to the safety of the national energy system.

Apart from these advantages and opportunities, there are disadvantages and risks, however: they are: the quality of the lignite extracted cannot be greatly improved, and the productivity achieved is significantly lower, in other countries; the cost of production achieved is still quite high, compared to the price of energy on the market and a selective exploitation of lignite cannot be achieved due to the deposit conditions; the machines used, although they have high capacity can not always be used to the maximum capacity, and the acquisition of new, more modern technologies involves very high costs, difficult to cover; due to the monoindustrial character of the area, there is a risk of rising unemployment rate and so on, with no alternatives; due to the environmental conditions imposed, it is necessary to purchase new equipment, which could increase the production costs; lignite production is closely related to the demand for energy and therefore to the operation of the Electro-Thermal Power Plants; modification of the national energy strategy that considers coal as a secondary source of energy production.

In the fifth chapter entitled „*Contributions to the sustainable development of the areas affected by the exploitation in the Oltenia basin. Case study - Rovinari city*” has made its own analysis on the situation existing in Rovinari city. Based on which a series of proposals were made for the implementation of the concept of sustainable development. Concept on the basis of which the area can be developed, and subsequently these proposals constitute a source of information and guidance also for other mining specific localities in similar situations. The city of Rovinari has a population of 12,300 inhabitants and covers an

area of 26.32 km². The natural environment of the city is characterized by relief, climate, hydrographical network, flora and fauna, the city being a young one, it does not yet have significant tourist objectives. Rovinari city has an area of 3.67 km² with agricultural destination, 8.35% occupied area of arable land, 3.26% hay and 1.4% orchards, smaller areas being occupied by vineyards and pastures. The housing stock of the city has experienced some stagnation in recent years and has 5095 houses with an area of 202293 m², of which 406 are in public property and the remaining 4689 are in private property.

With a population of about 12,300 inhabitants, it is the second city in the county of Gorj, after the municipality of Târgu Jiu. The population density is 4.48 inhabitants / km², well below the average density per county, which is 59.6 inhabitants / km², of which about half are female and half are male, with a relative gender balance. By age groups, the highest weight is held by people between 35 and 49 years old, followed by those between 25 and 34 years old and those between 50 and 59 years old, at the opposite pole being those who have over 75 years and children up to 10 years old, which is worrying because the population is in some decline. The educational level is low, and the employment rate is below the national level, the unemployment rate being 7.65% well above the national level which is about 4%.

The city of Rovinari has a good infrastructure, with acceptable access routes, as well as the water supply, natural gas and public lighting networks, having all the communication channels.

The city of Rovinari, has a city hospital besides which there are 13 individual medical offices that provide family medicine, 2 dental offices and 5 pharmacies, which is insufficient to ensure decent medical services.

In the sixth chapter entitled „*Contributions to the sustainable development of the rural areas affected by the exploitation in the Oltenia basin. Case study - Plopșoru commune*” a personal analysis was carried out on the situation existing in Plopșoru commune, which comprises 11 villages. The researches carried out in the field and the data collected from the town hall in the commune have led to offering solutions to elaborate and implement the strategy of sustainable development, concept on the basis of which the rural area can be developed. From the analysis on the labor force in the village of Plopșoru, it turned out that the active population employed at the level of 2012 was 1798 and the number of unemployed approx. 438. In 2016, a number of 257 unemployed people were identified, the unemployment rate being 8%, being the first places in Gorj County.

Plopșoru commune occupies a total area of 8002 ha, of this area approx. 643 ha is located in the village intavilan and 7359 ha is in the extra-urban area. At present, there are a total of 6787 inhabitants, which have about 2200 households and a total of 2300 dwellings. Also, it was pointed out that there are problems with the exploitation in the Roșia de Jiu, North and South Pit quarries because they do not have expropriated land, the owners refusing to negotiate on the land they own within the exploitation perimeter or exaggerated claims regarding selling price. By extending the quarries will be expropriated from the lands owned by the commune of Plopșoru cca. 7.83 ha.

So far, about 51.47% of the surface of Plopșoru commune is affected by sliding phenomena as a result of mining activity. The most serious effect of the daily mining operations is the removal from the economic circuit of large areas of land, and the reduction of the production capacity of some bordering lands by disturbing the hydrological regime.

In the Strategy for economic-social and environmental development of Plopsoru commune, the following strategic objectives are presented, namely: raising the standard of living of the inhabitants of Plopsoru commune; ensuring a high degree of competitiveness of all sectors of activity; supporting

economic development by promoting public-private partnership and creating attractive opportunities and facilities for potential domestic or foreign investors; promoting a performing agriculture and reviving the rural area, as a socio-economic alternative of the urban environment; development and diversification of public services offered to citizens; modernization and development of physical infrastructure and other public utilities; protection of the environment, development and rehabilitation of the environmental infrastructure; business infrastructure development; capitalizing on the local tourism potential.

From the calculations it has been shown that the level of taxation achieved in the village of Ploșoru does not fall within the level of taxation agreed, which indicates that there is a poor population in this area.

It was found that there are no prospects for making investments, as every five years the local council's management structure and development ideas change.

In the seventh chapter entitled „*The economic approach to sustainable development in the urban and rural areas of the Oltenia basin*”, the effects of the measure on the ecological rehabilitation of the Tismana I quarry and the Tismana II tailings dump were presented, which would lead to economic, ecological and economic benefits. immediate social issues in both urban and rural areas. Through the works that will be carried out, new jobs can be created, in their ecological reconstruction but also in their subsequent exploitation. Also, the inhabitants will be able to benefit from a clean environment, a place of leisure and recreational spaces, but also of the fruits that would result from these plantations, firewood and other products.

By accomplishing the ecological reconstruction of the Tismana quarry and the Tismana II interior dump, a series of effects are obtained whose material value is difficult to establish, but which are of particular importance: a sustainable development of the peri-urban area; biodiversity conservation; creating a favourable climate for inhabitants and wildlife; stopping the pluvial and wind erosion on the soil.

The economic benefits calculated will take into account the value of the wood obtained, the value of the berries, apples and nuts.

The income / cost analysis is a tool that allows us to choose the optimal option for the sustainable development of urban and rural areas; the solutions can be among the most diverse.

Following the completion of the research, it is possible to mention a series of contributions of original character, of which the representative ones are mentioned:

Identification of the natural resources available at the local level that can lead to the socio-economic growth of the urban and rural community;

- Identification of the negative effects produced by different economic, social and environmental activities at Rovinari city level;

- Analysis of the current situation of sustainable development indicators in Rovinari area,

- Determining the degree of employment in the city of Rovinari, from which it follows that it is below the national level;

- Analysis of the socio-economic environment, of the infrastructure that could facilitate the connection between the urban and the rural environment, in a future economic development of the area;

- SWOT analysis to assess the territorial development of Rovinari city;
- Determination of the human development indicator in the city of Rovinari, which turned out to be 0.415, which indicates a weak human development in the city of Rovinari;
- The socio-economic investigation in the city of Rovinari, by calculating the sustainable development indicators that can be applied in the area, allows the application of another type of development of the area as an alternative to mining;
- Determination of the Human Development Index for Plopșoru commune, with the value 0.408, which indicates that in the rural area human development, is low.
- From the cache of the Human Development Index for the urban and rural areas, it turns out that, the degree of human development is a low one, due to the dependence of the inhabitants on the mining and energy industry, the destruction of the agricultural surfaces from the mining activity, the lack of a well-developed infrastructure, the lack of investors to create new jobs, a migration of the population to other areas and abroad.
- The economic approach to sustainable development in the urban and rural areas of the Oltenia basin, through the ecological reconstruction of the Tismana I quarry and the Tismana tailings dump, using different types of ecological reconstruction, which in time will be able to generate a spectacular development of the three indicators. main, namely: economic, social and environmental.

Based on the researches undertaken by the completion of the works, a series of future research directions such as:

- Researching the influence of the local, public or private environment, with the external environment, but also the cooperation with new ones;
- Capitalization of land resulting from mining activity in the production of clean energy with reduced ecological footprint;
- The local public authorities require a permanent involvement in the sense of urban and rural development in the areas with mono-industrial activities on coal, and the involvement of citizens in decision making, as well as in social cohesion;
- Applying decisions on multicriteria principles to take into account the needs identified locally, as well as the development potential of the domain.
- Analyzing the needs and potential of the development of the area, in order to capitalize on the resources available locally in different fields of activity.