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INTEGRATED DECENTRALIZED PRACTICES FOR INTRODUCING REGIONAL "CIRCULAR ECONOMIES"

Consider and demonstrate opportunities to meet the requirements underpinning EU regulations and adopted in December 2015 year, a package of measures for the introduction of the "Circular Economy" on the one hand and, on the other hand, the implementation of the decisions of the United Nations Conference on Climate Change in Paris December 2015, incl. and the "4 on 1000: Soils for Food Security and Climate" initiative was adopted.
A possible model for a sustainable circular economy in the agricultural sector will be analyzed taking into account sources of funding in line with current local legislation.
JEL: Q50; E17

"The simultaneous improvement of our economic wellbeing and our environment was once considered an "impossible solution". Now called circular economy."

Jan Potočnik, Commissioner for the Environment

One of the strategic directions of visions, strategies, programs, guidelines for development in the fields of environment, agriculture, energy and economy, regional policies, human resources, etc. developed in the European Union for the next programming period up to 2030 year is the introduction of integrated practices for the realization of both regional economies based on resource recovery, regenerative practices for the restoration of the main elements of the environment – soils, water, air, micro and macroflora.

These practices are directly aimed at mitigating climate change, adaptation to climate change, management and information related to climate change.

At the World Climate Summit in Paris, December 2015, the "4 on 1000: Soils for Food Security and Climate" initiative was adopted and supported by Bulgaria, putting in place the introduction of low carbon decentralized practices with a view to regenerating basic nutrients of soils to achieve integrated results, incl. re-carbonization of soils to ensure their

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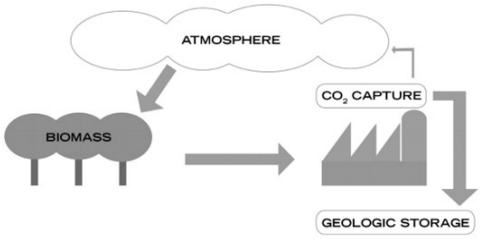
soil fertility and feeding the population. At the same time, the implementation of so-called BioCSS (Biomass carbon capture and storage) practices, namely the development of technologies that lead to an overall reduction in greenhouse gas concentrations in the atmosphere by providing a negative carbon balance

Figure 1

BioCCS in cellulose production



Unfortunately, in our national papers there is no realistic assessment of the ever-increasing effects of non-fulfillment of some of the strategic tasks in the management of our national economy: guaranteeing the population's nutrition, securing public health through management for the main components of the environment – soil , water and atmospheric air, ensuring the sustainability of ecosystems and territories.

Evidence of the above conclusion are the following documents and facts:

1. The Conclusion of the EU Report on Bulgaria Review of the Implementation of EU Environmental Policies (1): **"To date in Bulgaria there is no comprehensive circular economy policy program. Despite growing demand for environmentally friendly products and services, stakeholders are still refraining from investing in these areas."**

2. The assessments and recommendations given in the UN Economic Commission for Europe Review: Bulgaria's Environmental Performance Review, Third Review: Recommendation 8.3: **"The new EU Circular Economy Package means higher targets for the resource recovery of waste. It is already doubtful whether Bulgaria is able to achieve its current goals, such as recycling, not to mention the more ambitious goals in the "Circular Economy" package.**

3. The inactivity of the Ministry of Agriculture, Food and Forestry to implement the fair European principle of "polluter pays". The following amendments and supplements were adopted by the adopted Bill on amendment and supplement to the Waters Act, № 502-01-26, submitted by the Council of Ministers on April 7, 2015:

- in Art. 192, al. 1 (1) Economic regulation is based on the following principles:

1. reimbursement of the cost of water services, including those for the environment and the resource;

2. the polluter pays.

– in Art. 194, para. The right to use water is paid for:

3. pollution charge:

a) for the discharge of waste water into surface water;

b) for the discharge of pollutants into groundwater;

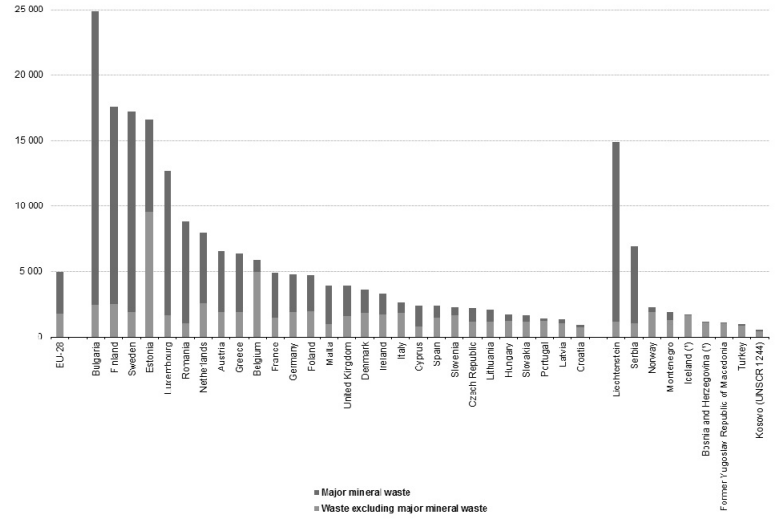
c) diffuse sources from agriculture; this fee shall not be paid if a fee is payable under ”a” or ’’b”.

The above mentioned mandatory payments by farmers for the use of mineral nitrogen fertilizers in the practice of European countries are summarized under the general name "nitrate imprint", which is determined and paid by the farmer on the basis of the pound of nitrate fertilizer per hectare.

Despite the fact that the official data of the National Statistical Institute on the "Agricultural, Forestry and Fisheries Report for 2017" and the "Waste Activity Report for 2017" have not yet been published, codes 02 01 - 02 07 , preliminary assessments of the generated waste resources suitable for secondary utilization indicate the possibility of resource utilization of annual quantities within 1 million tonnes of household waste and about 9 million tonnes of recoverable waste from the agriculture and forestry sector.

Figure 2

Generated waste per capita according to Eurostat data from 2014



For Bulgaria is particularly remarkable, as an average of 24.9 tonnes of waste per capita is generated in 2014 – five times as much as 4.9 tonnes per capita in the EU-28.

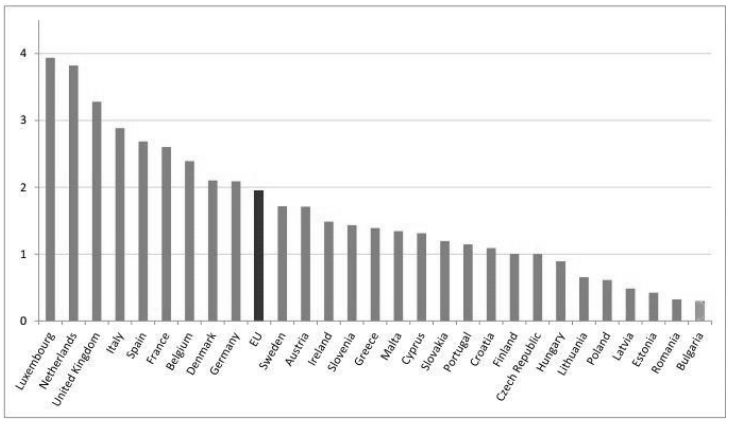
4. Bulgaria is the last in the EU on the productivity of its natural resources. The country lags behind the improvement of the indicator by more than 21% from 2002 to 2014. Bulgaria is the last in the European Union (EU) on the indicator of "resource productivity" with a level of EUR 0.30 / kg, according to Eurostat data for the effective use of natural

resources in 2014. Resource productivity measures the relationship between economic activity (GDP) and consumption of natural resources, revealing how effectively these resources are used.

At the top of the resource productivity ranking last year were Luxembourg – 3.94 euro / kg, the Netherlands – 3.82 euro / kg and Great Britain – 3.28 euro / kg.

Figure 3

Productivity of resources in EU countries in 2014 Graph: Eurostat



The generated waste in agricultural products, processing plants and wood processing is over 9 million tons per year.

In its opinion of 27 February 2014 of the European Economic and Social Committee on "The contribution of woodworking to the carbon balance" notes:

2.1 The European woodworking industry generates an annual turnover of around EUR 122 billion for a production value of over EUR 115 billion. According to Eurostat data in 2012, more than 311 000 companies were involved in woodworking.

About 1,600 companies work in the furniture business. About 40,000 woodworking companies work in the narrow sense of the word, while in other sub-branches of woodworking products there are about 145 000 companies **and recommends**:

4.2 ... to take into account the recommendations made in the Good Practice Guidance on the Sustainable Mobilization of Wood in Europe (2010) and to develop further, if necessary."

5. Apply the principles set out in the recent Commission Communication on "Towards a Circular Economy: An EU Zero Waste Program" 2010 and the measures adopted in 2014 that underpin the formulation: "Moving towards a circular economy is not only it is also profitable, but it will not happen without appropriate policies. "

According to Deputy Minister of Economy Lilia Ivanova, the private investments in the economic sectors in Bulgaria, which are important for the circular economy, are estimated

at about 81 million. This is estimated at 0.18% of the country's gross domestic product for 2017 and is above the EU average of 0.12%.

The European Parliament in its European Parliament resolution on the implementation of the circular economy package: options for addressing the issues of the interaction between chemicals, products and waste legislation (2018/2589 (RSP) of 10.09.2018) "welcomes the Commission Communication and the Commission staff working document of 16 January 2018, as well as the consultation process, but awaits rapid action to address the issues of "synergies"; supports the Commission's overall vision , which is in line with the objectives of the Seventh Environmental Action Program (EAP)";

The circular economy promotes sustainability and competitiveness in the long run. It can also help:

- Resource conservation – including some that are exhaustive and difficult to access;
- new business opportunities;
- environmental protection;
- creation of new technologies, respectively. new industries;
- opening new jobs.

For its successful implementation and management, it is appropriate to apply the model of the pyramid.

This is the simplest, with the least party spatial structure that can be the most universal. Each tip directly contacts the others, allowing to describe and simulate different situations. From a sample model it is easier to model private cases. Each peak can be described as an energy potential that affects positively and negatively various factors.

Figure 4

Recommended option

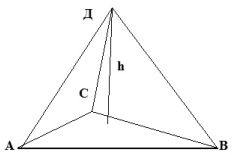
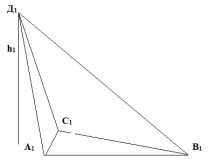


Figure 5

Critical option



The tracing of the individual elements in the case study "Circular Economy in the Agriculture Sector" is:

Peak A reflects the potential of an economy to exploit waste;

Peak B – the potential for generating products and waste;

Peak C – the potential of resources – human, financial;

Top D – State intervention to regulate this case-regulation of business relations, investment stimulation, tax rates, licensing and licensing regimes, sanctions, etc.;

h – the height of the pyramid, which shows the state's distance from the problems in the industry – the freedom of economic players to licensing and restrictive regimes, normative acts, taxes and fees.

Base area S – ABC represents the amount of tangible and intangible product that can be produced with available assets, labor and scientific excellence, whether own or foreign.

The volume of pyramid V – represents the gross national product of the respective branch, in the case of agriculture.

Most resistant is the option where the pyramid tip is projected into the center of the base, but if it emerges from the base, the pyramid may fall – A1B1C1D1.

The **peak A** has a positive impact on the increase, renewal and modernization of investments, negative – lack of interest and incentives for the utilization of the products without waste or the generated waste.

On the **peak B** the positive impact is the growth of the agricultural production and its processing in the country, and negative – the import of the crop and/or the limitation of its processing in the country.

On the **peak C** the positive impact is the growth the stimulation of innovation activity – innovation creation, implementation and realization, stimulation of research, state/financial support in waste processing, and negative - underestimation of the waste as a raw resource and implementation of the principles of the circular economy as well as development of new products/varieties, new crops, and productions.

The positive impact of **peak D** has stable and predictable economic conditions, stable political system and social peace, stimulating economic development legislation, and negative – corruption at all institutions and levels, non-transparent litigation

In order to develop an appropriate mathematical tool for describing the pyramid model, the following should be considered:

⇒ Each peak represents a potential in the economic system, which is influenced by many factors and has a distinct effect;

⇒ The distance between the peaks reflects the strength of the interaction between them;

⇒ The model should allow dynamic state analysis (rather than static), i.e. it must allow dynamic at distances between peaks;

⇒ The control of dynamics of the changes of the distances should allow for predicting the occurrence of critical events that would remove the system from equilibrium.

Convenient for these purposes is the metrics tool, or so on. metric geometry. The logical explanation for this is that the peaks form a metric space, and each peak can be considered a geometric space. The first introduces the concept of metric space and its description French mathematician Morris Frees. Subsequently, the metric finds development from

Gromov-Hausdorff and reflects on the theorems of Hopf and Rinn. This approach can be seen as a particular case of the application of Fensler's geometry created by Paul Finsler and developed by Singh, Taylor, Bertwald, Kartan, Wagner, Buzeman, Round, Minkovski and the contemporary American scholar Shen.

In the analysis of Fig. 4 and Fig. 5, the following conclusions can be drawn:

- In reducing the interaction (increasing the distance) between the economy and the structures (A1 → B1) generating waste, it can not be expected to realize a sustainable one, incl. and circular economy;
- Reducing the funding opportunities for science-intensive and innovative projects (the deviation of the C1 peak from B1) also fails to expect a successful circular economy;
- Inefficient legislative activity, not geared to the problems of the sector, will have a negative impact on general economic development. An illustrative example of this is the repeal of the Public-Private Partnership Act, which deprived municipalities of the possibility of solving waste problems by building with the private capital of industrial enterprises for their recycling or re-use;

There are three main objectives for resource utilization of waste from agricultural activity to regenerate the basic elements of the environment:

At the first due to the mass degradation processes, the extremely low organic carbon content in the soils on the territory of Bulgaria (below the boundary guaranteeing the soil fertility of the Bulgarian soils), the carbonization of soils, the lack of essential nutrients (eg phosphorus), it is necessary to import a standardized product recoverable agricultural waste with the quality of growth promoter ie. a product that supports the soil structure, introducing nutrients but also a wide range of growth promoters.

The second objective is to use biodegradable waste to ensure the use of such practices and such a process control system as to ensure 100% sanitization of the final products.

To achieve **the third objective** – sustainability which, in our view, is through the use of available resources, the production of products with high competitiveness and high added value, which will ensure through tax the public benefit and the most important recovery of the resources used, and major elements of environmental soils and water for subsequent use.

Is needed the following sequence of actions:

1. Estimation of the consequences of drought, erosion and destruction, the outlined trends of losses in the content of organic carbon, humus and severely degraded soil microbiology, the emerging persistent tendencies of loss of soil fertility both in the main grain-producing regions of Bulgaria and in semi-mountainous and mountainous areas occupied with permanent grassland and high nature value agricultural land.
2. Development and implementation of integrated measures and practices for:
    - reduction and prevention of atmospheric pollution from agriculture, etc. activities on the one hand and the creation of conditions for sustainable management of the

main components of the environment – soils, waters and atmospheric air to guarantee soil fertility, stable water-resistance, storage and maintenance of the soil microflora;

- introduction of decentralized systems for economically feasible energy production and stable accumulation and storage of organic carbon in soils to reduce on the one hand the amount of carbon monoxide, methane and nitrous oxide generated in the atmosphere and, on the other, to create the possibility of rapid recovery of damaged soils from increasing forest fires by restoring basic nutrients and topsoil and preventing groundwater pollution, regenerating soil microflora and fertility;

3. Introduction of municipal low-carbon heating systems with multiplier economic effect – on the one hand, reducing the costs of the waste management system to 70% and eliminating the cost of fossil fuels: natural gas, petroleum derivatives, wood, pellets and others.
4. Introduction of highly efficient settlement ecosystems for extraction and retention of CO_2 for sustainable prevention of natural disasters due to climate change.
5. Introducing BECCS practices that are considered as one of the most socially acceptable and recommended by the UN, EU, World Bank, World Population Organization – FAO practices to mitigate global impacts of climate change.
6. Forests and forestry. Estimation of basic eco-services guaranteed by forests and creation of objective and appreciable mechanisms for their compensation for infrastructure projects that disturb the forest areas and use of basic eco-sources – soils and waters.
7. Introduce effective practices for the restoration of forests with the utilization of waste generated during their management.
8. Introduce based system for sustainable development of the region and mitigate the effects of climate change through low carbon practices such as suspending the burning of stubble and prevent large-scale forest fires and air pollution, create economic incentives for reasonable utilization of waste biomass recovery and improvement of the quality of the main elements of the environment related to one of the main sectors for the region – agriculture, incl. soils, groundwater, guaranteeing soil fertility for the introduction of high-efficiency productions in farming, livestock and the processing industry.
9. Characterization of management objects by standardized methods and standardized tools;
10. Planning and implementation of projects to implement measures and practices for integrating environmental policies and climate change policies into their cost-benefit assessment.
11. Implementation of circular economy projects using products and waste from agricultural production through demonstrable socially acceptable Public-Private Partnerships through the creation of consortia with private entrepreneurs in

compliance with the laws on municipal property protection and the Law on Local Administration and Local Self-Government.

12. Integrated ecological and zero waste projects through consortia with private investors. This would compensate for the Government's refusal to implement the Implementing Agreement 1303/2013 in the use of funds from the European Funds for the 2014-2020 programming period. "At present, no implementation of the integrated territorial investment approach within the meaning of Regulation 1303/2013. There is targeted support for the development of the Northwest region (see 3.1.6). "(P.146 of the Agreement). Art. 36 Integrated Territorial Investments of Chapter III Territorial Development of Regulation 1303/2013 reads: "1. Where an urban development strategy or other territorial development strategy or territorial pact referred to in Article 12 (1) of the ESF Regulation requires an integrated approach involving ESF, ERDF or Cohesion Fund investments in more than one priority axis of one or several operational programs can be implemented as an integrated territorial investment (ITI)."

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