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**The Bioeconomic Strategy of Romania in the
Context of a Major Global Crisis**

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Abstract: In the 21st century, priorities regarding the future of Planet Earth will wear a completely different mask. Mankind is becoming increasingly concerned in the preservation of natural resources for the development of a new civilisation, with acknowledging the real possibilities of recovery regarding the multifarious range of resources in use. We are discussing resources of strict survival such as water, air, access to modern forms of energy, last but not least soil – all in order to preserve favourable environmental conditions. Bioeconomic development and world consumption must quickly abandon the unwarranted, all-encompassing levels of ambition concerning resources, and must contain only the levels of sufficiency. (Brown, 2000, pp. 27-29). Bioeconomic development of the New Earth must be accepted by the future only in terms of sustainable parameters – a harshly necessary attitude in Romania, consistent with worldwide efforts. (Brown& Fischlowitz, 2002, pp. 19-22). These major determinants will build a robust bioeconomy of Romania – as an important element of security in case of a worldwide crisis.

Keywords: bioeconomics; bioeconomic strategy; bioeconomy; measures plan; regions of creation; renewable resources

1. The Bioeconomic Strategy of the European Union

The European Union has timely addressed the need for the balanced and sustainable development of mankind, placing its efforts in a deserved place at the forefront of the bioeconomic world. It was in the very sense stated above that the *Strategy* and the *Action Plan* were generated as programmatic documents on sustainable development, connected to the forthcoming necessities of our civilization. The reason behind generating the Strategy has been imposed by the fast pace in using natural resources, which is specific to human development, and mankind's current necessity for comfort – all at a rate that does exceed by far the natural regenerating possibilities of raw materials used.

First, Europe will need to change its vision and consumption policies, by formally establishing a feasible option for anthropogenic pressures on the environment, to produce a new perspective on production, consumption, processing, storage, recycling and disposal of resulted waste, so as to facilitate the resumption of the complex natural cycle.

Therefore, the *Europe 2020 Strategy* states that efforts aimed at achieving a smart and balanced economic growth within the states of the Old Continent stand for the zero priority. Thus, it in 2012 that documents were issued by the European Union Commission under the title of “Innovation for a

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Sustainable Growth: a Bioeconomy for Europe”. The strategy achieves a coherent, cross-cutting and interdisciplinary approach to current requirements, linked to the need for a forward-looking European development. There is thoroughly considered the priority to build an innovative, low-polluting economy which reconciles the multiple demands of viable agriculture and fisheries with the sustainable use of biological resources for industrial purposes, all requirements being in favour of preserving the environment and protecting biodiversity. (Commission, 2012, pp. 7-8) In achieving its strategic objectives, the action plan focuses on major aspects regarding the development of innovative bioeconomic technologies and processes, on increasing competitiveness, expanding markets and optimizing cooperation. (Commission, 2010, pp. 7-8).

Preserving the possibilities of natural environment – in terms of keeping it healthy and balanced – is essential for sustaining all chances for the evolution of civilizations and the quality of life in the medium and long terms. The *Strategy on the Innovation for a Sustainable Growth: a Bioeconomy for Europe*, issued on the 13th of February 2012, includes the sustainable ecological approach to the natural environment, the subject of energy supply from clean sources, aspects related to food supply and the balanced maintenance of resource consumption in Europe, as well as in the world of the future. (Bogdan, 2014, pp. 135-136).

The future development of Europe must include approaches in terms of attaining efficiency in the production, consumption, storage, processing, recycling and disposal of bio-waste. The technologies used in the production of goods and services must be totally different from the energy-intensive or large resource-consuming systems. The effort taken to carrying out bioeconomy stands for a key element of smart growth in tomorrow’s Europe. Objectives will be achieved through the effort of applied bioeconomic research, the massive implementation of innovations that involve the management of renewable resources and by entering other markets. The use of the bioeconomic framework is supported by the existence of two major initiatives, as follows: “A Union of Innovation” and “A Resource-Efficient Europe”. (Commission, 2010, pp. 1-8)

The strategy contains two major innovative dimensions: addressing societal challenges and developing a coherent bioeconomy.

The approach to societal challenges stands for the predominant socio-economic standpoint, which combines aspects related to:

- ensuring food security within Member States;
- bioeconomic management of natural resources;
- reducing the dependence on non-renewable resources;
- mitigating climate changes and adapting society to resulting effects;
- creating new jobs and maintaining European competitiveness. (Commission, 2010, pp. 3-6).

The development of a coherent bioeconomy includes the predominantly politico-economic vision, which defines such aspects as:

- building coherent policies in the bioeconomic field;
- the rapid materialization of investments in knowledge, innovation and competitiveness;
- building participatory governance and an effective dialogue with society;
- setting up the new low-energy-consuming and high-efficiency infrastructures. (Commission, 2010, pp. 6-8).

Without probing into assumptions on its geographical limitations, and with making no estimate on the amount of natural resources within the Old Continent, we should simply admit that Europe has the unique opportunity for a sound future economic development through bioeconomic methods, creating jobs in rural areas and on the seaside, reducing the use of fossil fuels, increasing economic efficiency in primary and processing industries.

2. Benchmarks of the Possible Bioeconomic Strategy of Romania

The competent structures of the state and the society of tomorrow will have to act effectively for reducing the environmental impact and cutting in the degradation of nature – elements originated in the impact of today’s civilization. Economic activities, food production and consumption factors must be placed at the level of eco-efficiency. As ever-increasing amounts of goods have to be produced, there must be effected fewer and fewer demands on the environment with less and less waste. That waste will be reintroduced into the future resource circuit, fuelling development and reducing environmental impact. (Brown, Larsen, & Fischlowitz- Robert, 2002, pp. 23-27).

Faced with the harsh realities of the last period, given the increased pressure on the diminished natural resources, with the environmental aggression and the production of major climate disturbances, our country will have to quickly change the paradigm of development.

Fundamental features of the process are utterly significant - such the *urgency*, the *integral condition* and *faultless timing* of national efforts. We rely on the historic involvement of some major scientific personalities of the past such as Grigore Antipa, Nicolas Georgescu-Roengen, Nicolae N. Constantinescu, (Bogdan, 2014, pp. 143-145) as well as of some recent institutions, as the Romanian Academy, branch academies, faculties along with various national commissions.

The *urgency* arises from the pressing need to preserve the limitations provided by nature, prior to implementing other steps specific to the socio-economic field. Holding real responsibility in this field at the eleventh hour will mean prioritizing all needs to preserving key elements of future civilization and development such as air, water, soil, domestic and wildlife. It is necessary to exercise caution regarding the harshness in which civilization produces environmental aggressions.

The *integral condition* or *completeness* stands for the essential prerequisite for success in considering the desired approach, given the development of our society. Civilized existence and sustainable progress in the future must definitely be built at the level of all internal actors and must involve all institutions with avoiding irresponsible and catastrophic aspects. Basically, in the stated approach, the Power and the Opposition will have to shake hands for unitary efforts to be made over the long term.

The synchronization of plans involves a general approach in which all political forces, institutions, organizations and the population will subscribe to the requirements imposed for the future. Likewise, the national (strategic) plans, the operational and tactical (local) plans and development plans will be addressed simultaneously. Large-scale and long-term concerns will be achieved in accordance with European directives, the example of countries with notable concerns in the bioeconomic framework (such as Nordic countries, Japan, Switzerland, Germany, United Kingdom) being highly beneficial. Social entities will demonstrate a high degree of education and effective participation in meeting the self-assumed needs at the national level for achieving bioeconomic development. (Bogdan, 2014, pp. 145-155).

2.1. National Scope and Dimensions

Producing the multiple socio-economic and technological progress of society, building social welfare, ensuring an acceptable level of comfort, providing the necessary food to large social groups, but without affecting the natural environment stands for the very essence of national economy. The term “sustainable” must also be considered as “accepted”, “admitted”, “mandatory”, “permitted by the natural environment, without affecting existing ecosystems”. (Brown, Larsen, & Fischlowitz- Robert, 2002, pp. 79-82). Investments in rural areas are a top priority, due to major advantages. With a balance of landform settings and exceptional soil fertility, Romania requires modest efforts for irrigation, the efficiency of intervention being increased. Despite these conditions, the rural sector does only comprise about 40% of the country’s population – who do not have sufficient means of subsistence. It is deficient in food, the poverty level being dramatically high. The village world needs the allocation of massive social assistance and protection, in addition to bioeconomic investments. In rural areas, the *first step* is to stop the economic and social decline (bringing food to the population in rural areas), the *second step* is to provide food by their own efforts in poor rural communities, and the third step will be provided by reversing the village / town ratio, with the sending of surplus food to the urban environment and to export. (Bogdan, 2014, pp. 126-140).

The bioeconomic effort is simultaneously a strategic concept and a fundamental strategic priority of Romania. The content of the strategic concept prioritizes the multivalent-framework requirements of the national development and the achievement of the well-balanced functioning of the national economy, with involving all sectors of the state’s economy. It requires the mobilization of human resources together with the capitalization of socio-economic possibilities of Romania on the short, medium and long terms, with the primary focus laid on the very conditions and quantities of plant and animal food mainly from within rural areas, given the current set-up of human existence, comfort and well-being.

The *bioeconomic* effort involves using extra labour force in rural areas together with implementing modern technologies, apportioning financial resources, increasing the potential of rational land use institutions in obtaining, capitalizing, consuming and marketing plant and animal production in rural and urban areas. This process is completed with wisely considering certain particular elements regarding rural spaces - such as the industrial processing possibilities, the implementing of living conditions and standards along with the reaching of comfort or civilization goals, and the capitalization of the production surplus in the urban environment as well. (Brown, et al., 1992, pp. 189-201).

Romania ranks 5th in Europe according to the *arable area* and *agricultural area* indicators. The country has an extraordinary potential for food production, being able to provide food for a population of about 80 million inhabitants. (Bogdan, 2014, pp. 168-179). We believe that the figure can be increased to even 100 million or more, through the direct involvement of internal political factors and the massive support provided by the competent national institutions. The high-level food production can be achieved through a broad synergy of national efforts, provided there is an adequate political will.

The purpose of the previously underlined effort is to establish food security, an essential component of national security. We do consider that the required level of food can be achieved only under the operation of a quality management, the existence of financial resources, the materializing of modern biotechnologies, the rational use of available crop areas, etc. (Commission, 2010, pp. 9-10).

2.2. Guidelines

The strategy contains generic elements regarding the understanding of the necessity for the national approach, the relation with the military strategy and other branches of the national security strategy, the priority of achieving bioeconomic development, the food strategy, the major tasks for the future, the running in principle of all theoretical and practical mechanisms involved. (Commission, 2010, pp. 8-11).

In the process of substantiating the major projects of eco-economic development in Romania, it is necessary to review the basic aspects regarding the concept, characteristics, effort sectorisation, the elements concerning the strong and weak parts of the projects, as well as the future tasks. In order to mark constructive evolutions, with relatively similar manifestations and purposes, there are required measures regarding the structuring of well-founded concepts, the establishment of comprehensive action strategies and the development of implementation plans appropriate for realities of the territory and the priorities of the bioeconomy.

Implementing the *Bioeconomic Development* concept is an ultimate national priority, able to produce the internal economic recovery over the next 15-20 years. Delaying the start of this effort by 2-3 years can lead to major failures (the impoverishment of the rural population will upsurge, the agricultural area can be massively alienated, soil degradation will increase, climate change can greatly affect production, rural areas will experience massive degradation of living standards). The priority of the project implementation derives from the need for security, food and comfort of the entire population. The measure can change the living standard, which is positioned at survival rates – a level where more than half of the population is placed, therefore, this could by all means stand for a significant step forward in the forthcoming years.

The fundamental projects of sustainable development in Romania stand for systematic national-scale implications, carried out in relatively unitary terms on large geographical areas and landforms, which significantly employ human resources, massively involve the natural environment, plant and animal bioproduction, food industry and multiple technical elements. In order to achieve the goal of building eco-economic development and achieving food security on the national territory, a high financial support along with a major input from unconventional research and technology are needed.

The concept contains the basic elements for sustainable development and ensuring food security, through long-term national efforts. Coordinating the achievement of the projected bioeconomic requirements implies the integration of various bioeconomic development approaches, on the following levels:

- national, through the National Bioeconomics Council, the Romanian Academy, the University of Agronomic Sciences and Veterinary Medicine, the faculties of the eco-economic branch, the research institutes, etc. - on a long-term basis;
- that of development regions (counties), through the Institution of the Prefect, benefiting by the support of County Councils and of Local Action Groups (LAG), mainly on the medium and short-term bases;
- at a LAG and commune level, having to be established as a priority by the Mayor and the Local Council of communes, with efforts taken on a short-term basis. (Bogdan, 2014, pp. 234-243).

2.3. Characteristics

The implementation of major projects – which are essential in the bioeconomic development effort – are characterized by multiple aspects.

The *national effort* contains the strenuous intervention of the political class, the involvement of communities, central and local state administration bodies, the intervention of different power factors to produce all-inclusive achievements.

Central management stems from the undisputed national priority of bioeconomic development. As a result, the leadership of the effort to implement major projects will fall to the Prime Minister (appointed First Vice-President).

Permanence contains the dynamic activity on multiple levels (political, economic, social, environmental, financial, meteorological, agronomic, zootechnical, food-related, pharmaceutical, genetic, biodiversity-oriented, forestry-related, pedological, technological and others). (Academia Română/The Romanian Academy, 2010, pp. 9-11).

The *increased time gap* means that the protection of the natural environment and ensuring food security send to a long-term effort (over 10-15 years) taken to achieving and maintaining the well-being level of society.

Synergy involves synchronized efforts, reducing the factors of impact, increasing the possibilities for action and involvement of organisations, through the multitude of factors that can affect the environment and reduce food security.

Logistics requires the provision of the necessary financial, technical, technological and human resources (both specialized and non-specialized), together with the food production platforms, the implementation of storage facilities, the construction of innovative infrastructures, the production of ecological food and nutrients, the natural pharmaceutical industry, etc.

Systemic integration involves the completion of national efforts in an integrative, multiple tactic, revealing the needs for intervention and the natural or socio-economic changes appearing in different systems.

The *anthropic aspects* prioritize the fact that the success of the approach is overwhelmingly generated by the viability of man-made projects (irrigation systems, canals, artificial lakes, unconventional energy production systems, manufacture facilities), which bring changes to the natural environment.

Multiple cooperation requires a wide exchange of ideas, measures and different cooperation actions to achieve common goals and implement bioeconomic principles, provide food, build eco-economic modules in the space of neighbouring states, corresponding to the identified priorities. (Bogdan, 2014, pp. 191-199).

2.4. The Bioeconomic Management

The management specific to the national bioeconomic development is an essential tool for leading the multifarious effort, building food security and ending the chronic food crisis. The national bioeconomic system will stand for the integrative framework comprising the range of efforts taken by the empowered governmental factors – one fully essential in terms of the long-term management.

The system of national projects (Romanian Plains, Dacian Hills and Plateaus, Carpathian Mountains) must be established as an interface with similar systems belonging to the European Union (Lower Danube, Danube Delta and the Black Sea), as well as with the global system of bioeconomic development.

The national system of bioeconomic development must be subordinated to the Executive, the effort being directly coordinated by the Prime Minister. As the Executive subordinates the institutions – including those with competences to ensure the financing – financial funds will be directed from the level of the Prime Minister to all the institutions of the governmental structure. Thus, the Executive has *decision-making responsibilities* in achieving bioeconomic development and food security in crises, similar to solving possible crises from within the national territory. The National Bioeconomic Command can only be responsible for leading bioeconomic *technical* efforts, eradicating poverty and the national food crisis.

3. Achieving the National Bioeconomic Effort

The bioeconomic effort will find its practical applicability in the projects developed on the national territory – the Carpathian Mountains, the Romanian Plain, as well as the Dacian Hills and Plateaus. The Action Plan on the Sustainable Bioeconomic Development together with the pilot projects located in the territory are of major importance.

3.1. The Action Plan

The strategy has no action value in itself. The action plan is the practical-applicative instrument for the operationalization of the Bioeconomic Strategy provisions in a national profile. Basically, the Plan represents the instrument according to which the national effort is mobilized in expanding the communities from within the structure, and is motivated, trained, coordinated and directed towards the achievement of the proposed objectives for the entire territory. The approaches will be distinct for lowland, hill and mountain areas, as well as related to the typology of the bioeconomic modules to be established in development areas. The plan contains measures to be fulfilled, costs, typologies, deadlines and responsible structures, making effective human action possible. (Academia Română, 2010, p. 12).

Plan's durations can be estimated as follows: (Bogdan, 2014, pp. 237-243).

- Stage I (2022-2025) – the *initial phase* – the construction of an experimental bioeconomic module in each of the 8 development regions;
- Stage II (2026-2035) - the *fundamental phase* – the establishment of multiple and diversified modules in each region (up to nearly 100-150 units), in which the requirements of the European Union Strategy will find their expression; (Commission, 2010, pp. 237-243).
- Stage III - (2036-2040) – the *final phase* – the construction of modules in dwelling zones – i.e. small-surface localities and areas with modest economic possibilities – as well as within countries outside Romania (primarily among neighbouring states).

Completion phases regarding each module include: notification of intention, assessment of possibilities, setting options, planning, implementation and transition.

The variant of elaboration, dissemination, activation, use and review of the Action Plan shows similarities with elements existing in the military system.

3.2. The Bioeconomic Module

The pilot bioeconomic module stands for the basic local manner of organising the current complex eco-economic development with a prospective role in the rural area, in accordance with the limits imposed by the environment (*sustainable development*). In the initial stage, a bioeconomic module will be placed in each development region. (Bogdan, 2014, pp. 238-239). In the fundamental stage, from three to five such modules will be implemented at a time in each development region. The modalities regarding the implementation of the bioeconomic module can be varied, depending on the existing possibilities in the development regions. The bioeconomic projects will be designed as part of major national projects so as to support subsequent exploitation and continuance. The construction will be managed by regional and local administrative factors, which play a key role in the feasibility study, the design, the establishing of typology, the organizational structure, the support, implementation and operation of local bioeconomic modules in the established space.

The bioeconomic modules aim at certifying the validity of efficiently using human potential, natural resources, economic resources, financial means, at ensuring food security of the population, producing animal and plant food, collecting, processing and capitalization of fruits, wine, alcohol, berries, at the continuation of local crafts, the eco-economic growth of our own space, the use of technologies with low environmental impact, the conservation of ecosystems and the maintenance of biodiversity, the reduction of poverty and the increase of the well-being of citizens. Each local project will use funds of about 20-32 million euros, depending on the area, type, size and final products generated. New jobs will be created (1,500 and 5,000 in each module), which are extremely necessary, especially in rural areas. We will witness the stabilization of biodiversity, climate and water circulation, the imposition of food security and safety along with other benefits. (Academia Română/The Romanian Academy, 2010, p. 17).

4. Conclusions and Proposals

4.1. Conclusions

Bioeconomic development in the national profile needs to be approached very quickly, efficiently and responsibly in the context of the increased climate turbulences, the rapid depletion of aquifers and the expanding of arid areas, the reduction in agricultural areas, the uncontrolled increase in world population, the ozone layer depletion, the rising planetary ocean's level, the reduction in food-production areas, the use of meteorological and geotectonic weapons, etc. Possibilities of intentionally compromising large-surface production, the destructive use of medicines and anthropogenic biological agents, the introduction of genetically modified food into the diet, the production of compromised foods and the massive illness in human population will be thoroughly considered. (Bogdan, 2014, pp. 61-80).

The Paris Summit on the Implications of Climate Changes on the Destruction of Human Civilization stood for a further confirmation of the need for convergent action taken by all states. We are responsible for the future of the Blue Planet in terms of making systematic efforts before it is too late.

4.2. Proposals

The bioeconomic development must be considered as both a straightaway necessity for Romania and also an intrinsic part of the future of this Planet, in conditions of overpopulation, chaotic consumption of natural resources as well as the climate and environmental destruction.

The Legislature will endorse the Executive's projects on ending the land sale process, the preservation of environmental resources and opportunities, the establishing of competences and responsibilities at different levels, the setting up of an advanced legislative system, in line with the rapid changes at the global level.

It is necessary to take measures of maximum responsibility, implemented under the coordination of the Prime Minister (Deputy Prime Minister), with the allocation of amounts through the annual state budget, the access to European Union development funds in the field, the involvement of development regions, the participation of LAGs, town halls and local councils at the commune level.

There will set forth the *Bioeconomic Strategy of Romania* and the *Action Plan* in terms of highly significant and feasible documents drawn up in an integrative national profile. The plan (as an operational tool) will contain measures to be fulfilled, amounts allocated, locations (areas, facilities), stages, deadlines and responsible structures.

The National Bioeconomic Committee will be responsible for leading the *technical bioeconomic efforts*, the involvement in reducing and eradicating poverty and the overcoming of the food crisis.

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