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A ROADMAP FOR A SUSTAINABLE ENVIRONMENT OF DANUBE DELTA - A 3D INITIATIVE

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Abstract

3D - Danube Delta Decarbonising is an essential concept that promotes the maintenance of swamps and wetlands of the Danube and the adaptation of their socio-economic system to climate change. The relationship between climate change, atmospheric structure and greenhouse gases (GHGs) and other critical factors for the global environment, such as alteration of the water cycle, changes in biogeochemical cycles, erosion of soils and coastal areas, reduction of sea salinity, loss biodiversity, is a complex of specificities for the Danube Delta, given the duration of processes, diversity, and causality, both endogenous and exogenous system, and requires analysis of different variants and intensities of manifestation as an objective need for the functioning of the hydro-geo- morphological (HGM) and socio-ecological (SSE) of the Danube Delta. Wetlands such as the Danube Delta are a major source of methane (CH_4) and contribute between 30 and 40% to total CH_4 emissions. CH_4 emissions from wetlands depend on temperature, groundwater depth, and the quantity and quality of organic matter. Global warming will affect these three factors of methanogenesis, raising questions about the feedback between natural methane production and climate change. Forecasts show that by the end of this century, natural methane (CH_4) emissions from wetlands are expected to increase by up to 80% by the turn of the century if no concrete measures are taken to reduce greenhouse gas emissions and especially those generated by the anthropogenic factor, a better understanding of the situation is needed for future rebalancing. The scientific community agrees that an economic system based on fossil fuels, intensive agriculture, and the unsustainable exploitation of global natural resources have irreversible effects on the environment. The effects of the current economic system have detrimental effects on the Danube Delta, such as climate change, air and ocean pollution, and ecological decline, causing material and human damage to the local population. Thus, there is a real risk of catastrophic damage to our economies and societies over the next few decades, if the prevailing forms of production and consumption are not radically changed.

Key words: *Danube Delta, decarbonization, Greenhouse Gas emissions, climate change.*

INTRODUCTION

Any human approach in terms of practice is a form of manifestation of the relationship between the level of knowledge and understanding of the surrounding reality, on the one hand, and the value system assumed at different spatial-temporal scales.

The Danube Delta, the youngest and most dynamic geographical unit in Romania, is, in terms of systemic methodology, the expression of the legal interaction between natural components, matter, and energy flows (mainly climatic and hydrological), on the one hand, and human intervention in intensity and consequences more and more in the last decades), on the other hand (Niculescu, Lardeux, & Hanganu, 2017).

The transformations to which the Wetland System of the Lower Danube Floodplain and Delta has been subjected, given the spatial scale of manifestation, are relevant for the current context, marked by the absence of decision-making support tools that capitalize on decision-making power, scientific knowledge, experiences, and information.

We must recognize, at the same time, that the present provides us with much more scientific and factual evidence of the limited capacity of natural capital to provide goods and services (energy and raw material crises, climate change, and pollution of the planet) and yet the readiness to improve the ecological performance of socio-economic systems, as a reflection of an intra- and inter-generational solidarity, it is maintained at levels that feed the state of pessimism rather than optimism.

The effects of the current economic system such as climate change, air and ocean pollution, and ecological decline are *causing material and human damage to tens of millions of people globally, thus, there is a real risk of catastrophic damage to our economies and societies over the next few decades if the forms that currently are dominated by production and consumption are not radically changed* (IPCC, 2022)**.**

Mainly, the main objective, will be focused on the development of proposals for Carbon Neutral and scientific development in ecological restoration and rescaling in the conditions of Climate Change and scientific support for Adaptive and Ecosystem Management in the Danube Delta Biosphere Reserve, as a separate research-innovation direction of administrative operational projects, but at the same time excellent research, such as complex theories of entropy and aggregation.

At present, there are many arguments which convincingly demonstrate that sufficient time has elapsed to accumulate the data and facts strictly necessary to conclude, whether or not only preliminary, concerning what is, conceptually, merging, overlapping, in an unprecedented way, of the crisis of biodiversity loss and coastal erosion due to rising sea levels and decarbonisation:

- Construction of Lake Complexes in the Black Sea according to the natural model of the genesis of the Danube Delta, complexes located at the mouths of the outflow, where the accumulation phenomenon is more developed (Panin, Tiron, & Dutu, 2016).
- Increasing the sequestration time of C, by mineralizing of organic carbon. As the mineralization of the residual material is performed, the nutrients associated with dissolved organic C (DOC) and organic C particles (POC) can be released and transported to surface waters. Depending on abiotic and biotic processes, sequestration or C emission from a wetland may vary, biotic processes may include vegetation uptake by assimilation by planktonic communities, while abiotic processes may include adsorption, precipitation, and soil balance. and water columns.

It can be said that concrete measures are required, first of all (which is perfectly true), but we must not forget that nothing has a greater practical value than a good theory. **Without solid theoretical support**, even the most basic control measures do not have the consistency necessary to give the expected results.

From a scientific perspective, it is necessary to assume a realistic assessment of the limits of economic systems, where only the role of natural capital as a vital factor of production is reflected, to a very small extent; the exclusivity of private profit as a performance indicator must be abandoned, to make possible a multicriteria approach, in a holistic, integrative context.

Economic and environmental criteria must be complemented by socio-political criteria. It should be noted, in this context, that the multifunctional spatial planning of the Lower Danube Meadow / Romanian Sector is partially or totally replaced by advantages appropriate to the individual time scale (generated by agrosystems) with advantages appropriate to the social time scale (generated by wetlands); therefore, the socio-political criteria can significantly correct the result of the analysis of the economic-ecological efficiency.

3D – DANUBE DELTA DECARBONIZATION STRATEGY

The main objective is to develop proposals for Biodiversity Conservation and Sustainable Development in the context of Climate Change and scientific support for Adaptive and Ecosystem Management in the Danube Delta Biosphere Reserve. They represent a distinct direction of research innovation providing support in administrative operational projects, but at the same time research with a high degree of excellence, such as molecular genetics studies, not addressed at the institutional level so far (INCDDD Tulcea, 2022).

This complex, inter-, multi-, and trans-disciplinary approach can be implemented by the specialists of several disciplines, grouped in

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research nuclei correlated with the directions and priorities defined by the 3D Strategy.

The scientific community agrees that an economic system based on fossil fuels, intensive agriculture, and the unsustainable exploitation of global natural resources have irreversible effects on the environment. The effects of the current economic system such as climate change, air and ocean pollution, and ecological decline are causing material and human damage to tens of millions of people globally. Thus, there is a real risk of catastrophic damage to our economies and societies over the next few decades if the forms that currently dominate production and consumption are not radically changed.

Under the Paris Agreement, many countries have agreed to set a target to reduce greenhouse gas emissions sufficiently to keep the average global temperature rise below 2°C above pre-industrial levels. Keeping global temperatures above 2°C requires limiting greenhouse gas concentrations in the Earth's atmosphere to about 450 ppm of CO_2 equivalent emissions. As we can see from Figure 1, the time left to complete this change is very short. A massive effort to decarbonise is absolutely necessary over the next three decades. Forecasts show that in order to achieve reductions in line with the proposed 2°C target, CO_2 emissions from the electricity sectors of OECD countries, for example, should be reduced by 90% by the middle of the century (Volintiru et al, 2019).

Among the issues addressed at the 3D strategic level:

1. Issues specific to greenhouse gas emissions:

• Restoration of wetlands to offset carbon emissions. Wetlands have been systematically destroyed throughout Europe over the past century. Restoration of these areas is gaining importance in the carbon sequestration process due to a large number of scientific papers showing their ability to capture carbon emissions.

• Monitoring land-use change and specifically forestry, including deforestation and the need for sustainable practice through satellite monitoring techniques. The development of carbon sequestration "industries" and organic farming is an opportunity with great potential to accelerate the transition to a carbon-neutral economy. Vulnerability of the natural environment, forests, compact reed areas to climate change, the need for more innovations in the value chain of natural resources, and the difficulty of integrating biodiversity conservation and various landscaping in agriculture, fisheries, and forestry make land-use an important subject for storage and carbon sequestration through proper land and forest management (as well as ecosystem-based approaches) (Tognetti, Smith, & Panzacchi, 2021).

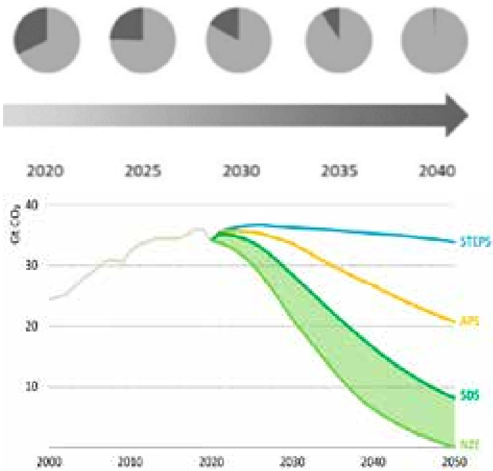

Figure 1. (top) Carbon Budget Evolution - Source IEA 2015 (bottom) CO_2 emissions in the WEO-2021 scenarios over time (IEA, 2021)

• Carbon capture, storage, use, and/or disposal. These "new industries" in which researchers, either by chemical processes or by facilitating natural processes, obtain new fuels and industrial products require investment in research and development. These processes support the capture, storage, use, and/or disposal of carbon with effects in decarbonising the economy.

• Industrial (process) emissions have been identified as a major problem for the carbon transition, with untapped potential for improving industrial efficiency (for example, through the use of alternative energy sources or the recovery of waste heat).

2. Specific economic sectors:

• Agriculture is a major emitter of greenhouse gases (especially animal husbandry), with significant opportunities at the local level to improve production cycles and reduce carbon emissions.

• Sustainable industrial production. The need to support sustainable production systems based on green energy and to encourage the use of new technologies and circular business models leads to the establishment of sustainable production standards.

• Waste management, recycling, reuse, and circularity in practice - have been identified each year as an important issue for communities, as well as the need for integration into policies to reduce pollution and change the culture of consumers.

3. Economic, legal and social models

• Economic models - including sustainable consumption and production, circular and life cycle rethinking. They need to be focused on resource efficiency, resilience, and conscious consumption or production based on the search for plans, strategies, and investments.

• Reducing the Carbon Footprint by Changing Consumer Behavior - there is a need for a cultural shift towards lower consumption, less waste, and more conscious decisions. These fundamental changes in behavior can only be implemented through the use of mixed economic, social, financial, and legislative policies (BIO Intelligence Service, 2012).

• The need for a regulatory system with an intersectoral approach.

• Fairness and fairness - these are linked to a transition that requires major socio-economic changes and the active involvement and participation of citizens and communities. Dealing with the effects of the transition on employment is often seen as a challenge, but many changes are expected to have a positive impact on employment, through proper training and education opportunities.

4. Public policy issues

• Public investment - including research and development - is seen as an opportunity to support clean technologies and administrative solutions that are needed to accelerate the low-carbon transition. Public transport, renewable energy sources, and electric vehicles are some of the areas that need public support (Gielen, et al., 2019).

• Taxes and fiscal policy are framed in both opportunities and challenges. In general, taxes reflect more on the behavior that needs to be encouraged or discouraged.

• Spatial Policy and Planning - an important issue includes creating synergies between urban and rural areas. The future of spatial policy and planning also faces challenges in developing suburban areas and the availability of workspaces in a way that does not promote road travel. Moreover, such a policy must take into account the regions and areas that will suffer from the energy transition.

• Carbon budgets - policies need to set ambitious but realistic decarbonisation targets that are seen as an opportunity in general. However, there are uncertainties, including scientific ones, which is why assessing the feasibility of these ambitious targets is very important. It is important to set carbon budgets and five-year targets for each administrative entity. The EU's overall goal is currently a challenge for all levels of society, as the 2050 zero emissions target is very difficult to achieve (Matthews, et al., 2020).

5. Multi-disciplinary studies on environmental issues

• Co-benefits, opportunities for improved air quality, improved health, reduced pollution, reduced biodiversity loss, economic development around regional supply chains, new industries, and job creation, energy security, and other environmental benefits.

6. Energy policies

• Renewable energy (as part of a clean or green energy system), emphasizing the need to develop renewable energy sources and technologies that inject more renewable energy into the grid. Several opportunities are emerging in this direction and include improving synergies between territories - given the Biosphere Reserve, decentralization of the energy system, research and development to improve existing technologies, and harnessing the potential. Rural areas can be a hub for solar energy and have the potential to produce renewable energy to provide for urban areas as well.

Considered a challenge between green restoration projects and the energy sources on which urban industries depend, as well as the need for energy storage (Bergmann, Colombo, & Hanley, 2008).

• Energy efficiency in buildings, especially for renovations, but also new buildings, identified as an important issue representing both an opportunity and a challenge. In general, new buildings have the potential to become carbon neutral as well as renovating their existing building stock. This requires investment in improving heating and cooling technologies but also in building materials. Improving the energy efficiency of homes also requires trained professionals and has the potential to create jobs (Khan, 2013).

• Fossil fuels are an important issue. Banning the use, import, and production of fossil fuels can be seen as an opportunity for the green and renewable energy market, but it is more of a challenge. Transport, infrastructure, and production in shipping are geared towards fossil fuels. Another challenge is the difficulty of removing hazardous pollutants from fossil fuels from the atmosphere.

• The use and efficiency of the energy industry are seen as a challenge in terms of the need for significant innovation and investment to further reduce energy consumption.

• Emissions from mobility and transport activities:

i. Cars and road transport and ships, shipping have been identified as opportunities, such as the development of biofuels and environmentally friendly modes of transport (eg cycling, car/ship exchange, or the use of electric vehicles).

ii. Public transport - development of the public transport network.

We consider that this 3D concept is itself a "challenge" for its authors, not only at the technical level, for analysis and elaboration of considerations, but also at the professional level. The opportunity to design this strategy allowed us to carry out an extensive, current, and objective analysis of the state of play of the EU Neutral Carbon policy. The current context inextricably links us to the environment in the conduct of daily activities, but also to the transfer of information between all entities, from companies, organizations, and government agencies to end-users. Also evolving, the virtual environment also generates opportunities for the development of the information society and can make a decisive contribution to the implementation of 3D.

The **general objective** of this desideratum is the analysis of the current challenges present in the field of Neutral Carbon, identifying the development paths but also the threats, vulnerabilities, and risks. The implementation capacity is studied, both at the national and European, and regional levels. The specific objectives of the project are to identify and classify resources but also vulnerabilities and risks present, analyze the evolution and structure of the ecosystem and adaptive management, identify good practices on Neutral Carbon, prevent and limit the effects of climate change, research preparedness to counter risks and challenges, the analysis of the cooperation between the public and the private sector in the field of Neutral Carbon and the proposal of some policies to harmonize the normative framework in Romania with the European recommendations in the field.

The development of a strategy to fulfill the mission for which it was designed includes the consideration of a long-term vision, as well as a risk assessment, precisely so that the design of the systems can answer the questions "what", "how", “who” and “how much”.

3D vision has 3 axes:

• 3D Initiative proposes a vision of the Danube Delta transformations, related to all economic and societal components, towards a well-preserved biodiverse region with net-zero greenhouse gas emissions by 2050 (with significantly reduced carbon footprint by 2030), in a social innovative context, enriching local economy and capitalising the local opportunities for job creation and local population benefits.

• This systematic multidisciplinary initiative proposes a complete innovation management process (supported by innovation agencies and companies in the group) in order to bring the region to the decarbonisation goal.

• In this scope, there will be projects on all levels, from Research to Innovations, Scaling Up actions, towards Business and Industry, targeting as an important milestone Social Innovation with Job Creation.

Looking ahead, it is assumed that system performance challenges will take place and

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new ways of implementing are actively being sought (Figure 2).

Starting from the fact that the *relationship between climate change, atmospheric structure, respectively greenhouse gases (GHG), and other critical factors for the environment, globally, which can interact with climate change, such as alteration of the water cycle, changes in biogeochemical cycles, soil and coastal erosion, reduction of sea salinity, loss of biodiversity,* is a complex of specificities, given by the duration of processes, diversity, and causality, both endogenous and exogenous system, analysis of various variants and intensities of manifestation is required as an objective need for the functioning of the hydro-geo-morphological (HGM) and socio-ecological (SSE) systems. The strategy has 5 Pillars and 6 Interdisciplinary domains. Figure 3 emphasizes the schedule of the actual stage with stakeholders involved in 3D.

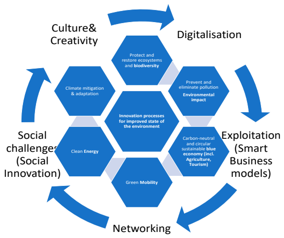

Figure 2. 3D Inter-relationship

Considering the current state of floodplain and deltaic ecosystems, their spatial distribution and major biometric characteristics, permanent climate change, accelerating regimes of warping of canal and lake clogging, and dramatic increases in anthropogenic pressure with a particularly negative impact on deltaic ecosystems, future climates of the region can lead to substantial drying up in large areas, damage to ecosystems and their services and, above all, to global warming.

Figure 3. Pillars of 3D Strategy

ARGUMENTS FOR 3D

1. **Climate change** is the notion that acts on the system, which consists of the two major subsystems in constant transformation: man, with his activities (SES) and nature (HGM) but the content of this notion is huge, consisting of many features on which have the elements included in the scope of this notion.

Any change in the elements of the system, in their interactions, in the external vectors, can lead to climatic variations, and the statistically significant variations in the climate characteristics are called climate changes.

We presented the atmospheric structure, because in this notion GHG acts, as follows:

The dry atmosphere contains:

■ gases that are not influenced by the infrared rays emitted by the Earth and are weakly influenced by solar radiation: (by volume) nitrogen (N_2) 78.08%, oxygen (O_2) 20.95%, argon (Ar) 0.934%;

■ gases that absorb and emit infrared radiation: carbon dioxide (CO_2) 0.04%, methane (CH_4) 0.0017‰, nitrous oxide (N_2O) 0.00003‰, ozone (O_3), these are called "Greenhouse gases" (GHG) and play a key role in the Earth's energy balance. But the normal atmosphere contains approx. 1% water vapor (H_2O), and this is the strongest natural GHG and the most variable component of the atmosphere.

Because water vapor only stays in the atmosphere for a few days or weeks before the rain, hence the water vapor inventory can change very quickly. In most general models for water vapor circulation, vapor parameters depend on the temperature at the surface of the oceans (e.g.: 8% per degree Celsius), and the relative humidity remains almost constant. Therefore, the changes that occur in the value of water vapor parameters will amplify the primary phenomena. For example, in the case of an excess of anthropogenic CO_2, in most models, the water vapor feedback amplifies the primary forcing of greenhouse gases 2-3 times.

There is a global consensus, most recently expressed in the Paris Agreement, that the change in global average temperature must remain well below 2°C. In this way, it is hoped to avoid the most severe effects of global warming on human societies, which include rising sea levels, increased frequency, and intensity of droughts, floods, and other extreme weather events, resulting in reduced food production, threatening the livelihood of millions of people and adding to existing migration pressures.

If the EU, GHG emissions budget were based only on cost considerations as low as possible, it would vary between 50 Gt (in the 1.5°C scenarios) and 90 Gt (in the 2°C scenarios), for the period 2020-2100. With current annual emissions at around 4 Gt, the EU would use its budget for 1.5°C by 2032. In scenarios for 2°C, the EU budget could be depleted by 2042, concludes the 2018 study (Ohlendorf, Vob, Velten, & Benjamin, 2018).

2. Biosphere

Earth Planet is a closed system for matter (except for small amounts of cosmic debris that enter the atmosphere), in other words, all the elements necessary for the structural and chemical processes of life have existed in the Earth's crust since it was formed. The ecosystem works by entraining solar energy and nutrients in the biological circuit where, by transformation into organic substances, it enters the structure of populations in the biocenosis.

The U.N.O. report "Millennium Ecosystem Assessment", in 2004, defines the ecosystem as "a dynamic complex composed of plants, animals, microorganisms and the surrounding still life, interacting as a functional unit."On a global scale, this movement forms geo-biochemical cycles, and the chemical elements and substances involved in the construction of the living world, called bioelements, go through these cycles in nature, with their own speeds and durations (Council Directive 92/43/EEC) (e.g. water circuit, carbon, nitrogen, phosphorus, organic matter circuit).

Geo-biochemical cycles are disrupted by extreme natural events and anthropogenic interventions. Many biogeochemical processes due to these interventions radically change the speed, intensity, and balance of some cycles, and we refer here, especially to the water circuit - which is responsible for carrying out metabolic processes in cells, maintaining the flow of nutrients through ecosystems, heat and energy distribution. - and the very long carbon cycle, geologists estimate that each carbon atom on Earth has made approx. 30 cycles in the 4 billion years since life is thought to exist here. In nature, carbon is found in oxidized form (CO and CO_2) or reduced form (methane and organic matter).

Some bacteria participate in carbon sequestration, and others produce methane from H_2 and CO_2. Carbon is also stored in the $CaCO_3$ of shells and the skeleton of organisms. In the last century, large amounts of carbon generated by human society have entered the environment, half of them remaining in the atmosphere. Mainly, global warming is a natural process: the sun's rays enter the atmosphere and reach the Earth's surface, where about half of the sun's heat is stored by the earth's crust and oceans, the rest being reflected back into space. The biosphere directly influences global warming, leading to cyclical global warming/cooling processes that take place over millions of years. Increasing the concentration of greenhouse gases in the atmosphere acts as a shield that prevents some of the infrared radiation reflected from the Earth's surface from reaching space. So we are witnessing an increase in global temperature as more and more heat is stored in the atmosphere, in the earth's crust, and the ocean water. And the most important greenhouse gas is carbon dioxide (CO_2), resulting from both natural processes and human industrial activity, based primarily on burning fossil fuels.

3. Carbon budget

The "carbon budget" shows us how much longer we can afford to pollute (how much CO_2 we can emit into the atmosphere) so as not to exceed a certain limit of global average temperature rise. The first annual "Global Carbon Budget" report have been published since 2005 by the organization Global Carbon Project (which was set up in 2001 to quantify carbon emissions and identify their sources), but only recently since 2013, they have become official reports of the IPCC (Intergovernmental Panel on Climate Change, a body set up by the United Nations to study climate change) (Figure 4).

Specialists' calculations show that in order to eliminate the pollution produced in the last 150 years, we would need to remove about 1,200 gigatonnes of CO_2 from the atmosphere. We do not discuss how long it would take for such a thing (if we assume, by absurdity, that we can decarbonize about 40 gigatonnes of CO_2 annually, so the pollution we produce in a year, we would need about 30 years) (Figure 5).

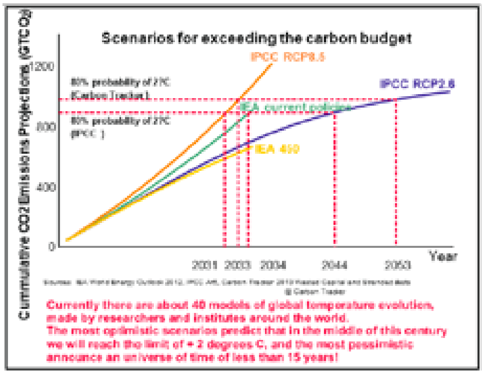

Figure 4. C Budget Scenarios (https://stiintasitehnica.com/carbon-budget-carbon-bubble-carbon-capture-groparii-economiei-fossil-fuels/)

The associated cost of capturing and sequestrating this impressive amount of carbon (1.2 billion tonnes of CO_2) would amount to about $ 150 trillion.

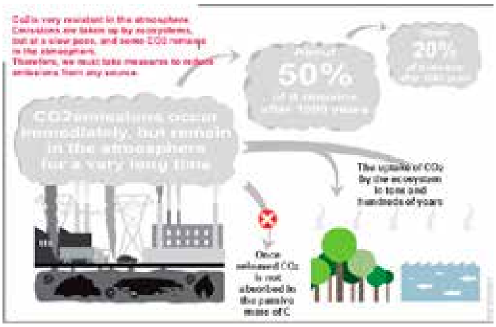

Figure 5. Carbon dioxide has long-term effects. The "recycling" of CO_2 emissions is the responsibility of plants in the ecosystem and the oceans. Human industrial activity and the intensive burning of fossil fuels (coal, oil, natural gas) have led to the accumulation in a very short time of a very large amount of CO_2 which adds to the carbon dioxide that already exists in the planet's cycle - so the biosphere and oceans need to process more CO_2, but this takes decades or centuries. Therefore, carbon dioxide accumulates massively in the atmosphere, directly contributing to the greenhouse effect. Experts estimate that in a century, only half of the anthropogenic carbon dioxide (emitted by humans) could be eliminated naturally, and after 1,000 years about 20% of this CO_2 would still remain in the atmosphere. (https://stiintasitehnica.com/decarbonizarea-atmosferei-noua-provocare-tehnologica-secolului)

4. Terrestrial/Wetland Ratio

In recent years, the expression "carbon sequestration" has become more and more common. It all started with an interesting hypothesis: if the surplus of carbon emitted into the atmosphere (due to human pollution) accelerates the phenomenon of global warming, could the extraction of this carbon not slow down climate change so that we have time to find solutions to understand them and adapt to new conditions.

Photosynthesis is the natural process by which plants absorb CO_2 from the atmosphere, which they separate, under the action of the sun's rays, into carbon (which they use as "food") and oxygen (which they emit back into the atmosphere as "residue"). Once the plants finish their life cycle, they begin to decompose. However, if there are certain conservation conditions (as in swamps, for example), plants are transformed, over millions of years, into what we now call fossil fuels: coal, oil, and natural gas.

In this context, maintaining swamps and wetlands is essential for adapting to climate change. Also, in the European context to meet the GHG reduction targets proposed by the European Commission for 2030 (40% at the EU level), Romania can no longer rely on "economic shocks" as it did in the first commitment period. (2008-2012 compared to 1990). Additional investment will be needed to achieve the required reductions while maintaining an acceptable level of economic growth - World Bank (2014) - Romania, Climate Change Program and Low Carbon Green Growth, Synthesis Report of Component B, Summary of Rapid Sector Assessments and Recommendations for Incorporating Climate Actions into Romania's Sectoral Operational Programs 2014-2020, January 2014. Meeting the 2030 target on reducing GHG emissions could have an impact on Romania's economy as GHG emissions today are rising again, having reached the lowest level (in 2012) compared to the levels of 1989. Therefore, when considering the potential effects of the 40% target, it will be important to pay attention to the aspects regarding the inclusion of the land use and forestry sector, not included in the previous commitments of the EU (LULUCF).

Wetlands are among the most important ecosystems in the carbon sequestration (CS) response strategy. However, their current CS potential is declining due to human disturbances, with a further decrease expected in the context of global population growth and climate change. Various measures are mentioned in the literature that seeks to improve CS through wetlands and therefore allow these ecosystems to remain vital in the global carbon (C) balance and climate change mitigation.

"A critical analysis of these measures, regarding their feasibility and impact on the functioning of wetlands, both ecologically and socio-economically indicates that the CS can be improved both by non-imposed measures and by a manipulative impulse. Non-manipulative measures aim at improving CS by spatially expanding wetlands, while manipulative measures aim at changing the characteristics of certain characteristic wetland components that influence CS.

Their overall objective is to increase the intake of organic matter, the allocation of C in the pools with longer life, and the increase of sequestration time. Based on the identified research knowledge, we recommend that CS actions for wetlands be addressed as a matter of priority in order to conserve existing natural wetlands.

Additional measures should take into account the associated risks, such as those on wetland flora and fauna, soil and hydrological regimes, and ecosystem services. In addition, we believe that the successful implementation of the measures that are imposed on the CS will require the attachment of economic incentives that are not only predictable but also adequate to meet the yields of competing land uses" (https://link.springer.com/article/10.1007/s41748-019-00094-0).

CONCLUSIONS

The impact of the current economic system on climate change, air and ocean pollution, and ecological decline are causing material and human damage to tens of millions of people globally. Thus, there is a real risk of catastrophic damage to our economies and societies over the next few decades if the forms that currently are dominated by production and consumption are not radically changed.

Considering the current state of floodplain and deltaic ecosystems, their spatial distribution and major biometric characteristics, permanent climate change, accelerating regimes of warping of canal and lake clogging, and dramatic increases in anthropogenic pressure with a particularly negative impact on deltaic ecosystems, future climates of the region can lead to substantial drying up in large areas, damage to ecosystems and their services and, above all, to global warming, the 3D Strategy is an indispensable instrument to adapt and mitigate the negative consequences of climate change.

3D Strategy is essential to ensure climate resilience and more sustainable and resilient development, Romania participates in global efforts to reduce greenhouse gas emissions, aiming to reduce its emissions by 20% by 2020, by 40% by 2030, and by 80-95% by 2050.

It can be said that, above all, concrete measures are required (which is perfectly true), but we must not forget that nothing has a greater practical value than a good theory. Without solid theoretical support, even the most basic control measures do not have the consistency necessary to give the expected results.

From now on, there are many fundamental changes in a multitude of connections, between the economic strength of a country and public health in the same territory, between labor and capital, between the market and public policies, between internal and external factors, between the individual and the communities to which he belongs, between the local communities and all the inhabitants of a state. For these reasons, an unprecedented mobilization and reallocation of resources has been and is needed, because only in this way can the battles for survival be won in the face of radical changes in the entire dominant social system in the world today.

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