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CIRCULAR ECONOMY AND ITS INTEGRATION IN THE MOUNTAIN ECONOMY

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Abstract

The actual economic development is increasingly conditioned by the environment and resources. Reducing the impact of human activities on the environment and decreasing the pressure on natural resources are requirements that can be achieved by adopting a circular economy, in order to replace the economy based on a linear process of production and consumption. The concept of circular economy is strongly used, both in Europe and worldwide, but, apart from a few practical models, the rest is limited to ideas and concepts. The aim of this article is to enhance to the scientific research of the circular economy and its impact on the mountain economy, especially on biodiversity. First of all, this article will focus on the definition of the circular economy, from the point of view of the sustainable development of the mountain area in Romania, and, secondly, this paper adopt a critical analysis of the concept, from the perspective of biodiversity. Considering that there are a lot of theories on the international level that argue and prove the potential of the circular economy, we refer to a few national models of circular economy, as landmarks, to support its application in the Romanian mountain area.

Keywords: mountain area, circular economy, sustainable development, biodiversity

1. INTRODUCTION

Worldwide, the studies estimate that the volume of the consumed resources will double until 2030, in the context of the tripling of world production between 2010 and 2030 [12]. While the pressure of the somewhat uncontrolled exploitation of natural resources is increasing, generated by economic development and population growth, the availability of resources will decrease dramatically.
Thus, there will be stocks of non-renewable resources that will remain inaccessible for a long period of time, and for renewable resources only a sustainable management would ensure the necessary productivity.
A sustainable management of natural, non-renewable resources needs an efficient and reasonable approach to stocks [32].
The actual economic models cannot support a sustainable growth of global production, because most of them are based on linear processes of production and consumption and on the exploitation of natural resources, apparently unlimited. In this sense, the circular economy tries to approach and eliminate, both environmental and economic risks, deriving from the shortcomings of current economic models, as far as possible.
Recently, both internationally, but especially in Europe, the concept of circular economy is increasingly being promoted as the only way to recover the impact of destructive human activities on the environment, to increase competitiveness, innovation and technological research.
By reducing waste and optimizing the consumption of natural resources, the circular economy contributes to cutting down wasted and achieving the goals of sustainable development and environmental protection.
In Romania, efforts are being made to understand the new circular economy, think strategies and seek financing solutions.

2. THE CONCEPT OF CIRCULAR ECONOMY

The concept of circular economy appeared in the USA in the mid-1960s when the American economist Boulding expressed the idea of recycling waste in his book "Earth as Spaceship" (1965). Later on, the terminology of "circular economy" has been introduced by the English economist David T. Beers in the volume "Economic of Natural Resources and the Environment".
Nowadays, the circular economy is an intense concept provided by the European Union, by several national governments including Japan, China, the United Kingdom, France, Canada, the Netherlands, Sweden and Finland, as well as by several business actors, worldwide located.
In view of the global resources deficit, the concept of circular economy has gained momentum by being transposed it into practice, especially in developed countries, where various models have been built: the United States (high-tech production), the Netherlands and Germany. (waste disposal technologies), Denmark (technologies in the green industry), Japan (a new industrial network).
Moreover, in other countries of Europe, the concept of circular economy has been advancing in Spain (circular bioeconomy), in Finland (in 2017, the national plan for circular economy was adopted), in France (in 2018 a roadmap on the circular economy), in Slovakia (amendment of the legislation in 2019, on waste management and inclusion of the circular economy and bioeconomy).

2.1. What is circular economy?

The circular economy can already be considered a promising concept, because it has succeeded to attract the business community towards sustainable development activities. According to this concept, the products/services have to be used several times, because a lot of work is included in their production and the raw materials are extracted from nature,

something that is more and more difficult to achieve. Compared to the linear flow, it reduces the consumption of primary resources, the production of waste and harmful emissions. The circular economy model follows the natural cycle, taking into account the physical flows of materials and energy. In the circular economy, it is highlighted the importance of high quality material cycles, the consumption culture and sustainable production, however being certain limitations regarding thermodynamics, defining the limits of the circular economy system, challenges in governance and inter-organizational management, material flows and inter-sectoral energy [19].

According to the studies carried out, most authors focused on improving the environmental performance of the circular economy, compared to the sustainability that encompasses the three dimensions: economic, social and environmental. The circular economy is seen as a condition for sustainability. This is seen as a regeneration system where the contribution of resources, waste, emissions and energy losses are reduced by slowing down, closing and narrowing the material and energy loops, this objective being achieved by designing, maintaining, repairing, reusing, restoring, long-term recycling. From the point of view of economic performance, sustainability is integrated for the benefit of present and future generations [14].

Experts from the Ellen McCarthur Foundation, an institution dedicated to the concept of the circular economy, have identified several key principles of the new economic field: improving and, at the same time, preserving natural capital through an efficient control of resources, as well as balancing the flows of renewable resources; streamlining the benefits offered by natural resources through a better recirculation of materials and finished products; optimizing the entire production system, and promoting this activity, by presenting negative externalities: water, air, soil pollution, toxins, the dangers of climate change. In short, a poor state of health of the whole environment" [11]. These principles underlie other actions involving the circular economy - "reusing, repairing, refurbishing, redistributing, and of course recycling" products and materials in an ideally closed loop [1].

What distinguishes the circular economy is the fact that the economic model is mainly based on production models that replace the concept of "end of life" by reusing, repurposing, redistributing consumer materials. All this leads to sustainable development, which improves the quality of life and the environment, ensures economic prosperity and social equity, all for the benefit of present and future generations [18].

2.2. Circular economy versus linear economy

At the beginning, humanity was based on a cyclical economy, an economy in which resources were used carefully and the resulting waste was minimal. The concept of sustainable development originated, over two thousand years ago, in Ancient Greece when, in those times, the Greeks were organized into tribes/families (genos). In this context, around the year 400 BC, Aristotle used the concept of "household economy", which assumed that the family had to support itself and not just be consumer oriented.

The concept of sustainable development has often been equated with sustainability, a term that originated in forestry, between the 12th and 16th centuries, when a balance between the consumption of resources and their regeneration capacity had to be ensured.

However, starting with the Industrial Revolution, the concept of cyclical economy has gradually eroded its applicability, being replaced by the new concept of linear economy.

The concept of linear economy continued with the global expansion. According to this model (extract-produce-use-throw), significant economic results could only be obtained by allocating certain resources.

Even for a century (between the 1800-1900), the global population increased from one billion to around two billion people, between 1900-2000, the global population would have reached about six billion inhabitants. In July 2015, the world's population was 7.3 billion (currently exceeding 8 billion), and global needs exceeded Earth's regeneration capacity by more than 50%.

Given only the demographic evolution, the idea of unlimited production, supported by the linear model, is no longer viable. Physically, it is impossible to continue with a quantitative growth of resources extracted from the environment, as production increases and waste is thrown away.

In this regard, long-term solutions must be found, but they cannot be adopted individually, given the interdependence and interconnection that characterize the current process of globalization. These solutions need to be globally addressed because, as a result of stronger environmental protection measures adopted in certain geographical regions, many situations have been noted where certain activities have been effectively worldwide relocated to the regions/countries where environmental protection was not a priority.

Given the solutions that need to be globally addressed, the idea of "prosperity without growth" observed by Jackson T. in his book "Prosperity Without Growth?" requires a major paradigm shift, similar with that change generated by the first industrial revolution.

A new economic model is needed, which has to include more people who enjoy a better standard of living, without increasing the consumption of raw materials and waste, and this model is given by the circular economy.

2.3. Transition to circular economy

The transition to the circular economy involves four major steps: - recycling of resources and energy; - reducing the demand for resources and recovering waste; - multi-level approach; - finding a way to achieve sustainable development and close relations with innovation [20].

The circular economy involves innovations in the production of goods and services, the way they are consumed and the ways in which the legal norms meant to support this model are issued and updated.

The benefits of the transition to the circular economy (Table 1) are definitely in contrast with traditional linear economic models, which consist of an infinite source of resources and which do not take into account the product of life.

Table 1. The benefits of the transition to a circular economy (*own source*)

ENVIRONMENT	Thanks to improvements in waste management and lower energy consumption, nature and, of course, everyone will benefit from reduced gas emissions generated by eventual overexploitation of resources.
ECONOMIC AND RESOURCES SECURITY	Dependence on imports considerably lowers the risk associated with price volatility and thus greater stability of natural resources, whether renewable or non-renewable, will be ensured.
ECONOMIC COMPETITIVENESS	Areas that already apply the concept and principles of the circular economy will be more competitive because it increases efficiency in terms of resource consumption. The transition to the circular economy insists on innovation, thus new markets will be opened, new jobs will be created for the production of products and services.
HEALTH AND SAFETY	It is expected, using the principles of the circular economy and the promotion of a sustainable consumption of resources, improvements in the quality of life.

The purpose of the circular economy is mainly focused on reducing waste, by maintaining materials and products within the production consumption chain as much as possible, in addition to maintaining the usefulness and high value of the products at all points in the production-consumption cycle. The circular economy cycle starts with the design of the product, considering what will happen to it at the end of its life. According to the new economic concept, the materials from which a product is made are preserved as much as possible [22]. The aim is to reduce the unsustainable exploitation of the resources and energy introduced in the manufacturing process as much as possible.

Like any other paradigm, the circular economy also has parties that require either delays or reformulations, as result of the conservative rejection reaction. Thus, the transition to the circular economy brings new challenges, presented in Table 2.

Table 2. Possible challenges to transition to the circular economy (*Own source*)

USER EDUCATION	The current curriculum does not contain elements and information related to the beneficiaries, regardless of specialization. Not all workers have the necessary skills for new types of jobs and no up-to-date way to make products according to the concepts and principles found in the circular economy.
CONSUMER EDUCATION	The population is not initially trained to make long-term use of resources, to manage and reduce waste, or to buy sustainable products.
ADMINISTRATION	The administrative structures, especially in Romania, are currently not very familiar with these concepts specific to the circular economy. In these conditions, the authorities will have to adopt a specific management at all levels (national and local).

Given the fact that the Japanese have shown that circular economy is possible, all the above-mentioned challenges are barriers that can be easily removed through a more effective prevention and warning system, organized both in schools and in society, in general.

As Japan has managed to integrate the circular economy into the daily lives of its citizens, through the right policies, properly administrated structures and the extension of the concept on a national scale, other countries (including Romania), could achieve it too, because the circular economy has become a necessity, in the context of sustainable development.

In Romania, before 1989, the 3R concept (recovery-reuse-reconditioning) and a certain type of circular economy were used in all branches of the socialist economy. The materials were recycled and the industries were set up and built in such a way that they functioned in a variety of manufacturing chain where the waste resulting from a certain section, constituted raw materials/resources in another section, with its limitations being caused by exacerbated pollution, which, at the time given, was definitely not an impediment.

Regarding the recycling of resources, the 3R concept was extended at national level, including education in schools aimed at this aspect, having not only a purely theoretical character, in the learning process, but especially a practical one, through the process of selective waste collection from paper, glass, etc. Even inside the factories, the resulting waste was taken over in other industries, as in the cotton spinning mills, all the resulting scales were collected with special brushes and used later in the plush and various products industry, which used these resources, as filling materials.

2.4. Barriers related transition to the circular economy

Obstacles to the transition to the circular economy are both technological and cultural, as a result of low consumer interest, level of information and warning, and insufficient organizational culture.

According to De Jesus and Mendonça (2018), there are four categories of barriers, which block the application of the circular economy: cultural, technological, regulatory and market.

Cultural barriers appear as a result of low interest, especially from consumers and producers, caused by the lack of specialists on sustainable development, decision-making factors (tons on the top) and a supply/distribution linear chain which is not willing to adopt the concept of circular economy. Organizational culture is very important to change the orientation towards the circular economy.

Technological barriers have always been a brake on the transition to the circular economy due to the fact that new technologies involve both innovation (the idea itself) and large financial resources. "Technological development is slow" [16].

Market barriers are the result of low prices of primary resources, compared to resources from recycled materials. The latter are expensive and if primary resource prices will increased, then the focus on recycled materials would be different, and the circular economy would benefit.

Regulatory barriers arise from a number of legislative acts, which are not updated, yet. Nowadays, the current legislation prevents the application of the circular economy, due to the fact that certain residues can only be recycled at high costs, or with border barriers, or simply because certain legal provisions prevent the use of recycled materials. Moreover, by the introduction tax facilities or other state aids the repair activity (instead of buying new products) and the activity of investing in new technologies could be stimulated. In this way it would be eliminated the excuse that the circular activity is too expensive, and, the transition from the classical linear system to the circular one would be encouraged.

In order to overcome the barriers mentioned above, the role of governments is essential. Through a series of measures, the governments should act, much more intensely, in order to decrease the linear economy (for example, by reducing subsidies) and to increase circular products (lower taxes and fees). These barriers can only be overcome through a constant effort in order to get out of the deep-rooted culture (both among producers and consumers) and to promote "best practice" business models in the field of sustainable development.

3. INTEGRATION OF THE CIRCULAR ECONOMY INTO THE MOUNTAIN ECONOMY

The mountain economy has enough specific characteristics in order to be included among the strategic priorities of a nation. For many people, mountains are sacred places where daily life is blessed. Also, for most of the inhabitants of the big cities, the mountains become areas of leisure and relaxation.

More than half of humanity depends on the mountain hydrographic basins for clean water supply. The mountain settlements serve as wood, mineral and hydroelectric deposits for the growing populations in the hill and plain areas. Thus, the mountain communities have become guardians of global resources that cannot be easily replaced. However, these isolated communities living in higher elevations suffer from limited access, no recognized property rights, and this leads to little control over the natural resources they manage. Throughout history, these communities in the mountain area have been isolated including from politics and economic concepts and feel powerless in making decisions that affect their lives. Their isolation limits access to a lot of data, and participation in foreign markets is usually based on uneven and unfavorable trading conditions [5].

If mountain communities are not mandated as critical administrators of natural resources and are not given secure property and use rights, access to information and decision-making and better standards of living, they could be forced to exploit other opportunities, even more important, as it may not be able to prevent the unreasonable over-exploitation of natural resources.

The World Organization for Agriculture recently analyzed, through a survey addressed to specialists, the issue of prices and the flow of resources and ecosystem services to and from mountain areas. Models of innovative financial mechanisms that could reverse the downward flow of benefits were thus gathered.

The main objective of FAO is represented by the increasingly important investments for the education of citizens and for the protection of natural resources, thus contributing to sustainable use of mountain resources globally (Talabă, 2011). [25]. Thus, mechanisms have been identified that have the potential for major adoption in mountain areas: transfer property and conservation rights, commercialization of spring water rights, fees for the use of various outdoor recreation areas, royalties, entrance fees, tourism taxes, hunting and fishing taxes, environmental taxes, regional brands, cooperatives, microfinance, foreign aid, trust funds, as well as the mobilization of funds from the private sector.

These stipulated conditions indicate that more and more upstream and downstream communities recognize the negative consequences of the unsustainable use of mountain resources and therefore try to realize and implement solutions aimed at mitigating the negative effects. At the same time, stakeholders are looking for models that have already proven successful and can adapt to their situation [21].

3.1. The mountain economy and its natural resources

Limiting ourselves only to Europe, forests cover 41% of its mountain area, and in 17 countries the wooded land represents more than 50% of the mountain area.

The forests surface in Europe has increased by 18 million hectares since 1990. More than half of them are forest plantations. Artificial forests have grown at a rate of 0.4% per year in recent decades, especially because of the use of abandoned land and the planting of forest species on land without forests [30].

Forests absorb greenhouse gas emissions (at European level, 10% of greenhouse gas emissions), and their biomass produces billions of tons of oxygen, through the photosynthesis process, making them an important tool in mitigating the climate change, a global warming [10].

Forests offer goods (wood and non-wood) and services (ecosystem and social). Forestry products include wood, biomass, coal, sap, fibers, fungi, fruits, game, herbs etc.

Last but not least, forests offer many elements needed for employment in rural areas. In the chain that is made up of all economic activities based on wood products from the entire forestry fund, 488,500 people are employed in the European Union countries, these activities generating a turnover of almost 500 billion euros (Table 3).

Table 3. Labor force involved in forest economy activities at EU level (*Source: Eurostat, 2017*)

	Hired annually, thousand		Employed persons/ thousand hectares		The gross added value of the employee, thousands of euros		Wood exploitations/ each employee, in thousands of m3	
EU-28	448.1	488.5	3.3	3.6	1.0	0.9		52.9
Belgia	2.4	24	3.6	3.6	2.1	2.8	:	38.9
Bulgaria	13.3	14.0	5.2	6.3	0.4	0.5	6.3	18.3
Cehia	27.4	21.6	10.9	9.4	0.6	0.7	18.1	40.9
Danemarca	5.0	6.0	9.4	10.5	0.6	0.6	:	51.7
Germania	47.4	50.2	4.4	4.6	1.2	1.1	36.6	66.6
Estonia	6.0	7.1	2.9	3.6	0.9	1.3	:	32.4
Irlanda	2.1	2.0	3.6	3.1	1.3	1.5	:	4.1
Grecia	4.7	5.6	1.4	1.6	0.3	0.0	11.4	13.0
Spania	31.5	21.9	2.3	1.5	0.5	0.8	25.0	49.9
Franța	30.8	28.5	2.0	1.8	1.7	1.8	96.4	118.8
Croația	:	13.1	:	7.5	:	0.4	:	14.1
Italia	33.5	39.6	4.3	4.8	0.3	0.1	10.9	31.1
Cipru	0.1	0.1	2.9	2.7	0.1	0.1	13.2	23.2
Letonia	19.4	18.8	6.3	6.0	0.7	0.7	:	19.1
Lituania	18.7	13.8	10.2	7.1	0.3	0.5	5.4	50.6
Luxemburg	0.3	0.6	3.0	6.5	1.0	0.7	22.8	47.8
Ungaria	8.7	19.7	5.2	11.1	0.7	0.3	15.2	10.9
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Olanda	1.6	2.0	5.3	6.6	0.7	1.1	29.6	55.5
Austria	18.9	17.1	5.7	5.1	0.9	1.0	46.1	67.2
Polonia	36.8	48.7	4.4	5.9	0.9	0.8	30.2	46.7
Portugalia	13.3	13.0	6.0	6.2	0.8	0.9	61.2	68.9
România	45.8	46.7	9.1	10.1	0.3	0.3	6.9	13.7
Slovenia	6.0	6.1	5.1	5.3	0.5	0.8	19.2	36.3
Slovacia	13.4	7.8	7.7	4.3	0.7	1.2	19.4	41.1
Finlanda	20.0	22.5	1.0	1.2	2.6	2.6	121.1	147.5
Suedia	29.0	42.9	1.4	2.2	3.4	1.7	:	91.8
Regatul Unit	12.0	17.0	4.0	5.4	0.7	0.6	29.7	34.2

: = not available

In Europe, the total wood harvest increased from 392 million m^3 in 2002 to 470 million m^3 in 2017, according to Eurostat. The percentage growth of the crop is 20%, under the conditions of harvesting of an average about 70% of the forest growth, annually, the stock of wood in the forests increasing proportionally. Future consumption projections suggest an increase of 30% by 2030 (compared to 2010).

58% of the growth of woody biomass produced by the European Union forests, an equivalent to about 7% of the European Union GDP, is used annually.

Official data shows that wood processing industries generate turnover of 129 billion euros, at EU level, with over one million employees. From the total turnover, 12% is generated by the primary processing industry (timber), 47% by other wood-based industries, and 41% by the furniture industry.

In 2016, the pulp and paper industry achieved a turnover of 81 billion euros and employed over 175,000 people. In fact, this industry achieved a record paper recycling rate of 72.3% in 2017.

3.2. Adequate exploitation of mountain resources

Adequate exploitation of mountain resources implies:

3.2.1. Increased responsibilities for the associated resources exploitation There is a great diversity of forest ownership, at the European Union (EU) level, with private property predominating in Western European countries and public ownership in Eastern countries. This is very important when it comes to logging, because forested watersheds not only provide timber and other ecosystem services, but also many other related resources. Therefore, the ownership of a resource essentially represents the right of ownership, even of those that were not included in the initial granting of legal ownership of the resource [15].

Given the wealth of this "property", the great challenge is to establish a clear set of responsibilities towards natural resources, even for those that have not yet been defined but are already being exploited. While, in the short term, excessive logging of forests affects mainly mountain communities, in the long term, negative impacts on air and water quality, soil erosion and reduced production capabilities will affect lowland communities as well.

3.2.2. Capitalizing resources at a fair price The major difficulty in evaluating and exploiting mountain resources is coming from the fact that mountain resources are themselves complex and interdependent, so they should be considered being a common product rather than a single one.

The value of resources is not usually reflected in the value of goods and services provided by the mountain area, due to the complexity of mountain ecosystem resources and services and traditional pricing barriers. Although these goods and services have a financial value that can be accounted for, it does not include the whole "basket" because the costs of maintaining the environment in the best condition have not been included. As a result, the mountain communities, as providers, do not get adequate benefits [6].

Therefore, the challenge is to identify and capitalize resources, as much accurate is possible. This fact can lead to the conclusion that natural resource conservation action can reveal the benefits of balancing resource extraction with the maintenance of existing environmental assets.

Once the full value of the resources is established, mechanisms for collection and redirection from lowland users to upland communities can be created.

3.2.3. Rational exploitation of "public goods"

From an economic point of view, public goods are defined as those which cannot be excluded by other users and whose consumption by an individual or group does not diminish the amount available to others [26].

However, overexploitation of ecosystem resources and services can limit their benefits for everyone. Biodiversity, but also pure water, clean air can be given as classic examples. Traditional economic instruments are not quite adequate in measuring these goods which are not traded in a market.

However, despite the unfavorable situations, there are case studies that demonstrate that economic evaluation is achievable and that recovery of the investment imbalance in mountain resources requires the identification and, where possible, the quantification of these values [17].

3.3. Mountain economy of circular type

Because the forestry sector is an economic sector with huge potential and amazing dynamics, its benefits will depend, to a large extent, on the proper management of all its resources, in their complexity, and on the transition, as smoothly as possible, to the economy of circular type. The already conclusive examples today provide evidence that market-related approaches in the growth and transfer of resources for the conservation and sustainable development of mountain areas fall within the scope. This will help negate the effects of the conventional theory that "conservation doesn't happen because it doesn't pay" [32]. The 2030 Agenda - the result of a broad scientific foundation and a broad consultative process at European level - includes a series of targets based on sustainable forest management, as follows: a sustainable increased mobilization of wood resource, more added value through ecosystem services, other than wood, towards "zero" waste (circular economy), efficient use of natural resources, diversification of production technologies and logistics, secure and attractive jobs (the link between rural and urban areas), renewable building materials for a healthier life, new products based on fiber and carbon emissions by 80% lower and, last but not least, renewable energy for society.

A 2017 FAO report on European forests presented the situation that, in many ways, the forestry sector is increasingly resembling with the "green economy". In that year, the UN Environment Program (UNEP) described a green economy through features such as "low carbon, resource efficient and socially inclusive". "Sustainable development is not an optional choice, but an imperative one," said Achim Steiner, UN leader at United Nations Development Program (UNEP). "In the whole Europe's forestry sector, in the coming years, there will be a transition to a green economy, implicitly, especially through firmer, innovative measures".

An example in this regard is a revolutionary technology - Ioncell - that transforms wood waste into new textile fibers. The process, without the use of harmful chemicals, turns cellulose into fibers that, in turn, can be transformed into fabrics. More specifically, Ioncell technology uses a new solvent called ionic liquid, which is an environmentally friendly solvent that can be recycled and non-flammable, like many others that are already in use. Those who worked with this new product claimed that the fibers obtained from the synthesis of plant residues were soft, but they remained "strong even when they are wet". The properties of Ioncell fibers are similar or even better than viscose fibers and even those of cotton. Due to their high strength, Ioncell fibers are also optimal in technical applications, such as composites. Among the properties of ionic fiber: it absorbs moisture, is biodegradable, has a shiny, shiny appearance, can be dyed just like cotton and/or viscose.

3.4. Transition in Romania to the mountain economy of circular type

In the Romanian mountain economy, the fields are diverse, diversified and mainly natural. This diversity leads to multiple aspects that are more or less emphasized, depending on the mountain areas concerned: accessibility and attractiveness of the territories, supporting the seasonality of activities and multi-activity, qualitative positioning of agricultural production and resilient organizations, farms, energy transition, quality improvement of tourist offer. In this context, given the political environment commitments related to climate change and the vulnerability of the mountain ecosystem, the ecological transition is a central problem in these reflections on the development of the mountain territories.

3.4.1. General information regarding the mountain area of Romania In summary figures, the mountain area of Romania comprises 29.94% of the national territory, and it is inhabited by 3,354,041 people, who represent 15.08% of the Romanian population. About 2.1 million are found in families of farmers, 1.3 million having the status of active farmers. Also, there are 815,000 agricultural holdings, of which 254,348 are registered in the Single Farm Identification Register (APIA) in 2018. The arable land in the mountain area covers a surface of 528,046 ha (5.62% of the total arable area of the country), while the mountain pastures occupy 1,232,415 ha of the total area of the country (37.66%). The meadows in the mountain area cover a surface of 930,538 ha (representing 59.79% of the total meadows existing in Romania).

The mountain land is estimated at about 7,325,000 hectares, of which 2,894,900 hectares that comprise an agricultural land. The forests and forest vegetation cover an area of 4,005,900 hectares, and the pastures occupy 1,283,000 hectares. 938,000 hectares are meadows, and 201,000 - pastures [3]. On average, the agricultural area corresponding to one household is about 2.5 hectares at an altitude of 600-700 meters and 3.5-4.5 hectares at an altitude of over 800 meters (Mountain Zone Agency / APIA).

3.4.2. The forest and the Romanian mountain economy In the mountain area, forests represent one of the most important creative resources of added value through the sustainable use of both wood and non-wood products (mushrooms, berries, game, etc.) [37].

Poor development of the accessibility network in the forest land (the average density of forest roads is about 6.5 m / ha, compared with France - 26m / ha, Austria - 36 m / ha or Switzerland - 40 m / ha), and the lack of financing for the development of ecological logging technologies have led to the folowing issues: logging is concentrated in the easily accessible areas, the soil is degraded, as a result of frequent exceeding the optimum distances for collection of the wood material, the operational costs are increased , the log quality is

also depreciated, as a result of late harvesting, leading to a decrease in the economic value of harvested products.

Wood exploitation is done by small economic units, poorly modernized, which use outdated methods and techniques. As a result, it is necessary to financially assist these companies in order to improve the working conditions of the employees, to increase productivity and to perform investments in equipments which are environmentally friendly. However, the forestry industry is concentrated in large units of primary processing, having the capacity to absorb a significant daily quantity of wood, leading to the disappearance of small and medium-sized enterprises, which cannot resist competition with the large units.

In many cases, the exploitation of the forest land has been non-rationaly performed, being exclusively based on the valorisation of wood in a raw form, without added value, as a result of changing the forest ownership structure, increasing the forest areas belonging to the private property, a lack in management efficiency and in local development programs.

Forestry, logging and wood processing were the basic occupations of the communities in the mountain area. Nowadays, the poor financing of the forestry area and the small number of integrated rural development programs have led to the restriction, even the disappearance of traditional activities, in some cases.

Romania is recognized for the high quality of mushrooms and berries that come from the mountain area. Unfortunately, the exploitation of these resources is not realized rationally and efficiently, limiting itself only to the harvesting of small quantities and their valorization in unprocessed form, without added value. Those who exploit these resources on a large scale are commercial agents who sell the whole quantity abroad. More than half of the forests from the mountain area play a protective role or they are located in protected natural areas, this fact conducing to restriction or prohibition of wood harvesting. The lack of financial compensation for forest owners has led to increased pressure on the forestry land and illegal logging with negative consequences in maintaining of the assigned role. In 2000, the national network of protected areas was created based on the Law no. 5/2000 regarding the approval of the National Territory Improvement Plan (Section iii-Protected Areas), by the inclusion of a 55,000 hectare-virgin forests surface. Until 2000, in order to be protected, these virgin forests were included in forest reserves, through forestry arrangements.

3.4.3. The correct use of the Romanian mountain resources

The total economic value of the various resources must be identified and measured, in order to balance the flow of benefits between the mountain area and people. The price of harvesting a forest, for example, must include the total value of the trees cut, including what is lost by forgoing the various benefits of forest ecosystem services. When the social benefits and environmental costs of using natural resources are factored into the cost-benefit calculation, consumers will understand the true balance between ecosystem well-being and society.

Therefore, to define the relationship between the community and the resources in the mountain area, important in motivating conservation and sustainable use is represented by the understanding of the ownership structure. Thus, all those concerned can better understand and accept their rights and corresponding responsibilities [27]. However, not all natural resources can be privately owned because this could lead to unsustainable overexploitation. Cash, quickly earned by exploiting the forest, is more useful than the value of the standing forest, but this will cause serious long-term degradation consequences. In addition, all though property rights can attract decisive motivations for performing management [29]. Despite the fact that upland forests play a key role in protecting springs, most of the benefits of a watershed are used by lowland (downstream) communities and not by upland communities that maintain forests in good condition.

4. CONCLUSIONS

Current economic models cannot support sustainable growth in world production because, for the most part, they are based on linear production processes, unsustainable consumption and exploitation of seemingly limitless natural resources. The circular economy tries to approach and eliminate, as far as possible, both the environmental and economic risks that derive from the shortcomings of the current economic models.

In the mountain area, the main resource is the forest. Even if it is renewable, according to the Japanese approach, this is a reserve that regenerates over a longer period of time. If the exploitation is not done in a proper manner, taking into account the complexity of this resource, the quality of life can be irremediably affected and even the life itself endangered. Moreover, if the resources of the mountain area (forest, biodiversity and related reserves) are not properly evaluated, neither their usage is correct, and the effects are devastating, in the chain. Nowadays, by the current methods of measurement, which are the basis for establishing the prices of natural resources, the total costs of deforested lands, eroded hills and polluted rivers or the severely affected ecosystem due to micro-hydroelectricity are ignored - not to mention the social recrudescence, the costs of uprooting of people who are dependent on the natural resource.

Recognition of total costs would ensure the basis for the provision of a direct incentive in order to minimize the impact on the environment, which would lead to much higher returns. Therefore, by implementing the circular economy in the mountain area, the usage of resources (according to the 3R principle) should become more efficient. However, in order to achieve this goal, coherent policies, consistent investments in new technologies and research (both from the perspective of discovering new manufacturing techniques and methodologies for calculating the total price of mountain resources) are needed and, last but not least, a strong information system, meant to awake the people's consciousness, regarding the importance of rational exploitation of natural resources.

As a conclusion, regarding the mountain circular economy, from our point of view, research should be continued, at an advanced granularity level, in order to identify the natural resources, in their completeness and complexity and to find the adequate calculation method, in order to evaluate the correct price of these natural resources.

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