

SUSTAINABLE DEVELOPMENT AND TRANSDISCIPLINARITY IN KNOWLEDGE SOCIETY – AIMING TO INCREASE THE QUALITY OF LIFE IN RURAL AREAS

Lucica DOBRE, Dorina Nicoleta MOCUȚA

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd,
District 1, 011464, Bucharest, Romania, Emails: dobrelucia@gmail.com,
dorinamocuta@yahoo.com

Corresponding author: dobrelucia@gmail.com

Abstract

The study pays attention on both the concept of sustainable development and the concept of transdisciplinarity. We analyze the impact over the quality of life in rural areas in today's Knowledge Society via SDG 4: Quality Education. The study clarifies the concept of transdisciplinarity, through concepts easier to understand such as: disciplinarity, multidisciplinarity and interdisciplinarity, from the very author of the concept, Basarab Nicolescu. It also clarifies the concept of Knowledge Society and its demands, focusing the analysis on the general impact of Knowledge Society on sustainable development with references on the quality of life and along with SDGs perspective. This analysis is needed to fill a gap that exists in understanding the concept of transdisciplinarity itself and the transdisciplinarity approach in general. The topic is an extensive one and by bring in it to analyses, it is destined to raise the awareness to the scientific community interests in order to encourage alternative analysis.

Key words: sustainable development, transdisciplinarity, quality of life, quality education, Knowledge Society

INTRODUCTION

The perspective in which we look towards „our common future” [1] must be built in the sense of the awareness of the fact that change must be achieved both at the microsocial and macrosocial level, calling on all the resources that make up the ecosystems, the biosphere as a whole. The ancient maxim according to which „Man is the measure of all things” (Protagoras) contains itself that deep wisdom that places MAN - as humanity - in the foreground of this vast picture that includes the „whole common living” [10]. This makes him simultaneously the manager, the administrator, the direct responsible of all the transformations - positive or negative - that take place on Earth. There is a functionally, organic interdependence between human life, non-human life, created life - people, families, communities, organizations and the environment, say the authors of the "common living whole" paradigm.

The different perspectives in which human thought approaches the complexity of the relationships in the ecosystems, the ways in which different scientists conceptualize nature

and the relationships that humanity establishes with it, give rise to a plethora of viewpoints and comprehensive paradigms. Sometimes the different approach can bring us to the point of convergence, cohesion, tradition and multiculturalism necessary to achieve common goals and objectives.

This research has a transdisciplinary documentation base with a transdisciplinary methodology, using data and information from education [4, 5, 6], economy, statistics [9, 13, 14, 15, 17], official reports [1, 2, 5, 17, 11] and specialized literature [2, 3, 7, 8, 12]. Fortunately, the concept of transdisciplinarity was popularized in academic, scientific environments by its creator. We owe the concept of transdisciplinarity to the Romanian scientist Basarab Nicolescu who created it, describe it and launched it in the academic circles. As it was stated before, the authors consider that this analysis is needed to fill a gap that exists in understanding the concept of transdisciplinarity itself and the transdisciplinarity approach in general. Also, they believe that it could be useful to wide range of researchers, PhD students from all fields of expertise.

MATERIALS AND METHODS

This research is based on the study of literature on the topic as listed at the end and from which the main ideas were systematized, structured approached in the authors' vision.

The main ideas have been pointed out and illustrated in tables and graphics.

Important data were picked up from the National Institute of Statistics regarding the situation of poverty and social exclusion rate living standard in the rural areas as well as regarding the education level of the population by age at the country level and by region of development.

Finally it was emphasized the analysis of Romania's progress in SDG4.

RESULTS AND DISCUSSIONS

The scientist Basarab Nicolescu, whose name is inextricably linked to the concept of transdisciplinarity, in his scientific paper „Transdisciplinarity” [7] clarifies the problem of confusion that can be created with close concepts, such as disciplinarity, pluridisciplinarity and interdisciplinarity, „the four arrows of one and the same bow: that of knowledge”.

Another valuable scientific paper mandatory to facilitate a better understanding of the concept is „Science, Meaning and Evolution – The Cosmology of Jakob Bohme” [8].

Punctually, our contribution consists into synthesize the concepts by clarifying each one separately and then explain them with the concept of sustainable (durable) development. Disciplinarity refers to the mono-approach, through the perspective of a single science. For example, as a research topic, quanta, in quantum physics. Interdisciplinarity and pluridisciplinarity rise at the intersection of several sciences as ways to approach knowledge.

The analysis of an object or a phenomenon from the perspective of more than two sciences is called a multidisciplinary approach.

For example, explains the author, quanta from a philosophical, psycho-social, cultural perspective. However, the extra knowledge

will be attributed to the disciplinary field of which the researched object is a part, i.e. quantum physics.

Through interdisciplinarity are created bridges that make possible the transfer of methods from one discipline to another, from an applicative, epistemological aspect and as the production of new courses, independent, autonomous sciences, with their own scientific methodology and with their own language.

Sciences do not have a universal character, because the formalism in the ontological interpretation of its own results "escapes" the science itself. Examples of the transfer of methods that led to the creation of new sciences: mathematical methods in the field of physics, led to the creation of mathematical physics, methods from particle physics in astrophysics led to the creation of quantum cosmology, informatics in art led to computer art, etc. However, the value of knowledge remains in the field of research of the science that initiated the transfer of knowledge. Transdisciplinarity approach is both a scientific and a cultural approach simultaneous. Transdisciplinarity, involves cooperation with all branches of knowledge, both the exact sciences (physics, chemistry, mathematics, biology, etc. having their own autonomy) and the human ones, Art and Tradition - (Christian traditions, Hebrew, Islamic, etc.)

Transdisciplinarity is the bridge that makes possible the meeting between science and Tradition (with a big T), the meeting between the different levels of Reality (horizontal and vertical), by studying the isomorphism between the different fields of knowledge.

Transdisciplinary research goes beyond the classical, continuous level, and simultaneously enters the dynamic realm of tree-like, discontinuous structures of several levels of Reality. The net advantage of transdisciplinarity is that this approach passes through disciplinary knowledge, which makes the approaches complementary, similar to a „win-win situation”.

The main methodology of the transdisciplinary research is based on *three pillars*: the levels of Reality, the logic of the

third included (and/and), complexity. Nature has a dual nature: Science and Tradition, says Nicolescu.

These two domains claim a dynamic that takes us from the Reality of a universe to the Realities of the most diverse universes, in the multi-verses.

In conclusion, as we understand it, transdisciplinarity is all the blended knowledge included in both: the real Reality and the ideal Reality.

It is not, one or another. (such as: black or white). It is one and the other, both, united, as One. (black and white). This is the principle of the third included, as Nicolescu states.

The concept of sustainable (durable) development is increasingly congruent with in all fields of human activity, as an imperative process that remind us that everything we do, think, feel, must have the attribute of being sustainable and therefore lead to durable development.

While may appear to be synonymous, the concepts of sustainable/durable development and sustainability, nevertheless have specific nuances that differentiate them.

Durable development is a *process* that involves continuous change in which the resources involved – human resources, investments, institutional changes, exploitation of resources - change themselves, being at the same time interdependent with each other, and with the political will also.

Thus, require a medium to long term process. The concept of sustainability, states that for something to be sustainable, to have this *attribute*, one must act, behave, think, in a certain way. Sustainable is "to act in such a way as to meet the needs of the present without compromising the ability of future generations to meet their own needs" [1, 2].

So, is mandatory to exists an interdependency between these concepts.

Sustainability involves actions here and now, which make sustainable development possible, in a future with a high quality of life for all. In the table below we exemplify through a model of sustainable actions that can lead, in long terms, to sustainable development (Table 1).

Table 1. 16 ways to a sustainable living

16 ways to live a sustainable life day by day	
Go paperless	Eliminate single-use plastics
Do not print unless absolutely necessary. Use technology, digital tools to make payments, bills, plane tickets, etc	Say NO to single-use plastic items .By 2050, unless we act sustainably, there will be more plastic in the oceans than fish.
Use natural cleaning products	Bring Your Reusable Bags
Cleaning products can be very harmful due to the chemical composition of the ingredients. Use ecofriendly and eco environment alternatives that contain lemon or vinegar.	More and more countries, cities have banned the use of plastic bags in shops. Buy reusable bags and use them whenever you go shopping.
Go thrift shopping buy smart	Eat Local, Buy Local
Avoid cheap "fast fashion", due to the materials used (polyester, microfiber, processed leather, chemical dyes), and exploitation by labor is used for their manufacture.	By acting in this way, you will be able to reduce the carbon pollution resulting from the transport of goods. You will also help support and supporting entrepreneurs and local producers.
Monitor your electronics	Air Dry Your Laundry
Conserve energy use with economical and fast ways, for example, charging your phone in airplane mode and shutting down your computer when you are not using it.	Let Mother Nature and the Sun air and dry your clothes. If we used dryers at least once a week, enough energy would be saved from coal or nuclear power plants.
Eat Less Meat	Monitor Your Taps
This has a significant effect of reducing environmental, water pollution, protecting ecosystems, the biosphere. It has a special role in creating a healthy, plant-based, vegetable-based lifestyle.	When you brush your teeth, when you shower or wash the dishes, don't let the water run and waste.Remember that in some countries of the world, children walk even 10 km/day to bring water to their homes.
Plant a Tree	Volunteer
Trees provide oxygen and food. It helps to save energy, to clean the air.	Get involved in volunteering in your community.
Drive Less, Bike More	Educate yourself and others
Reduce, Reuse, Recycle – 3R	The more you educate yourself, the more you become aware of the positive impact of sustainability and can teach others too.
Selective collection of waste	

Source: own processing.

Therefore, sustainability refers to concrete, consistent, day-to-day actions, without whom sustainable development in the future is not

possible. So the difference is between two stages: **Now & Here = sustainability** and **Now & Future = durable development**.

Furthermore, we put together the concept of the Knowledge Society to the concepts of transdisciplinarity and durable development, unitarily. As defined in National Law of Education, updated in 2022, also in the Educated Romania Project [7]. „*The Knowledge Society is a society in which Knowledge is the main resource, being created, shared and used to generate prosperity and well-being for its members*” [5].

Based on what we analyzed so far, we can observe that the Knowledge Society is a transdisciplinary society because involves the an isomorphism of action and conception both at the macro and microsocial levels. At the macrosocio-cultural level, the requirements stated in the given definition above, involve a somewhat difficult process, due to the profile and mentality of the dominant culture and subcultures, in competition for resources, and also due to legislative incongruities. However, we must note that the Knowledge Society is a necessity imposed by the very world in which we live.

We enlighten to our analysis a particularly important point among the 17 objectives of sustainable development, namely SDG4: Quality Education: „*to ensure inclusive and equitable quality education and promote lifelong learning opportunities to all*”. [14].

SDG 4 - Quality Education, refers to that percentage of the total population enrolled in primary and secondary education, regardless of age and gender. Students over or under school entry age, due to late registration or grade repetition, are also considered. The target is 100% enrolment, regardless of age and gender. Globally, sub-Saharan Africa has the lowest percentage, 7.9%, South Asia 8.8%, the rest of the continents exceeding 9.4%, Europe and Central Asia with an average of 9.9%, North America 10 %.

As we stated, our analyze brings to attention the Quality Education indicator, mainly related to the rural areas from Romania.

Quality education is a very important indicator for increasing the quality of life, and

it indicates the prospective trends in terms of the professional orientation of the generations that will join the labor market in the coming decades - Generation 2050.

Certainly at least two generations – Generation Z also known as the Zoomers, those born between 1997-2012, as well as Generation Alpha, the children born after 2010, would no longer have the same digital skills nor the same perspective and attitude towards some of the main human activities: playing, learning, working.



Fig 1. The20s: Really the best age to be?
Source: UNESCO, 2023,
<https://www.unesco.org/en/articles/20s-really-best-age-be>, 2021, Accessed on July 20, 2023 [16].

From the statistical data provided by the National Institute of Statistics, at the national level, in 2019 a slight upward trend is observed towards *special vocational schools-secondary cycle 2*, meaning those schools that allow graduates to integrate directly into the labor market according to the qualification for which the student applied the practical test and the oral test to support the project.

In a recent draft law 2022, these special vocational schools will be integrated into the existing high schools, with the title of vocational high schools, on four profiles: *technical, services, natural resources and environmental protection*. Students can obtain, after 3 years of study, a level 3 certificate for the qualification in the chosen specialization and, if the students choose to

take the full exam, grade XII, they can also obtain the Baccalaureate diploma.

Table 2. Graduate rate by education cycle

Years	2016	2017	2018	2019	2020	2021	2021/2016 %
Professional schools cycle 2	1,862	22,404	21,991	22,787	2,3491	29,953	1,608.6
Special Profesional schools cycle2	803,00	923,00	1,069	1,164	1,186	1,101	137.11
Secondary schools	29,272	28,599	27,271	29,016	30,658	27,915	96.36
Foreman schools	2,566	2,253	2,043	2,265	2,406	2,111	82.26
Special secondary schools	144,00	133,00	119,00	105,00	110,00	132,00	91.66

Source: Own processing. based on the data from INSSE, Tempo Online [13].

The advantage of professional education (and dual education where it exists) is that students are engaged, during their schooling, with a training contract, in internships in the field of future qualifications, specializations, the educational unit having signed partnership contracts with various public economic agents and private (Table. 2).

Combined with the pandemic period in which the school dropout rate increased, mainly due to the change in the educational paradigm, the current conditions and requirements, not only the educational ones, necessarily require adaptation to the new informational and technical methods. One of the purposes is to achieve the conditions - social, economic, cultural, environmental - which in the future will allow and ensure an increasing quality of life as a whole, prosperity and well-being for all.

Closely related to the low percentage recorded in the education quality index, the AROPE index is an indicator that shows the procent of the total population of people at risk of poverty or social exclusion. This social category is characterized by at least one of the following situations: a disposable income lower or on the poverty line; a severe state of material deprivation; a very low work intensity per household [3].

At the national level, according to the data from the National Strategy for Social Inclusion and Poverty Reduction 2015-2020, there are 992 marginalized rural communities - 35% of the total communes in the country - and 1,605 villages - 12% of the total villages. On the map of poverty and social exclusion, the highest percent of the population living in marginalized rural areas, generally small, non-

Roma communities, is in the North-East region, with the rural marginalization average twice as high as the average national: 11.3% compared to 6.2% nationally [17].

Also, the Center region is above the national average, with an average of 8%, the South-East has an average of 6.8, South-Mountain 4, South-West 4.5, North-West 4.4, and the region of Vest and Bucharest-Ilfov are at the opposite pole, with a marginalization rate of 1.2% and 0.6%, respectively.

In these regions, the communities are mixed – both Roma and non-Roma (Fig. 3).

Macroregion 2 and the North-East Development Region have the highest AROPE index at the national level. At the county level, Vaslui has the highest rate of marginalization in the country, with approximately 23%, which is four times higher than the national average. Rural poverty is at its highest level in the Northeast-Moldova region, where there is the largest number of villages with extreme poverty levels.

Well-being, increasing the quality of life, both in urban and rural environments, depend and are largely the result of joint efforts of the family or the community: These efforts are made not only to carry out economic activities that lead to ensuring - at least a standard of living decent, but they can also create the conditions for the manifestation of the socio-psycho-spiritual potential necessary for the harmonious development of the personality of individuals. These are prerequisites and determining factors in increasing social progress and creating conditions for increasing the quality of life.

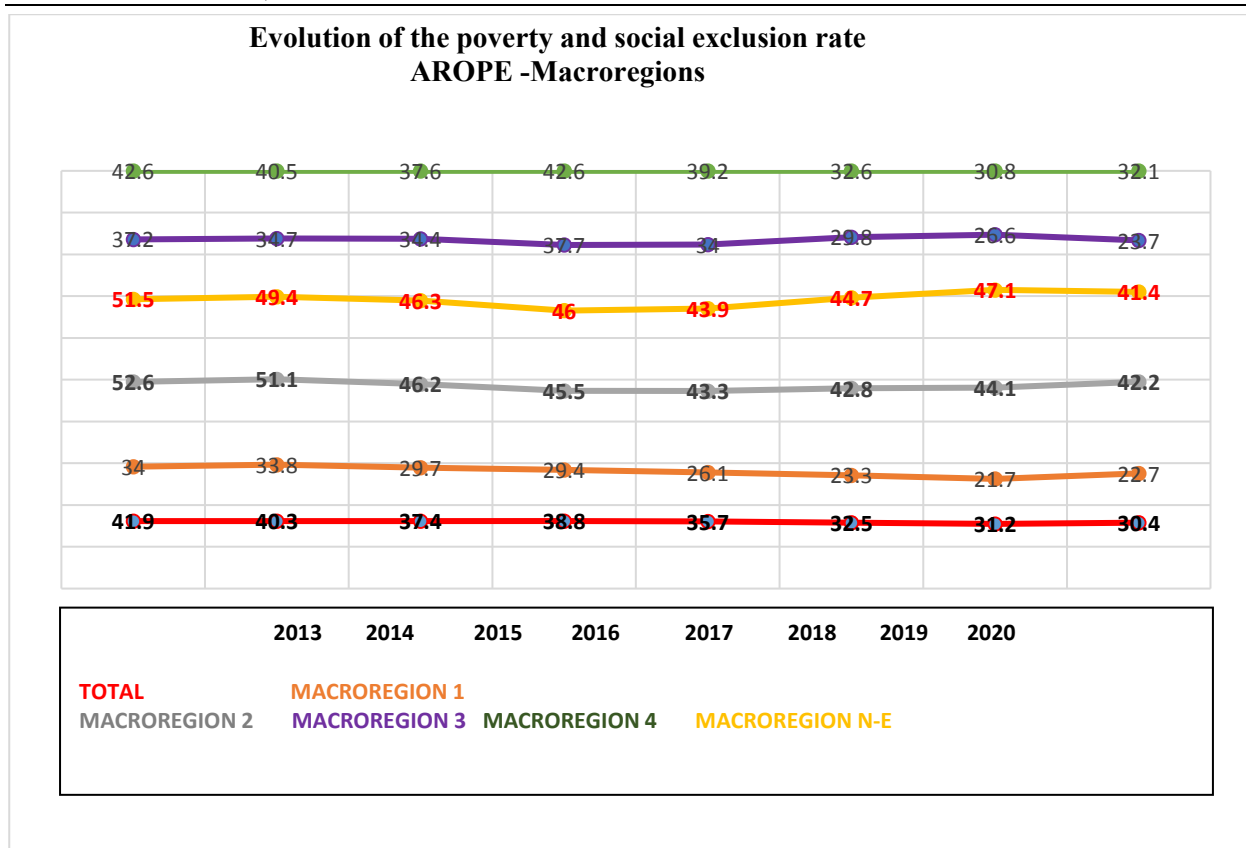


Fig. 2. Evolution of the poverty and social exclusion rate AROPE –Macroregions
 Source: Own processing based on the data from INSSE, Tempo Online [13].

Romania's progress in SDGs

In an article wrote in 2019, prior to pandemic crises, the economist Professor Jeffrey D. Sachs from Columbia University, New York, launched 6 elements to a Transformation SDGs Agenda, as follows:

- „ (1) education, gender and inequality;
- (2) health, well-being and demography;
- (3) energy decarbonization and sustainable industry;
- (4) sustainable food, land, water and oceans;
- (5) sustainable cities and communities;
- (6) digital revolution for sustainable development.

Each Transformation identifies priority investments and regulatory challenges, calling for actions by well-defined parts of government working with business and civil society. Transformations may therefore be operationalized within the structures of government while respecting the strong interdependencies across the 17 SDGs” [12].

The National Strategy for Romania’s 2030 Sustainable Development, underlines that for achieving SDG 4 - Quality Education – is required that all students to gain the knowledge, the skills and the abilities necessary for a longlife learning and sustainable development. [18].

The department of sustainable development of the Romanian Government, released an report, an analyses on the progress made by Romania in achieving SDG 4. In comparison to EU 28, Romania show low percent on reading and also low percent of people choosing tertiary education. An element of plus is the higher percent on the segment of preschool population, which in medium and long term could have positive effect on the equal opportunities in education.

Table 2 shows the actual progress made by Romania to achieve the SDG 4 Quality Education.

Table 3. Analysis of Romania`s progress in SDG 4

Romania						EU-28			
Basic education	Unit of measure	Year	Percent	Year	Percent	Year	Percent	Year	Percent
Persons who left earlier the educational system	% of population age between 18-24 y.o	2013	17,3	2018	16,4	2013	11,9	2018	10,6
Preschool	% of population age between 4 - 7 y.o	2012	85,5	2017	89,6	2012	94,0	2017	95,4
Low level in reading	% of 15 y.o students	2015	38,7	2018	40,8	2015	19,7	2018	21,7
young people who are not professionally employed and do not follow any educational program	% of population age between 19 -25 y.o	2013	19,6	2018	17,0	2013	15,9	2018	12,9
Tertiary education	Unit of measure	Year	Percent	Year	Percent	Year	Percent	Year	Percent
Graduates of tertiary education	% of population age between 19-29 y.o	2013	22,9	2018	24,6	2013	37,1	2018	40,7
Employment rates of new graduates	% of population age at least 16 y.o	2013	67,2	2018	77,4	2013	75,4	2018	81,7
Adult Education	Unit of measure	Year	Percent	Year	Percent	Year	Percent	Year	Percent
Adult participation in learning process	% of population age between 25-64 yers old	2013	2,0	2018	0,9	2013	10,7	2018	11,1

Source: Own processing based on the data from [11].

CONCLUSIONS

In today`s Knowledge Society the need for collaboration between experts and specialists from all fields is increasingly felt for finding solutions to the problems concerning sustainable/durable development, the quality of life, education, to name a few. In the academic and political circles around the world there is a substantial concern regarding sustainable development, and how it can be applied with beneficial, visible solutions and effects in the society. The obvious purpose is creating sustainable societies, with a decent level of quality of life. A sustainable society must concretely ensure at least a decent level of quality of life for all. This can be achieved mainly through economic growth, quality education, a performing health system,

accessible and open to all, job creation, etc. In a constantly changing world, the goals and targets of sustainable development involve integrating the life perspectives of the younger generation so that the sustainable development would take place as a whole, in the future. This implies respect for human rights and gender equality, respect for the multiculturalism and promotion of culture in attitude of non-discrimination, peace, non-violence, cultural appreciation of diverse cultural backgrounds, cultivation a proactive attitude toward working culture and a positive insertion on labour market [16].

REFERENCES

[1] Bruntland, Gro Harlem, 1987, The Bruntland Report: Our Common Future, The World Commission

on Environment and Development editor. Oxford Press.

[2] Bruntland Report 1987, <https://www.are.admin.ch/are/en/home/media/publications/sustainable-development/brundtland-report.html>, Accessed on 24.05.2023.

[3] Dobre, L., Mocuta, D., 2023, The national and international importance of the development and planning of the rural space- A vital pillar of the sustainable development, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, Vol.23(1), 163-167.

[4] Law of National Education, 2001, updated 2023, art. 46, pp. 306.

[5] Law of National Education No.1/2011, https://www.edu.ro/sites/default/files/_fi%C8%99iere/Legislatie/2022/LEN_2011_actualizata_2022.pdf, Accessed on July 20, 2023.

[6] Ministry of Education, 2023, Laws on Education, https://edu.ro/proiecte_legi_educatie_Romania_Educatia, Accessed on July 20, 2023.

[7] Nicolescu, B., 1999, Transdisciplinarity, Polirom Publishing House, pp.28-55.

[8] Nicolescu, B., 2007, Science, meaning and evolution. The cosmology of Jakob Bohme. Cartea Româneasca Publishing House, pp. 119-142.

[9] OurWorldinData, Research and Data to make progress against the world's largest problems, <https://ourworldindata.org>, Accessed on 24 April, 2023.

[10] Popescu C., Taşnadi, A. Stanciu, M., 2023. Ecolonomic dialogues about the "health of the living whole", Eco Print Publishing House, pp 18.

[11] Romania's Government, ODD4-Education of quality. Analysis of Romania's progress, <https://dezvoltaredurabila.gov.ro/web/odd-4-educatie-de-calitate-analiza-progresului-romaniei/>, Accessed on July 5, 2023.

[12] Sachs, J.D., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., Rockstrom, J., 2019, Six Transformations to achieve the Sustainable Development Goals. Nature Sustainability 2, 805–814. <https://doi.org/10.1038/s41893-019-0352-9>

[13] Tempo online, <http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table> Accessed on May 25, 2023.

[14] UN, 2023, Sustainable Development Goals, <https://www.un.org/sustainabledevelopment/>, Accessed on 4 May, 2023.

[15] UN, 2023, Sustainable development Goals kick off with start of new year, <https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/>, Accessed on 4 May, 2023

[16] UNESCO, 2023, The20s: Really the best age to be? <https://www.unesco.org/en/articles/20s-really-best-age-be>, 2021, Accessed on 4 May, 2023.

[17] World Bank, 2016, The atlas of the marginalized rural zones and of local human development in Romania (Atlasul zonelor rurale marginalizate și al dezvoltării umane locale din România), Bucharest.

[18] The National Strategy for Romania's 2030 Sustainable Development, 2018, editor Paideia, chapter II, 37-41.