Scholar Publishing Group
Nature Environmental Protection
https://doi.org/10.38007/NEP.2020.010404
ISSN 2790-2684 Vol. 1, Issue 4: 27-36

Economics Supporting the Transformation of Multimodal Data Algorithm in the Natural Protection Environment Model

Akshayasimha Channarayapatna Harshasimha*

University of Carthage, Tunis 2085, Tunisia

**corresponding author*

Keywords: Environmental Model, Economic Analysis, Multimodal Data Algorithm, Economic Index

Abstract: With the increasingly serious natural environment problems, people from all walks of life have sought ways to protect the environment from multiple perspectives. Among them, the intervention and right exchange of the relevant parts are proposed by economists, which have certain effects but also have limitations. It is necessary to treat environmental protection as an industry and form a benign cooperation and balance in production, supply, consumption and other aspects to promote the healthy operation of green industry, so as to improve the utilization efficiency of resources and reduce environmental pollution to protect the ecological environment. Many researchers have provided new ideas for the study of the transformation of the natural protection environment model. This article was based on this as the research direction and research basis. This paper analyzed the natural protection environment model from the perspective of economics, and then carried out academic research and summary on the transformation of natural protection environment model and supporting multimodal data algorithm in the natural protection environment model. Then, the algorithm model was established, and the relevant algorithms were proposed to provide theoretical basis for the economic analysis supporting the transformation of multimodal data algorithm in the natural protection environment model. At the end of the paper, the simulation experiment was carried out, and the experiment was summarized and discussed. According to the change of land use in the ecological protection safety line in the region, after the transformation of natural protection environment mode with the help of multi-modal data algorithm, the difference between the land use rate of residential area and normal was 0.1. The difference between the land use rate of commercial area and normal was 0.4, and the difference between the land use rate of vegetation and normal was 0.7. The difference between the land use rate of water area and normal was 0.4, and the difference between the land use rate of traffic roads and normal was 0.6. At the same time, with the in-depth study of supporting multimodal data algorithms, the research on the transformation of natural protection environment model is also facing new opportunities and challenges.

1. Introduction

With the development of modern society, the ecological environment is deteriorating, and the protection of the ecological environment has become an important issue. On the one hand, it is necessary to dare to face more serious natural environment problems. On the other hand, with the promotion of economic openness, it has also promoted the dissemination of information and made people realize the problems of the natural environment. At the same time, with the sustainable development of human society, the issue of natural environment has increasingly become a major issue in the world. Therefore, natural environmental problems must be taken seriously and corresponding countermeasures taken to ensure the transformation of the ecological environment.

Many experts have studied the environmental protection model of nature. Tomislav Klarin studied that the concept of sustainable development has gone through different stages of development since it was put forward. The historical development of this concept has witnessed the participation of various organizations, which were currently stepping up the implementation of this concept [1]. Hemingway Jordon D believed that similar studies on the diversity of binding strength in sediments could reveal the ways and reasons for the preservation of organic carbon and the change of atmospheric composition and climate with geological time [2]. Aerts Raf studied the natural environment and green space to provide ecosystem services, and described the mechanism and evidence of the impact of natural and green space biodiversity on human health [3]. Whitburn Julie found that the deep connection with nature might partly explain why some people were more environmentally friendly than others, and this relationship was everywhere. The promotion of closer tied with nature might lead to more participation and protection of people, although more randomized longitudinal studies were needed to prove the reason [4]. Fang Jingyun discussed the impact of climate change and human activities on the structure and function of the ecosystem, focusing on quantifying the quantity and distribution of carbon pools and carbon sequestration in the ecosystem [5]. Watson James EM studied that maintaining the integrity of a complete forest ecosystem should be the core component of a proactive global and environmental strategy, and also the current efforts to stop deforestation and promote reforestation [6]. The above studies have achieved good results. However, with the continuous updating of technology, there are still some problems.

There are studies on supporting the transformation of multimodal data algorithms in the natural protection environment model. Pei Tao studied that geographic information science and remote sensing have long provided basic data and method support for the research of natural resource challenges and environmental issues [7]. Rajasekar Vani proposed an enhanced multimodal biometric identification technology for smart cities based on fractional fusion. Specifically, the method he proposed solved the existing challenges by providing multimodal fusion [8]. Matthews Thomas J believed that species abundance distribution was one of the most widely used tools in macroecology. It was increasingly obvious that many experiences could be best described as multimodal [9]. Mirmozaffari Mirpouya studied the mixed use of simulation and empirical data sets to test the new model, including the sensitivity of model parameters to the number of individuals and species in the sample [10]. Wyles Kayleigh J believed that so far, few large studies have explored the impact of natural environment type and quality on these results [11]. Haider Tobias P believed that in recent years, the littering of plastics and problems related to the durability of plastics in the environment have become the main focus of research and news [12]. The above research shows that supporting the application of multimodal data algorithm has a positive effect, but there are still some problems.

This paper studied the transformation of multimodal data algorithm in the natural protection environment model. First of all, from the perspective of economics, the natural protection

environment model was analyzed, and then its relevant content was given. The application of the multi-modal data algorithm was supported, and the relevant application algorithm has provided theoretical basis for the experiment. Finally, from the perspective of economic analysis, regional urban development was compared and analyzed under the support of multimodal data algorithm, providing reference significance for such research.

2. Natural Protection Environment Model from the Perspective of Economics

2.1. How to Understand the Mode of Natural Protection Environment

From the economic level, environmental issues are analyzed, and it is considered that it is an effective way to include environmental protection in the industrial field. The environmental resource system refers to the overall ecological system formed by the organic combination of various elements and phenomena. The natural environment not only has economic value, but also has ecological, cultural, leisure, health care, aesthetic and other functions. It can not only meet people's material interests, ecological interests and cognitive needs, but also maintain ecological balance [13].

The natural environment and resources system has non-competitive and non-proprietary nature. If it is provided by individuals, it is easy to be used without paying any price. Although it can be bartered, it is also possible to minimize its own needs. Therefore, effective measures should be taken to provide such public goods through collective action so as to avoid the high cost of personal provision. The production of the natural environment and resources system project is to meet certain environmental quality standards and repair the damaged ecological environment. The deterioration of the environment is prevented by reducing or controlling the emission of pollutants, so as to produce high-value environmental resource system products that meet the needs of environmental users.

The trade between producers and suppliers is essentially a market transaction. Producers produce environmental resources system products and deliver them to consumers, while producers receive certain rewards. Consumption in the environmental resources system is formulated by the supplier according to specific standards. Supply, production and consumption are interrelated, which can promote the operation of the ecosystem. The specific relationship is shown in Figure 1.

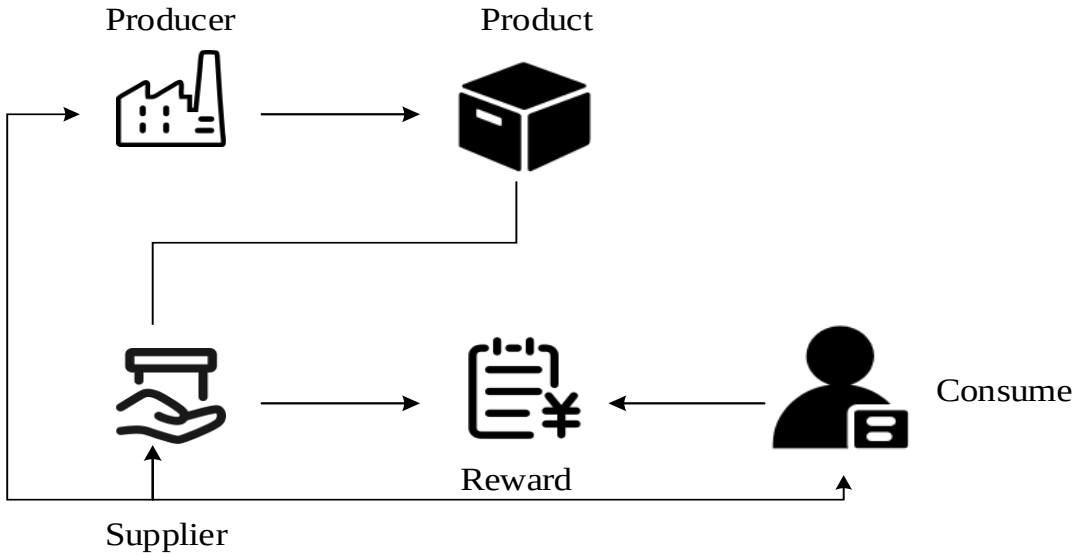

Figure 1. The nature of trade between producers and suppliers

2.2. Methods for Transformation of Natural Protection Environment Model

The research methods related to the transformation of natural protection environment model are as follows, as shown in Figure 2.

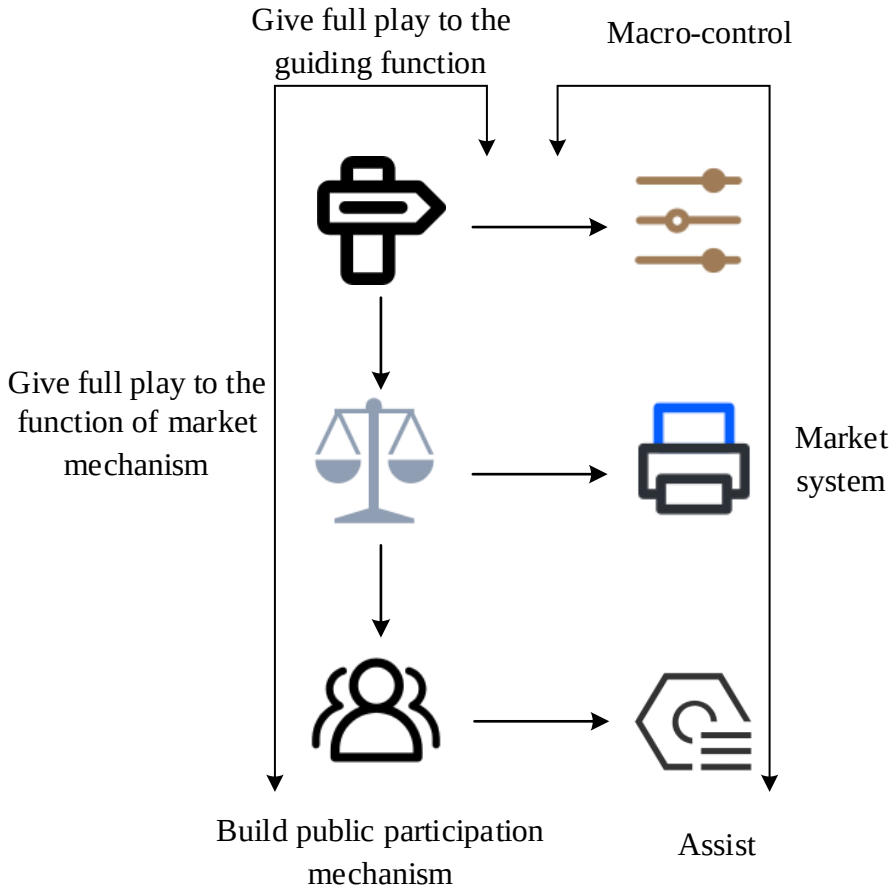

Figure 2. Research methods for the transformation of natural environment protection model

When market mechanism is introduced into the field of natural environment protection, the relationship between relevant departments and the market must be properly handled to realize two-way regulation and make full use of public participation. Only in this way can it be realized that the single protection mode of accusation is transformed into a multiple protection mode of sector regulation, market regulation and public participation [14].

2.2.1. Playing the Guiding Function

The departments should play a leading role in the protection of the natural environment and actively change their functions to strengthen macro-control. The responsibilities of departments in natural environment protection mainly include the following aspects, as shown in Figure 3.

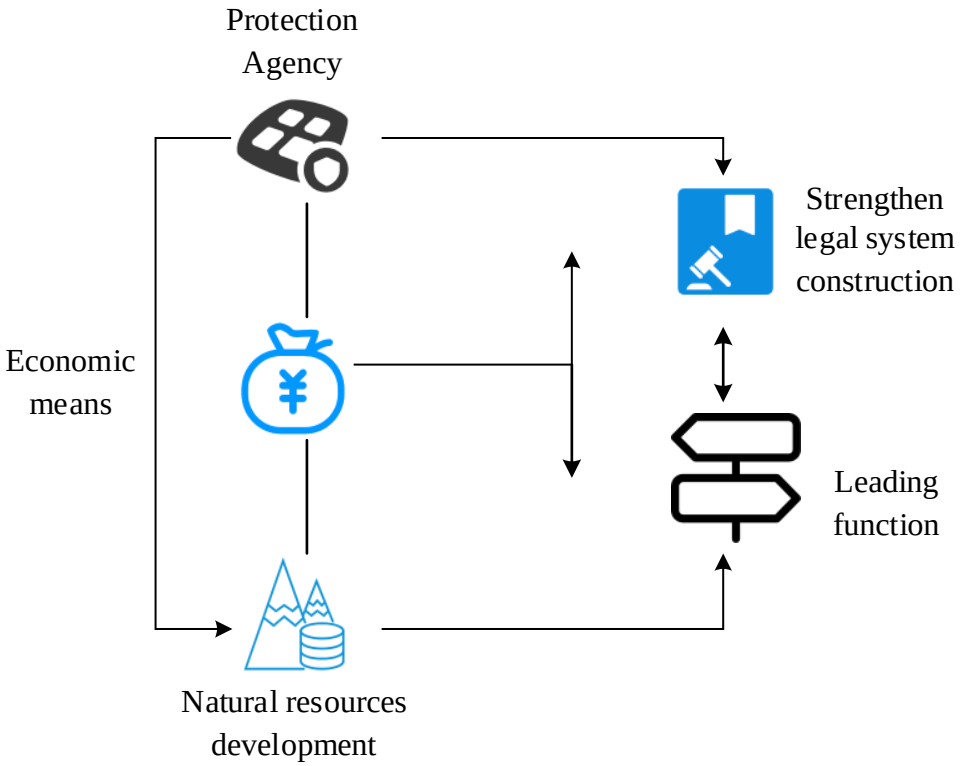

Figure 3. Responsibilities of departments in natural environment protection

First, it is necessary to clearly protect natural resources and the ecological environment, which is a function of the economy. At present, it is necessary to pay attention to the protection of institutions and personnel in place. The second is to use macroeconomic policies, social development policies and various economic means to evaluate the natural environment in order to predict in advance and prevent mistakes. The third is to strengthen the management of the development and construction of natural resources. The project initiation, approval, tracking and acceptance should be carried out to avoid going through the motions. Fourth, it is necessary to strengthen the construction of the legal system and do a good job in the publicity of existing laws and regulations and administrative law enforcement. It is necessary to focus on solving the existing problems of non-compliance with laws and failure to find out in time. It is also necessary to formulate new laws and regulations according to the actual situation and gradually improve the existing legal system. Fifthly, it is necessary to do a good job of various types of nature protection demonstration projects with the highest performance and guidance in the same period, and give play to the function of radiating and leading the surrounding areas in advance [15].

2.2.2. Playing the Role of Market Mechanism

Since the destruction and protection of the natural environment are both human economic activities, with both inputs and outputs, the basic function of the market mechanism should be played in the protection of the natural environment. However, natural protection under the market economy environment must conform to the basic principles of market economy, and should be included in the scope of market mechanism as far as possible to maximize the interests of economic subjects. Only in this way can economic efficiency and social justice be realized. To give full play to the fundamental role of market mechanism in the protection of nature, market system needs to be established and developed. At present, the focus should be placed on the development of factor

markets to accelerate the marketization of factors.

In a market economy, natural resources are an asset and a commodity. Through a flexible price mechanism, the scarcity of resources can be reflected in a timely manner, so that economic laws can play a better role in natural protection. Taking land as an example, as long as a reasonable price system and a standardized real estate market are established, more people can be attracted to carry out land development so that the lost land can be restored and managed. This virtuous cycle of input and output can give full play to the natural ecological potential and promote the sustainable improvement of the natural ecological environment.

In the protection of natural environment, there are two basic functions of market mechanism. First, in the process of ecological protection and construction, the main body of its development, utilization and recovery should be defined. Second, from the perspective of resource protection and rational utilization, it is necessary to implement the policy of paying for the use of resources, protecting those who develop them, restoring those who destroy them, and compensating those who use them. Natural resources are valuable in the market, and its price is determined by market supply and demand. In short, as long as it conforms to the operation rules of the market economy and the requirements of efficiency and fairness, the market mechanism should have the basic regulatory function.

2.2.3. Construction of Public Participation Mechanism

In today's world, due to the severe environmental problems and the impact of market and other factors, public participation is essential. Although public participation is only an auxiliary role in natural environment protection, it is still very important. The scope, form, procedure, approach and legal guarantee of public participation in nature protection have developed from an independent practice to a general consensus.

The natural environment problem is very serious, and the department's funds and the ability of protection personnel are relatively limited. Without the active participation of the public and the improvement of the national awareness of natural environment protection, the natural environment is difficult to meet the people's requirements for a higher quality of life. Public participation in natural environment protection plays a very important role in improving the quality of overall decision-making, enhancing public confidence in government decision-making, and supervising the law enforcement of environmental protection. Therefore, it is necessary to build a perfect public participation mechanism for environmental protection according to the current legislation and the experience of developed regions, so that the public can participate in the natural environment protection.

3. Application of Support Multimodal Data Algorithm

To obtain the joint probability distribution of the model, some prior parameters in the model must be estimated. Since only the data in image and text modes are analyzed, some prior parameters of the model must be estimated.

In a group of files B, each file $b_n \in N$ is a photo, that is:

$$b_n = (I_n, T_n) \tag{1}$$

Among them, $1 \leqslant n \leqslant N$, N is the total number of B files. According to the principle of maximum likelihood estimation, the following logarithmic likelihood function can be obtained:

$$\log(I_n \mid S_n, \theta_I) + \log p(T_n \mid S_n, \theta_T) \tag{2}$$

In the formula, there is a certain relationship between the priori parameters that minimize the objective function. In order to simplify the calculation, the approximate solution of the formula is decomposed into the sum of three parts, and the calculation formula is as follows:

$$\arg_{\theta r} \max \sum_{n=1}^{N} \log(T_n \mid S_n, \theta_T) \tag{3}$$

On this basis, the former term of the maximum equation is used to give the best parameter estimation. On the premise of following the polynomial distribution on S, the constraint conditions can be obtained:

$$\sum_{k=1}^{K} \mu_k = 1 \tag{4}$$

According to the Lagrange operator method, the estimated value is:

$$\mu_k = N_k / N, k = 1,2,...,K \tag{5}$$

In the formula: N is the total number of files in B, and N_k is the number of files generated by the k-th semantic concept in B.

After obtaining the estimate of prior parameters, the prior distribution of semantic concepts is:

$$p(S \mid \mu) = \prod_{m=1}^{K} \mu_k^{s_k} \tag{6}$$

In the formula, S_k is the k-th component of S.

4. Urban Development in the Mode of Natural Protection

The natural environment protection is still in a relatively severe situation. Therefore, environmental protection should not be treated with excessive optimism. The future economic development strategy must change the economic development model and the extensive industrialization model centered on economic growth to focus on the coordinated development of economic society and environment. At the same time, it is also necessary to modify the environmental protection work and incorporate environmental protection into the development of economy to realize the synchronization of environmental protection and economic development. Table 1 shows the land use changes within the ecological protection safety line in a certain area.

Table 1. Land-use changes in the ecological protection safety line

	Normal usage rate (%)	Current use (%)	Use after transformation (%)
Residential district	2.1	3.4	2.2
Business zone	0.9	1.8	1.3
Vegetation	89.3	86.5	88.6
Waters	7.3	6.9	6.9
Traffic road	0.4	1.4	1

It can be seen from Table 1 that the five land use conditions of residential area, commercial area, vegetation, water area and traffic road are listed here. Among them, according to the analysis of land use in the ecological protection safety line in the world, the land use rate of residential areas generally does not exceed 2.1, that is, within the safety line. However, the land use rate of

commercial area should not exceed 0.9, and the land use rate of vegetation should be controlled at 89.3. The land use rate of water area should be controlled at 7.3, and the land use rate of traffic road should not exceed 0.4. As can be seen from the Table 1, the current land use rates of the above five types of land in the region exceed the safety line. However, with the help of multi-modal data algorithm, the difference between the land use rate of residential areas and the normal value is 0.1. The difference between commercial land use rate and normal land use rate is 0.4, indicating that the work needs to be improved. The difference between the land use rate of vegetation and normal is 0.7. The difference between the land use rate of water area and normal is 0.4. The difference between the land use rate of traffic roads and normal is 0.6. In this regard, the relevant local departments should focus on the optimization of traffic routes, cancel the planning of unnecessary roads, and optimize the control of existing roads.

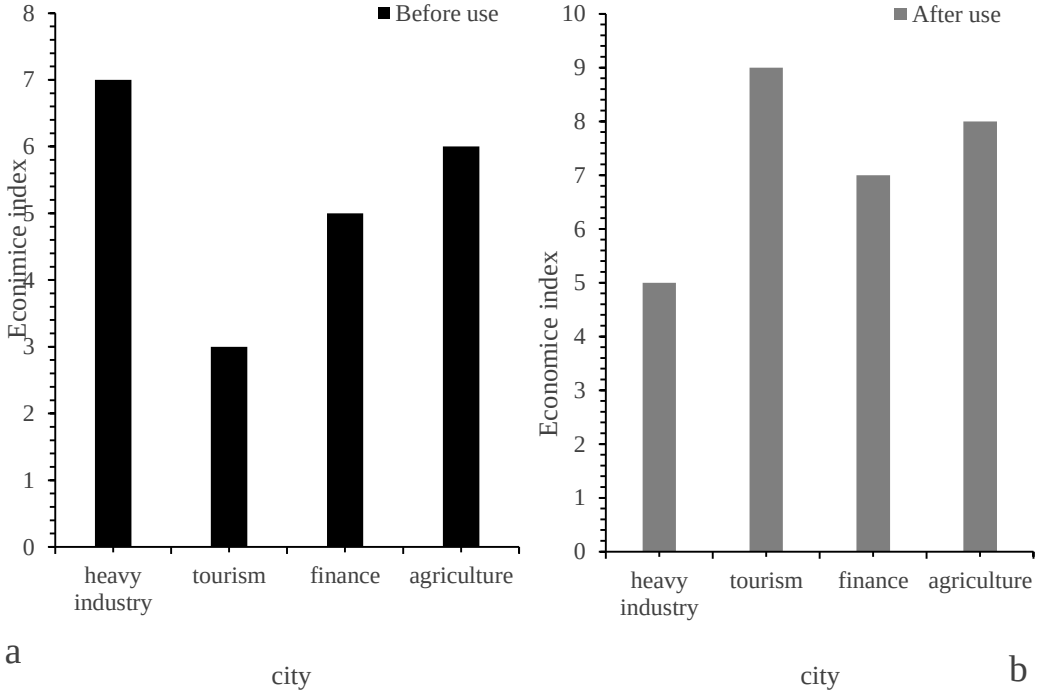

Figure 4a. Economic index before its use

Figure 4b. Post-used economic index

Figure 4. Economic index before and after use

Figure 4a shows the economic indexes under the first four urban development models, and Figure 4b shows the economic indexes under the last four urban development models. It can be seen from Figure 4 that the urban development in the region before the transformation of the natural protection environment mode is mainly concentrated in the urban circle dominated by heavy industry, while the economic development index of the cities dominated by tourism is low. This development mode is conducive to urban construction in the early stage of the region. However, with the excessive consumption of natural resources, the environment is gradually destroyed, and such economic development structure is not ideal. After the transformation of the natural protection environment model, the urban development in the region is mainly concentrated in the circle dominated by tourism, assisted by finance and agriculture, to promote the healthy development of the region's cities.

Before and after the transformation of the natural protection environment model, the difference

of the economic development index of heavy industry is 2, and the difference of the economic development index of tourism is 6. The difference of the economic development index of heavy industry is 2, and the difference of the economic development index of heavy industry is 2. Except for heavy industry, which is decreasing, the rest is on the rise.

To sum up, from the perspective of economics, this paper analyzes the transformation of natural protection environment model under the support of multimodal data algorithm. It is concluded that such methods can effectively adjust the industrial structure of regional cities to promote sustainable and healthy economic development.

5. Conclusion

With the trend of economic globalization, the industrial development in many regions is booming. However, the loss of natural ecological environment is also very serious. Various kinds of natural disasters, major environmental pollution and ecological environmental damage accidents occur from time to time. With the rapid development of urbanization, urban environmental problems are becoming increasingly prominent. Therefore, from the perspective of economic development, it is necessary to develop the extensive industrialization based solely on economic growth towards the coordinated development of economy, society and environment. At the same time, the work of environmental protection must be changed. It is necessary to combine environmental protection with economic development to achieve the purpose of protecting and developing the economy.

Funding

This article is not supported by any foundation.

Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

References

[1] Tomislav, Klarin. "The concept of sustainable development: From its beginning to the contemporary issues." Zagreb International Review of Economics & Business 21.1 (2018): 67-94.

[2] Hemingway, Jordon D.. "Mineral protection regulates long-term global preservation of natural organic carbon." Nature 570.7760 (2019): 228-231.

[3] Aerts, Raf, Olivier Honnay, and An Van Nieuwenhuyse. "Biodiversity and human health: mechanisms and evidence of the positive health effects of diversity in nature and green spaces." British medical bulletin 127.1 (2018): 5-22.

[4] Whitburn, Julie, Wayne Linklater, and Wokje Abrahamse. "Meta‐analysis of human connection to nature and proenvironmental behavior." Conservation biology 34.1 (2020): 180-193.

[5] Fang, Jingyun. "Climate change, human impacts, and carbon sequestration in China." Proceedings of the National Academy of Sciences 115.16 (2018): 4015-4020.

[6] Watson, James EM. "The exceptional value of intact forest ecosystems." Nature ecology & evolution 2.4 (2018): 599-610.

[7] Pei, Tao. "GIScience and remote sensing in natural resource and environmental research: Status quo and future perspectives." Geography and Sustainability 2.3 (2020): 207-215.

[8] Rajasekar, Vani. "Enhanced multimodal biometric recognition approach for smart cities based on an optimized fuzzy genetic algorithm." Scientific Reports 12.1 (2020): 1-11.

[9] Matthews, Thomas J.. "Extension of the gambin model to multimodal species abundance distributions." Methods in Ecology and Evolution 10.3 (2019): 432-437.

[10] Mirmozaffari, Mirpouya. "A novel artificial intelligent approach: Comparison of machine learning tools and algorithms based on optimization DEA Malmquist productivity index for eco-efficiency evaluation." International journal of energy sector management 15.3 (2020): 523-550.

[11] Wyles, Kayleigh J.. "Are some natural environments more psychologically beneficial than others? The importance of type and quality on connectedness to nature and psychological restoration." Environment and Behavior 51.2 (2019): 111-143.

[12] Haider, Tobias P.. "Plastics of the future? The impact of biodegradable polymers on the environment and on society." Angewandte Chemie International Edition 58.1 (2019): 50-62.

[13] Chawla, Louise. "Childhood nature connection and constructive hope: A review of research on connecting with nature and coping with environmental loss." People and Nature 2.3 (2020): 619-642.

[14] Abessa, Denis, Ana Famá, and Lucas Buruaem. "The systematic dismantling of Brazilian environmental laws risks losses on all fronts." Nature ecology & evolution 3.4 (2019): 510-511.

[15] Islam, Talat, Ghulam Ali, and Humaira Asad. "Environmental CSR and pro-environmental behaviors to reduce environmental dilapidation: The moderating role of empathy." Management Research Review 42.3 (2019): 332-351.