



The Effect of CO₂, CH₄, N₂O Gases Emissions on Agricultural Grounds in Iraq After 2003 By Using Neural Networks

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Keyword

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Abstract:

Exacerbating the environmental impacts of pollution and leaving them unchanged will ultimately lead to disastrous environmental disasters Consequences, in addition to incurring a lot of human and material losses in addition to wasting and dissipating a lot of energies and foreshadow in the end a threat to the human existence and the great danger it poses to the future of Iraq. The research attempts to identify the impact of environmental pollution on health, agriculture, economy and development and threatening the lives of the population. For the purpose of reaching this goal, the research included in its theoretical part the concept of pollution and its types, and the Iraqi environment, especially after 2003, while the practical part dealt with the impact of methane emissions, and dioxide Carbon and nitrous oxide on the soil in Iraq using the Quick Back Propagation artificial neural network.

Keywords: Emissions, Pollution, Neural Networks, Quick Back Propagation

تأثير انبعاث غازات ثاني أكسيد الكربون، الميثان، وأكسيد النيتروز على الأراضي الزراعية في العراق بعد العام ٢٠٠٣ باستخدام الشبكات العصبية الاصطناعية

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الخلاصة:

إن تفاقم الآثار البيئية للتلوث وعدم تغييرها سيؤدي في نهاية المطاف إلى عواقب كوارث بيئية، بالإضافة إلى تكبد الكثير من الخسائر البشرية والمادية بالإضافة إلى إهدار وتبديد الكثير من الطاقات، وينذر في النهاية بتهديد البيئة. الوجود الانساني والخطر الكبير الذي يشكله على مستقبل العراق. يحاول البحث التعرف على أثر التلوث البيئي على الصحة والزراعة والاقتصاد والتنمية وتهديده لحياة السكان. ولغرض الوصول إلى هذا الهدف تضمن البحث في جزئه النظري مفهوم التلوث وأنواعه، والبيئة العراقية خاصة بعد عام 2003، بينما تناول الجانب العملي تأثير انبعاثات غاز الميثان وثاني أكسيد الكربون وأكسيد النيتروز. على التربة في العراق باستخدام الشبكة العصبية الاصطناعية QUICK BACK PROPAGATION.

الكلمات المفتاحية: انبعاثات، التلوث، الشبكات العصبية، شبكة الانحدار الخطي السريع.

Research Methodology:

A- The Research Goal:

The research aims to analyze the negative effects of methane emissions, carbon dioxide, and nitrous oxide on Iraqi soil after the year 2003.

B- The Research Importance:

The theoretical aspect, which presents the concept of pollution and its types, as well as the status of the Iraqi environment after 2003, as well as the role of neural networks in analyzing the effects of pollution on lands in Iraq.

The practical side is to use the Quick Back Propagation Network to analyze the effect of some gas emissions on lands in Iraq.

C- The Problem:

The Iraqi environment has been subjected to various and difficult challenges since the year 2003 until now. This came due to the devastation and devastation it has suffered as a result of wars that have cast its shadow on that environment. Water, air and spatial, and the question that we are trying to answer in this research, what is the effect of emissions of carbon dioxide, methane, and nitrous oxide on Iraqi soil? Can the neural networks represented by the Quick Back Propagation Network give useful results?.

-Introduction

Pollution is one of the issues that concern individuals, governments and organizations in all societies, especially that air and water are a matter for humans and more than medicine. The environment has not returned to the purity that God Almighty created on it, so man has been

infested with it, so factories, factories, sources of electric power generation, and finally wars. From 2003 until the liberation of cities occupied by the terrorist gangs of ISIS, which led to the deterioration of the environment, as these sources transmitted millions of tons of waste and toxins without any controls or regulations that prevent the exposure of the population and the environment to high levels of risk to their lives and security, and according to a program report The United Nations Environment Program (UNEP 2009), "Despite the protection provided by many legal means, the environment remains the silent victim of armed conflict at the global level. According to the diagnosis of this program, the damage resulting from these conflicts is usually direct or indirect.

Pollution is one of the most direct damages of wars, such as pollution resulting from the bombing and bombing of industrial sites, and the intentional destruction of natural resources, as well as debris and waste resulting from the destruction of various targets and services. Indirect damage; The environmental impacts resulting from the displacement of large numbers of people from the areas of warfare, or the collapse of the environmental management system, and the lack of data and financial allocations necessary to protect and rehabilitate the environment.

The Theoretical:

1. The concept of pollution:

Pollution It is everything that negatively affects the environment or the living organisms that live in it. The main types of pollution can be divided into: water pollution, air pollution, and soil pollution..

The substances that cause unwanted changes in air, water, and land are referred to as pollutants. Thus, a pollutant is a substance (such as dust and smoke), chemicals (such as SO₂ or methylmercury) or a factor (such as heat, noise, etc.) that affect the environment, have a real or potential negative impact on human interests, and the polluter has been defined as: "Any solid, liquid or gaseous substance that tends to harm the environment." We have different types of pollutants that range from gaseous pollutants to radioactive wastes present in nature, and accordingly, the entire pollutants were classified into two broad categories: biodegradable and non-degradable pollutants [11][12].

Environmental pollution is associated with a disorder in the natural system, as the efficiency of this system decreases when a change in the harmonic movement of its constituent elements occurs. This results in damage to the ecosystem, which results from human behavior in its endeavor to maximize its material gratification by intensifying its exploitation of the environment as a source of material resources and as a container for dumping its waste.

And environmental pollution results from subtracting waste of production and consumption in the natural system in sizes that exceed its absorption capacity, especially if they are complex materials that are difficult to deal with or toxic substances harmful to the environment. The Algerian project defines environmental pollution as: "every direct or indirect change of the environment, and the reason for it Every action that is harmful to the health and safety of people, plants, animals, air, air, water, land, collective and individual properties. "Environmental pollution is considered an economic type of market failure to achieve efficiency and resource allocation and not taking into account the external effects of benefits and External costs [3] [7].

2. Types of pollution:

Environmental pollution is associated with a defect in the ecosystem, the efficiency of this system decreases, a change in the "harmonic movement of its constituent elements", the ability to support life, and consequent damage to the ecosystem, which results from human behavior in the exploitation of the environment as a source of material resources and landfill of waste and causes damage to health Man and his safety as well as its impact on plants, animals, air, water and land. In economic terms, environment. Environmental pollution can be classified into four main forms: air pollution, water pollution, land pollution and audio pollution [3] [10].

a. Air Pollution:

Air is one of the most important environmental resources where no living organism can ntal pollution is considered a type of market failure in achieving efficiency and allocating resourcesdispense with it, and it is one of the most prevalent forms of pollution because it is easy to move from one area to another and in a short period of time and is meant by air pollution. Liquid or solid that may cause harm to life. "Among the most important air pollutants[6][22] :

- 1- Exhaust from transport vehicles, which reached a high level of danger, and this is what obligated many countries in the world to enact environmental laws that limit emissions from vehicle exhaust and prevent their movement on the road except under certain safety conditions.
- 2- Gases resulting from manufacturing processes and their various forms
- 3- Structural processes such as building and demolishing of buildings, roads, and various projects that are an important and major source of dust escalation and fine particles flying into the atmosphere
- 4- Volcanic eruptions and earthquakes are another cause of air and environmental pollution in general.

b. Water pollution:

Water pollution is a defect in the water where it becomes damaged and not fit for consumption, and its definition came as "the introduction of any material in the aqueous

medium that would change its physical, chemical, and biological properties of water" and would be a danger to human health, and harmful to animals and plants and wild water [15].

Water is considered polluted if certain materials or conditions are present that the water cannot be used for a purpose. Water pollution is defined as the presence of excessive amounts of hazard (pollutants) in the water so that it is not suitable for long time drinking, bathing, cooking, or other uses. Pollution is the introduction of pollution into the environment, it is through industrial and commercial waste and daily agricultural practices from human activities, most notably transport models [4]. The treatment of agricultural wastewater in the loose soil that has been washed away by the fields is the largest source of agricultural pollution. Farmers use erosion controls to reduce the flow of runoff and preserve the soil in their fields. River and fertilizer use (nitrogen and phosphorous) usually on agricultural land, animal manure, or spraying municipal or industrial wastewater (liquid waste) is among the most pollutants of water [19].

c. Auditory pollution (noise):

Environmental risks constitute 25% of diseases. Widespread exposure to environmental noise from roads, railways, airports, and industrial sites contribute to these diseases. One in three individuals is disturbed during the day and one in five suffers from disturbed sleep at night due to traffic noise. Epidemiological evidence suggests that those chronically exposed to high levels of environmental noise increase the risk of developing cardiovascular diseases such as myocardial infarction. Thus, noise pollution is not only an environmental factor but also a threat to public health [22].

The greatest evidence of the effects of environmental noise on health is disturbance, sleep, and cognitive performance in adults and children. Exposure to occupational noise also shows some association with high blood pressure, and the relationships between response to emotions and blood pressure can be demonstrated. The effects of noise are the strongest of those outcomes that can be classified, such as emotionality under "life stress" rather than disease [20].

Noise has become a serious environmental problem because it causes psychological and health hazards, and pollution is linked. Auditory in urban and industrial areas that increase with the use of modern equipment, vehicles and machinery. Hearing pollution means "a mixture of information and heterogeneous and unwanted sounds with energy that affects the ability of consciousness to distinguish information and sounds and offends the health of the auditory system and affects the functions of the nervous system [13].

3. The Iraqi environment after 2003:

The wars led by the United States in 2003, and before that, in 1991, caused extensive environmental damage in Iraq, and severely affected the lives and welfare of Iraqi citizens, and

United Nations sanctions have exacerbated the problem. Today, the United Nations Environment Program describes the environmental situation in Iraq as terrible. The Tigris and Euphrates rivers are heavily polluted with industrial and military waste, which poses a threat to people's health. Sewage treatment systems have collapsed in southern Iraq in particular, in addition to the failure of hydraulic infrastructure and sewage floods, and the mixing of surface water with that waste in addition to military waste[21].

But behind the scenes, the environment in Iraq has created a political opportunity for foreign companies seeking access to natural resources. The Iraqi government and NGOs leading the reclamation process have been able to restore the marshes in ways that have enabled foreign companies to benefit from the initiative in other ways as well. Through the initial investment in the restoration of the swamps [8].

4. Land pollution in Iraq:

The Iraqi soil was no better under the ongoing war situation: pollution caused by military debris, including unexploded ordnance, spent cartridges, and military vehicles, as well as radioactive materials such as uranium depleted from American munitions, polluted the soil and in 2003, The United States shot about 1,200 tons of ammunition in Iraq, which increased the pollution problem.

The environment in Iraq has undergone many changes as a result of the wars the country has gone through, the last of which was with ISIS (which caused many remnants of war, whether it was the result of burning oil wells or sulfur fields). Or because of a change in the climate, such as an increase in salinity in the water or air pollution and the lack of green areas, all of which was the result of the low level of environmental services, which made Iraq possess a legacy of environmental pollution[25].

Millions tons of explosives used in the Gulf War were stuck to dust in areas effective military operations. These minerals were converted to semi-gas oxides by exposure to high temperatures of explosions, after which they fell over large areas by wind. These soils contaminated with oxides of heavy metals (or trace elements) adhere to the inner membranes of lung cells when inhaled, and how the cells that protect the lung do not have the ability to contain or dispose of these heavy metals and this means precisely that in every dust and sand storm blowing in Iraq Since 2003, residents of areas contaminated by gases and radioactive minerals are exposed to additional internal and external radiation doses that accumulate in their bodies. The adhesion of these pollutants to soil grains is after their oxides are converted to a semi-gas state as a result of the high temperature (3000-6000) degrees Celsius resulting from the explosion and burning of envelopes. The shells fillings when hitting the target in the air, and are transported by the

wind and gases and clouds of pollution usually rise high for long distances, until they gradually fall and settle over large areas of land, green cover, water, or building surfaces. South surrounding the areas of military operations [2] [5] [24].

5. The use of artificial neural networks in pollution issues:

Artificial neural networks are used in a wide range of applications, for complex data sets with their flexible mathematical architecture. By introducing more links and variables in general. One such application is its use in statistical measurements such as the covariance matrix of a parameter in order to increase test performance[16].

It is observed at the present time, air pollution in almost all cities separate periods, and unfavorable meteorological conditions where emissions affect and contribute to the accumulation of activities in all aspects surrounding cities in the water, land and water, and to avoid high pollution rates under these conditions it is necessary to predict the content of pollutants with Consider all conditions. However, prediction methods such as knowledge, time series, regression analysis and others, do not give adequate and adequate predictive results because the set of factors and poor research, which are difficult to consider in prediction models, affects the process of analyzing the causes of pollution. Moreover, monitoring Data Pollution is characterized by multidimensional characteristics, as environment and pollution data are nonlinear and characterized by uncertainty. These aspects make environmental prediction very difficult. Artificial neural networks are often used to improve results. They are able to work and analyze results in circumstances where information is ambiguous and take into account the factors that are not visible, and all this leads to giving accurate results and making appropriate decisions in a timely manner [18][14].

The Practical

The idea of research has emerged from the environmental reality, which faces many challenges such as pollution in all its forms and types. Given the large number of pollutants that have begun to float on the surface, the choice has been made on the effect of carbon dioxide emissions, methane, and nitrous oxide (transportation, residential buildings, and manufacturing industries). , Electrical energy, and carbon dioxide equivalent) on agricultural land after the year 2003, and the Quick Backpropagation neural network was chosen to implement the practical aspect.

1. Quick Backpropagation Network

This network is the basis for training neural networks, a method of adjusting weights for this network is based on the error rate obtained from the previous step as the correct control of weights allows to reduce error rates and make the model reliable by increasing its

generalization. Reverse diffusion is a short form of "reverse error propagation", it is a standard method for training artificial neural networks that helps to calculate the gradient of the loss function taking into account all the weights in the network, this network has the ability to calculate the true gradient error in one step for each period in a straight line, but In other ways, the gradient bends significantly to the lowest and the rapid back propagation network is used in many applications including robotics and automation, and the use of this network has made a huge stride in many areas[1][9][16][17] [18]. The data was entered with one hidden layer, and with (1000) times the repetition of implementation, which is the training stage that aims to follow the real time taken for implementation, as well as the spread of error and weights on the network, and the acceptable error rate for the network was (0.0051), and **figure (1)** represents implementation.

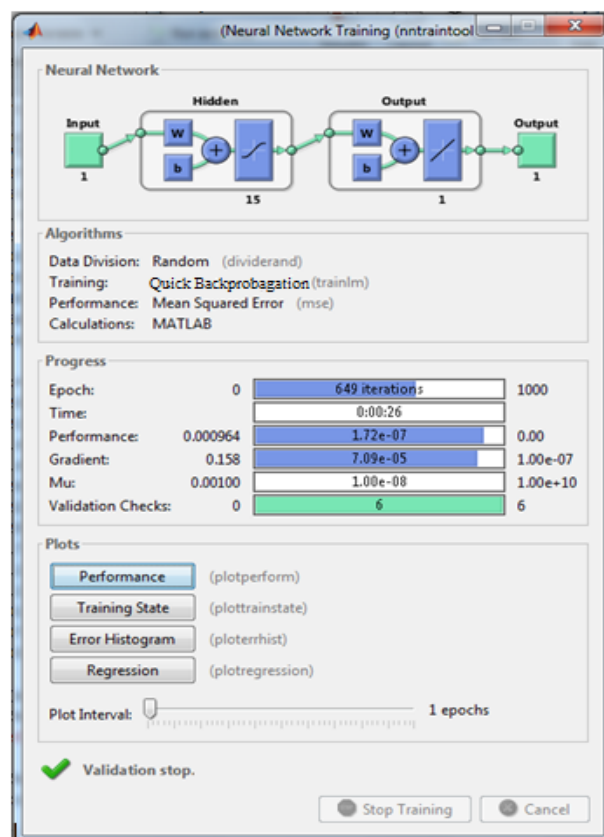


Figure 1: Quick Backpropagation Network implementation

2- The effect of carbon dioxide emissions on agricultural lands

We note from **Table (1)** that the R^2 was 41%. This indicates that independent variables affect 41% with the adopted variable and that 59% are variables outside the model. We note that Adjusted R^2 was a small percentage indicating that the model does not affect the society in which it is. If we look at the F and t tests, we note that the F test was higher than the tabular

evidence for the validity of the model selection, but the t test values were not significant, this is evidence that the chosen variables (which were transport emissions from manufacturing and construction, heat and electricity production, and residential buildings) And commercial services), do not affect the approved variable or that their impact is limited, for several reasons, including the declining agricultural cover and desertification, and volatile climate factors in recent years as a result of unexpectedly increasing temperatures, and the increase in urban areas at the expense of the green area. Carbon dioxide is an important factor Among the factors of photosynthesis process, the plant absorbs this gas and excretes the oxygen gas, so that the atmosphere is purified. Therefore, the declining green areas led to an increase in the pollution ratio and the **figure (2)** clarifies the relationship between the dependent and the represented variable. The y-axis and independent variables are represented by the x-axis.

Table (1): Analysis of CO2 emissions on agricultural lands

Multiple R	0.644486537
R Square	0.415362896
Adjusted R Square	0.025604827
Standard Error	0.009955588
F	1.065694154
Significance F	0.448834285
t-test All Variables	28.98230274 0.133823308 -0.634210819 -0.430980034 0.413010975

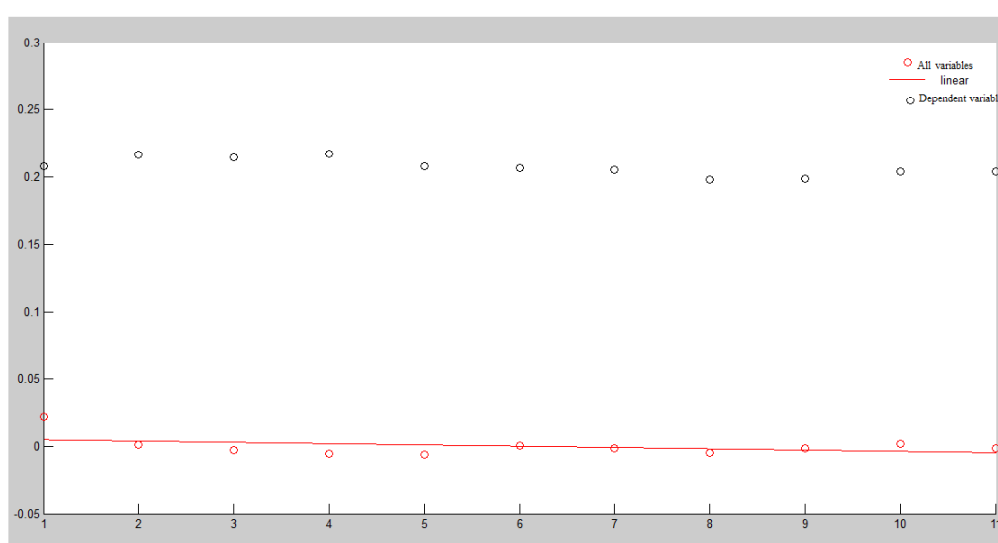


Figure 2: The effect of carbon dioxide emissions on agricultural lands

3- The effect of methane emissions on farmland

We note from **Table (2)** that R² of the model is 74% and this indicates that the independent variables explain its proportion 74% of the adopted variable and that its proportion of 26% are the effects of variables outside the model and that Adjusted R Square 65% and this indicates the effect of the model in the society in which we note The F test was a significant sign of the model's significance index and that the t tests for the independent variables were significant except for one variable, which is the methane emissions from the energy sector.

The effect of this gas on agricultural lands and crops is great, that the emissions of this gas have increased significantly in the recent period, and that such matters are capable of causing high climate changes that negatively affect the agricultural sector, where we note that any increase in emissions of this gas causes a significant change in the total crops And cultivating other types and varieties that are resistant to climate change, the important thing that happens here is that agricultural activities, both plant and animal, are among the causes of this gas emission, and it is clear that this gas is one of the most dangerous gases that threaten the climate and the environment, and **Figure (3)** shows the effect of methane emissions on Agricultural land.

Table (2): Analysis of methane emissions on agricultural lands

Multiple R	0.864328536
R Square	0.747063818
Adjusted R Square	0.655087024
Standard Error	0.006058002
F	8.122307683
Significance F	0.002660011
t-test All Variables	32.59763647 3.807573693 -0.472769047 3.214342146 -3.495931042

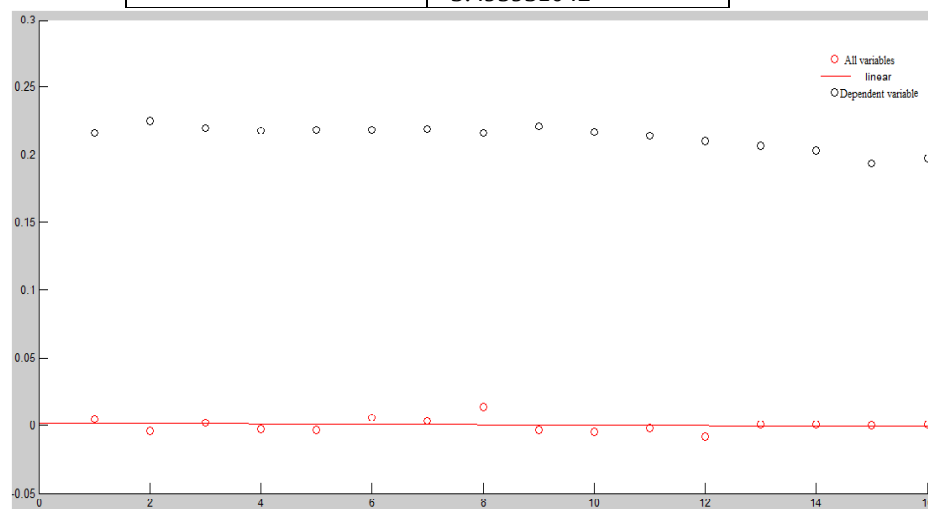


Figure 3: The effect of methane emissions on agricultural lands

4- The effect of N₂O emissions on agricultural lands:

We note from **Table (3)** that R² was worth 77% and this indicates that the independent variables explain 77% of the changes taking place in the adopted variable and that 23% are influences outside the model and that Adjusted R² was 66% and indicated the influence of the model in society. As a whole, we note that the calculated value of F was 6.96, and we note that the t-test values for the independent variables were not significant, indicating that this gas has no effect on the agricultural harvest, but that this gas is produced from soil and animal waste, and **Figure (4)** shows the effect of N₂O emissions on land. Agricultural.

Table (3): N₂O emissions analysis on agricultural lands

Multiple R	0.881488096
R Square	0.777021264
Adjusted R Square	0.665531896
Standard Error	0.004799401
F	6.96946513
Significance F	0.010155311
t test	-0.09367918
	-0.12777294
	0.584600917
	0.060609111

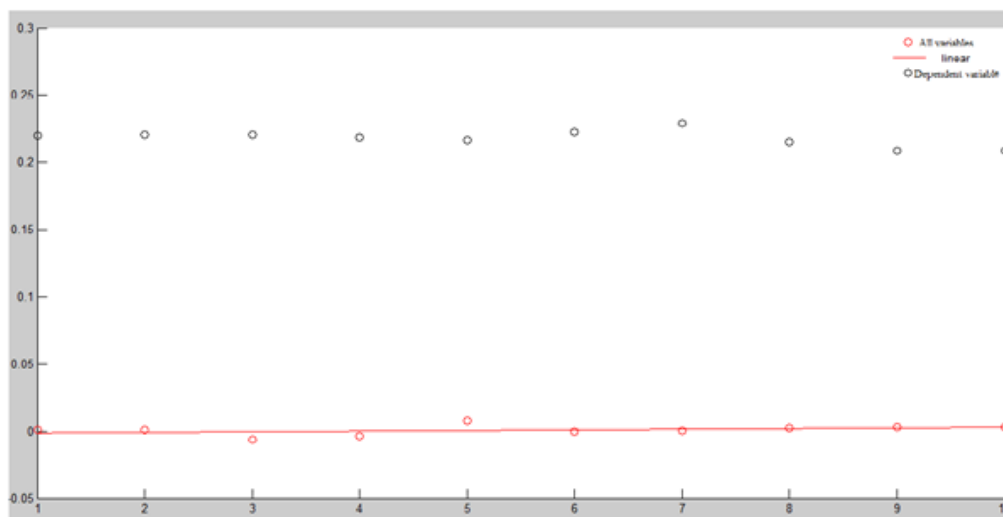


Figure 4: Effect of N₂O emissions on agricultural lands

Conclusions:

1. Reliance on neural networks provides us with the means to control air pollution, and to distinguish between the causes of air pollution faster and more accurately compared to traditional methods such as manual scanning. The adoption of neural network models in

monitoring air pollution will undoubtedly improve the quality of government and management work for environmental safety in the city.

2. Quick Back propagation is the same as any artificial neural network that does not need a hypothesis on data, unlike statistical methods, and the decision-maker's obtaining the outputs he needs in formulating appropriate decisions.
3. The Quick Back propagation network used in the practical side showed great potential in determining the variables affecting and not affecting agricultural land pollution in Iraq, and this is proven by the results of the practical side.
4. The CO₂ emissions are constantly increasing due to the large number of war residues and the lack of vegetation, which leads to an increase in the temperature of the earth and the lack of oxygen.
5. Methane is one of the most dangerous gases that causes global warming, and this negatively affects the agricultural sector and hence the economic sector.
6. N₂O Gas is a gas from agricultural and animal wastes and therefore has no impact on agricultural land.

The proposals

1. Training new computer models on pollution-related data by adopting other neural networks to accomplish the task of searching for the main causes of gas emissions from dense installations, such as clusters of tall buildings, open ponds, and military factories.
2. The activities of afforestation, cultivation and increasing green areas contribute greatly to absorbing CO₂ emissions caused by human activities, which works to purify and filter the atmosphere.
3. Conducting studies and holding conferences, seminars and workshops to reveal the risks of pollution on the reality of the Iraqi environment, especially after the year 2003.

Reference:

- [1] ABIODUN, ISAAC OLUDARE & AMAN, JANTAN, & OMOLARA, ABIODUN ESTHER & DADA, KEMI VICTORIA & UMAR, ABUBAKAR MALAH & LINUS, OKAFOR UCHENWA & ARSHAD, HUMAIRA & KAZAURE, ABDULLAHI AMINU & GANA, USMAN & UBALE KIRU, MUHAMMAD, "Comprehensive Review of Artificial Neural Network Applications to Pattern Recognition". IEEE Access, this work is licensed under a Creative Commons Attribution 4.0 License, 2019, VOLUME 7, P. 158821
- [2] Al-Azzawi, Souad Nagi, "Desertification and Pollution of the Environment of Iraq," Copyright by Arab Society Society ArSCO, (2017), pp. 42-66, Wales-England.
- [3] Al-Taie, Walid Khalif Jabara, "Environmental Pollution and the Green Economy," Ministry of Finance, Economic Department, Economic Policy Division, (2012), pp. 1-3.

-
- [4] D.Owa, F., " Water Pollution: Sources, Effects, Control and Management", *Vol 4 No 8, Mediterranean Journal of Social Sciences*, (2013), P.66
- [5] Faraj, Sahih Jahia and Muhammad, Taghreed Qasim, "Desertification and salinization in Iraq and its economic effects, with special reference to Basra Governorate for the period (2004-2015)", *Gulf Economic Journal*, (2017), No. 33, pp. 60-61.
- [6] Farooq, Majid & Meram, Gowhar & Yousuf Amreena & Singh, Gurmeet, "J&K ENVIS NEWSLETTER-State of Environment & its Related Issues in J&K", Volume 6 - Issue 2, P. 3, published by Department of Ecology, Environment & Remote Sensing, J&K. Feedback for the newsletter would be appreciatedm(2019)
- [7] Firas, Harith Hazem Ayoub and Al-Bayati, Abbas Fadel, "Environmental pollution hindering development," *Iraqi Journal of Market Research and Consumer Protection* (2010)• Volume (2)• No. (3), pp. 249-250
- [8] Guarasci, Bridget, " Environmental Rehabilitation and Global profiteering in Wartime Iraq",*Watson Institute, International & Public Affairs*, (2017)• PP.6-11.
- [9] Islam,Mohaiminul & Chen,Guoron & Jin, Shangzhu, " An Overview of Neural Network", *American Journal of Neural Networks and Applications*, (2019) , 5(1):7-1
- [10] Jaber, Azhar, "Air and Water Pollution, its Types, Sources," and Its Effects, *Babylon University Journal for Humanities*, Volume (19)• No. (2)• (2011)• PP. 3-7.
- [11] Manisalidis, Ioannis & Stavropoulou Elisavet & Stavropoulos. Agathangelos & Bezirtzoglou, Eugenia , " Environmental and Health Impacts of Air Pollution: A Review", *Front Public Health*, Vol.8 , Article 14, (2020), PP.2-3
- [12] Mirta, Abhijit, "Environmental Pollution and Its Control". chapter 7, PP. 59-6.
www.researchgate.net/publication/327779390_Environmental_Pollution_and_Its_Control
- [13] Murad, Nasser (2016)• "The Problem of Environmental Pollution in Algeria"• *ASJP*, Volume (6), No. 1, (2018), PP. 163-174.
- [14] Pawul, Małgorzata &Śliwka, Małgorzata, " APPLICATION OF ARTIFICIAL NEURAL NETWORKS FOR PREDICTION OF AIR POLLUTION LEVELS IN ENVIRONMENTAL MONITORING", *Journal of Ecological Engineering*, Volume 17, Issue 4, (2016)• PP. 191–192.
- [15] Radawa, Muammar, "The Financial Cost of Protection from Environmental Pollution, The Case of Algeria," *Master's Thesis*, Faculty of Economics and Management Sciences, University of the town, Algiers, (2006)
- [16] Rahman,P A & Panchenkom A A & Safarov, A M, " Using neural networks for prediction of air pollution index in industrial city", *IOP Conf. Series: Earth and Environmental Science* 87, (2017) ,P.2.
- [17] Sarhan, Mohammed & Mohamad, Fatma Susilawati,"Dynamically adaptive Weight in Batch Back Propagation Algorithm via Dynamic Training Rate for Speedup and Accuracy Training", *Journal of Telecommunications and Information Technology*, (2018), PP.82-83.
- [18] Sildir Hasan, & Aydin, Erdal & Kavzoglu, Taskin, "Design of Feedforward Neural Networks in the Classification of Hyperspectral Imagery Using Super structural Optimization", *Remote Sens.*, 12, 956; doi:10.3390/rs12060956, (2020), P.1
- [19] Soni, H.B. "Categories, Causes and Control of Water Pollution: A Review", *International Journal of Life Sciences Leaflets*. 107: (2019), pp4-12

- [20] Stansfeld, Stephen A & Mathesonm Mark P, "Noise pollution: non-auditory effects on health", *British Medical Bulletin*, (2003), Vol. 68
- [21] Tawfiq,Luma Naji Mohammed & Farah Feasal Ghazi, "Heavy Metals Pollution in Soil and Its Influence in South of Iraq", *International Journal of Discrete Mathematics*, 2(3): 59-63. (2017)
- [22] Vallerom Daniel Alan, "Air Pollution", *Kirk-Othmer Encyclopedia of Chemical Technology*. Copyright John Wiley & Sons, Inc., 2015), P.1
- [23] Weilgart, L., , "The impact of ocean noise pollution on fish and invertebrates", *Environmental noise in Europe — 2020*, European Environment Agency, 2020, (2018) PP. 61-63.
- [24] World Bank, Iraq Economic Monitor from War to Reconstruction and Economic Recovery," First National Voluntary Review on Sustainable Development Goals 2019 (The Triumph of National Will)" Spring , (2018),P.32.
- [25] Zwijnenburg ,Wim and Postma, Foeke, " Living Under A Black Sky-Conflict pollution and environmental health concerns in Iraq", PAX, Editor: Doug Weir, PP 22-24, The Netherlands. (2017)