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Assessing the level of CO_2 emission in Iran via the econometric approach

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ABSTRACT

The main objective of this study is to investigate the production of carbon dioxide and its effective factors on CO_2 emission in Iran and other parts of the world. The results show that by increasing the population and to meet their needs, it is necessary to increase the production of fossil fuels, in the less-developed or developing countries. Also in developing countries by increase in the gross domestic product (GDP), expenditure in these countries arises. Since there is no suitable infrastructure for optimal use of resources properly. In Iran, the rate of CO_2 emission arises by increased population and GDP. However, in developed countries, due to the high technology available to the society and government, the amount of CO_2 emission is decreasing or under the control. In order to create suitable infrastructure for proper management of resources and expenditure, as well as to reduce CO_2 emission, long-term planning is suggested to be drawn. Hence, transferring the technology to the country and domesticating it, will help in this trend. Furthermore, cooperation with successful countries in the field of reduction and control of CO_2 emission and using experiences of successful countries facilitated this trend.

Keywords: Carbon dioxide, Greenhouse effect, Country population, GDP, Primary energy.

INTRODUCTION

By increased development of technology and societies, the amount of consumption is increasing dramatically. More consumption and more production as well as increasing the level of technology has caused an elevated standard of living (Tsankova *et al.* 2019). However, in spite of all the benefits of development, it has its drawbacks. One of the undeniable disadvantages that has directly affected human life and health is CO_2 emission. Hence, increased production has forced many communities to shift toward clean fuels despite their high cost (Fu *et al.* 2018). Nowadays, The environment is also of great importance to public opinion and governments (Mdehheb *et al.* 2020). In the point view of economic growth, environmental resources, in addition to being used as inputs in production and consumption, are also affected by economic activities in the form of production and consumption. Sometimes, increased economic activities lead to higher employment of energy and water resources, agricultural lands, etc. Therefore, climate pollution, destruction of pastures and reduced fertility of agricultural lands. Therefore, economic growth on the one hand by upraising production and consumption elevates human welfare, while on the other hand by creating environmental pollution negatively influences human health (Azuma *et al.* 2018). Due to the finite nature of most environmental resources, the study of how economic activities affect the environment can play an effective role in conserving environmental resources and also achieving the goals of sustainable growth (Falahip 2013). Emission from fossil fuels and other human activities pose a serious threat to global warming (Vessally *et al.* 2018). Climate change may disrupt the environment and human activities. Barley is a global commodity, so reducing greenhouse gas emission in any country has global external benefits. Companies and organizations, and even countries that do not strive to protect the environment and create environmental pollution, do not have a good impact on society and will face widespread protests. Hence, some companies and organizations spend billions of dollars annually on environmental measures and social responsibilities (Mundaca & Markandya 2015).

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181
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In Iran, due to the huge reserves of fossil fuels, not much attention has been paid to energy saving leading to environmental damage and degradation. The pattern of development in the energy sector is acceptable when it has the least amount of environmental degradation. Given that the world is moving step by step towards clean energy and not to use environmental pollutants, the relationship between crop production and pollution is raised. In this regard, countries with reserves such as oil and other fossil reserves have neglected other alternatives in terms of clean energy, but developed countries, which on the one hand have many products and on the other hand have replaced clean energy and tried not to use destructive energies to the environment. In the present study, the main purpose is to estimate the optimal or average level of CO_2 emission in Iran compared to other countries. The main question will be "what is the optimal level of CO_2 emission compared to the world?" and how far are we from it? Mundaca & Markandya (2015) in a study examining the progress and movement towards green energy found that in the short term there is a significant relationship between countries progress and the use of clean energy. However, in the long run, this relationship does not exist significantly. Shahiki Tash *et al.* (2013) concluded that all energy-based industries are very far from the optimal point of production. Numerical values of Morishima tensile also indicate the confirmation of the relationship of technical substitution of all inputs with each other, so that the values obtained are one or higher. Keskina (2015) also pointed out that the production planning policy is based on the optimal amount of CO_2 emission and is determined according to the constraints defined by the company. Finally, in the numerical results, by comparing each of the methods, a solution was identified according to each criterion. Hadian (2013) reported that environmental damage due to economic activities is the most important negative side effect affecting the welfare of society. Therefore, a three-part model including household, enterprise and government is considered. After solving the model, the optimal amount of pollution tax has been calculated using statistics related to the Iranian economy. After calibrating the solved model, the optimal pollution tax rate is 7.8 thousand Rials per ton of CO_2 emission.

Alam *et al*. (2007) using data from Pakistan in 1971-2005 reported that a 1% increase in GDP leads to a 0.84% upraise in CO_2 emission, while a 1% increase in the growth rate of energy intensity causes a 0.24% elevation in its releasing. In addition, increasing urbanization and population growth significantly elevate the spread of pollution, while these two factors will reduce economic growth in the long run. Shi (2003) in a study on 93 developed and developing countries between 1975 and 1996 examined the relationship between population change and CO_2 emission exhibiting that despite previous studies which considered a single stretch for CO_2 emission per population change, in this study two stretches were found to be larger than one during two decades. In addition, the effect of population on CO_2 emission in developing countries is greater compared to developed countries. Falahip & Hekmati-Farid (2013) in a study on the factors affecting CO_2 emission in the provinces of the country reported that energy intensity, real per capita income, population size and urbanization rate are the most important economic and social factors affecting environmental pollution. They found that the per capita elasticity of CO_2 emission to real per capita income and energy intensity were 0.71 and 0.95 respectively. Their results also exhibited that by increasing population and urbanization rate by 1%, per capita CO_2 emission elevates to 1.34% and 1.68% respectively. Saleh *et al.* (2009) also reported the existence of a one-way relationship between the CO_2 emission and GDP concluding that since the growth rate of CO_2 emission is higher than that of GDP, so the Kuznets environmental curve in the conditions of Iran does not display the expected form proposed in the theoretical analysis. In other words, the economic situation of the country is not yet in a position to reduce environmental pollutants. The CO_2 emission is affected by many factors and also affects many factors and variables. Identifying these factors can be effective in controlling and improving the production of this gas. Given that Iran is a developing country and is increasing its production level day by day, and also due to its availability to a high level of low-cost fossil fuel, production of so many products from oil is not surprising in this country. Clean energy is a good alternative to fossil fuels, but in countries where the cost of fossil fuels is low, the shift to clean energy, or in other words, new energy, is slow and is faced to resistance (Oduber *et al*. 2019).

Hypotheses

H 1: The population of the country affects the amount of CO_2 emission in Iran.

H 2: GDP affects CO_2 emission in Iran.

H 3: There is a significant relationship between CO_2 emission in Iran and in selected developed countries.

H 4: There is a significant relationship between CO_2 emission in Iran and selected developing countries.

In the present study, the following model is presented based on Mundaca & Markandya (2015).

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181 Received: May 06. 2020 Accepted: Oct. 23. 2020
DOI: Article type: Research

$CO_2 = \beta_0 + \beta_1 pop + \beta_2 GDP + \beta_3 TPES/GDP + \beta_4 CO_2/TPES + e$
CO_2 = amount of CO_2 emission
Pop = Population of the country
GDP = Gross domestic product
TPES / GDP = Primary energy supply divided by GDP
CO_2 / TPES = CO_2 emission divided by primary energy supply
e = error coefficient
The following models are also used to test the 3rd and 4th hypotheses:
$IRAN = \beta_0 + \beta_1 FRA + \beta_2 GER + \beta_3 UK + \beta_4 USA + e$
$IRAN = \beta_0 + \beta_1 BAH + \beta_2 IRAQ + \beta_3 QAT + \beta_4 UAE + e$

Carbon dioxide: Plants use it in the process of photosynthesis to produce carbohydrates and take it out, releasing oxygen. The CO_2 present in the atmosphere acts as a heat shield for the earth and prevents the cold in the earth by its natural greenhouse effect. However, the high concentrations of CO_2 emission in the earth atmosphere, which are produced by burning fossil fuels, are known to be air pollutants.
Country population: The number of people living in a country, province, city, district, village, town or village, and in short in a border settlement and place is called population.
Gross Domestic Product: Gross domestic product is the monetary value of the sum of goods and services that are produced in a country over a period of time, usually one year.
Primary energy: Energy derived from naturally occurring materials, including crude oil, gas and coal.

MATERIALS AND METHODS

This research is applied in terms of purpose because the research results will be used in the community. In terms of data collection, it is descriptive-correlational because it examines and describes the relationships between variables. This research is also hybrid in terms of time. Combined data examines variables by integrating time series and cross-sectional data.
The population data in the present study include information from Iran and the average from selected countries in the world and also the Middle East from 2005 through 2019. So, the present information will be used from the site and information of the World Bank and the Central Bank of Iran. In this study, a multivariate linear regression model has been used to test the hypotheses.
The statistical method is based on the panel method. However, to determine the panel method with or without effects (fixed and random), we used Chaw test. The Hausman test was also used to determine which method is useful in the panel method with fixed or random effects. Thereafter, we explained the tests related to the significance of the whole model and the significance of the independent variables. Finally, after describing the tests related to the assumptions of classical regression, we stated the decision to reject or accept the research hypotheses. In this study, EViews software has been used to test the model.
In the combined data approach, the following constraints and assumptions are considered on the width of the origin and the slope coefficient of the model:
$Y_{it} = \alpha_{it} + \beta X_{it} + \varepsilon_{it}$
where Y_{it} is the dependent variable, X_{it} is the set of independent variables, and ε_{it} is the model error sentence. The hybrid data approach usually includes three constrained patterns, fixed effects, and random effects.
In the restricted model, the width of the origin is considered the same in the regression model for all time periods and location. One of the advantages of the constrained model is its simplicity of estimation and one of its disadvantages is the inability of this model to consider the specific characteristics of each section. This template is as follow:
$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$
In the fixed effects model, the width of the origin in the regression model is considered different between years or companies because each year or company has its own characteristics. The pattern of fixed effects is appropriate in situations where the width of the specific origin of the year or company is correlated with one or more explanatory variables.
$Y_{it} = \alpha_{it} + \beta X_{it} + \varepsilon_{it}$

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181 Received: May 06. 2020 Accepted: Oct. 23. 2020
DOI: Article type: Research

In the stochastic effects model, it is assumed that the width from the origin of a single unit is a random selection from larger communities with a fixed mean. Thus the width of a single origin is expressed as a deviation from this constant mean. Random effects are suitable in situations where the width of the origin (random) of each cross-sectional unit is not correlated with the explanatory variables. This model is presented in a simple way as follow:

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad , \quad \alpha_i = \alpha + u_i \quad , \quad i = 1, 2, \ldots \quad , N \; or \; T$$

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} + u_i \quad , \quad \psi_{it} = \varepsilon_{it} + u_i \quad , Y_{it} = \alpha + \beta X_{it} + \psi_{it}$$

RESULTS

Descriptive statistics of data

Table 1 shows the descriptive statistics of variables during the period of study. These statistics variables measured using World Bank data during the period, including mean, median, standard deviation, minimum and maximum.

Table 1. Descriptive statistics of variables during the period of study.

A symbol	Variables	Average	Middle	Skewness	Kurtosis	standard deviation
CO_2	CO_2 emission	6.7134761	6.8008201	-0.144120	1.923451	1.0848391
POP	population	77450025	77522640	-0.060540	1.944733	5317033
GDP	Gross domestic product	2.89E $^{+11}$	2.39E $^{+11}$	0.411874	1.704726	1.73E $^{+11}$
TPES/GDP	Primary energy to Gross domestic product	30121.45	28177.00	0.499791	1.758118	4268.264
CO_2/TPES	CO_2 emission to Primary energy	1.07E^{-08}	1.05E^{-08}	0.116605	1.439270	4.44E^{-09}

As shown in Table 1, the variables have a relatively normal distribution, e.g. in the dependent variable (carbon dioxide), the mean and median are close to each other, exhibiting the proper distribution of this variable. In addition, the standard deviation from the mean is very small, revealing the low dispersion of this variable. Moreover, as the kurtosis of the variables is close to 3, this variable has a good kurtosis. Besides, as the skewness of this variable is between 2 and -2, the CO_2 emission variable has a good skewness. Therefore, according to this table, all variables, such as dependent ones display a suitable distribution.

Normality of the error distribution

Jarque-Bera test was used to check the normality of the model error distribution. This test is performed to distribute the variables normally. According to Table 2 which reveals if the data is normal or not, and also based on econometrics, only the normality of dependent variables is enough.

Table 2. Jarque-Bera test of variables.

A symbol	Amount of	Significance	Result
CO_2	1.208433	0.546503	Normal
POP	0.940207	0.624938	Normal
GDP	1.963580	0.374640	Normal
TPES/GDP	2.075220	0.354300	Normal
CO_2/TPES	2.117864	0.346826	Normal

According to Table 2 and based on the results of Jark test, since the probability level is more than 5% and their statistical values are not in the critical value, hence, the data of all variables, whether independent or dependent, exhibit normal distribution.

Error independence test

Watson camera statistic examines serial correlation between regression residuals (errors). Due to the fact that the calculated Watson camera statistic value of the regression model in the present study is between 1.5 and 2.5, the independence of the model errors is confirmed.

Analysis of variance

In the present study, the variance heterogeneity is investigated using White test (Table 3).

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181 Received: May 06. 2020 Accepted: Oct. 23. 2020
DOI: Article type: Research

Table 3. Analysis of variance.

Model	Statistics	Sig	Result
The main research model	1.762520	0.627731	rejection
Model of Iran and developed countries	1.688919	0.268384	rejection
Model of Iran and developing countries	0.631763	0.771430	rejection

This table exhibited that the probability level of all variables is more than 5%. Hence, given that the variance heterogeneity is rejected, it can be concluded that all three study models have variance heterogeneity.

Sustainability test

According to the definition of reliability, a time series is stable when the mean, variance, covariance and consequently its correlation coefficient remain constant over time and it does no matter at which time we calculate these indicators (Nofaresti 1999). The single root test is one of the most common tests used to determine the reliability of a time series process. Some of the most common unit root tests include Dickey-Fuller test, generalized Dickey-Fuller test, and Phillips and Peron tests. In this study, generalized Dickey-Fuller test was used to evaluate the reliability of variables. Notably, after examining the reliability of the variables and their degree of reliability, represented by I (d), if the variables are stable by a maximum of one differentiation [i.e. I (1)], it is necessary to make sure that the variables are cohesive. Hence, we should check the reliability of the regression disorder statements. If the regression-related perturbation statements are at a stable level [i.e., I (0)], the usual econometric methods can be used to estimate factors using time series. Thereby in statistical inferences from statistics, we use T and F. Otherwise the data must be differentiated.

Determining the appropriate model for estimating the regression model

According to the literature and the nature of research hypotheses in this study, combined data were used. In order to determine the appropriate model (combination or panel with fixed or random effects) to test the hypotheses, Chow and Hausman tests were used.

Chow test (Limer test or F test)

At first, to examine the effect of different companies, it is necessary to test the significance of the group. This determines whether the data panel can be used to estimate the desired function or not. The F test is used for this purpose. If the calculated value of F is less than F in the table, the null hypothesis is accepted and only one width of the origin is required. However, if the calculated value of F is greater than F in the table, the null hypothesis is rejected and the group effects are accepted. Thus, the width of different sources should be estimated and used.
The test results for the regression models of the present study are shown in Table 5. Due to the significance level, the results of the Chow test show that the hypothesis (integrated model) is not confirmed. In other words, there are individual or group effects and the panel data method should be used to estimate the research regression model, which is then used to determine the type of panel model (with random effects or fixed effects).

Hausman test

Once it is determined that the width of the origin is not the same for different variable in all four models, the method used in estimating the model (fixed or random effects) should be determined, using Hausman test. In this test, we examine the null hypothesis based on the consistency of random effect estimates against the opposite hypothesis based on their inconsistency. If the calculated chi-square statistic is larger than the statistic table, null hypothesis is rejected and it could be concluded that there is a correlation between the non-origin-width perturbation and the independent variables. According to Table 4, all variables exhibit reliability.
The results of the Hausman test are shown in Table 6 exhibiting that the null hypothesis has been rejected (significant level < 0.05) and it is necessary to use the panel model with fixed effects. The first model, which is presented to examine the first and second hypotheses of the study, is as follow

$$CO_2 = \beta 0 + \beta 1 pop + \beta 2 GDP + \beta 3 TPES/GDP + \beta 4\ CO_2/TPES + e$$

The results of the analysis of this model is presented in Table 7.

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181 Received: May 06. 2020 Accepted: Oct. 23. 2020
DOI: Article type: Research

Table 4. Dicky Fuller test.

variable	Sig.	Degree of reliability
CO_2	0.0081	I(0)
POP	0.0001	I(0)
GDP	0.0002	I(0)
TPES/GDP	0.0000	I(0)
CO_2/TPES	0.0021	I(0)
FRA	0.0075	I(0)
GER	0.0373	I(0)
UK	0.0047	I(0)
USA	0.0069	I(0)
BAH	0.0062	I(0)
IRAQ	0.0397	I(0)
QAT	0.0060	I(0)
UAE	0.0302	I(0)

Table 5. Chow test.

Test result		Possibility	Statistics F
Panel model	Rejection of the null hypothesis	0.000	12.293

Table 6. Hausman test.

Test result		Possibility	χ^2
Panel with fixed effects	Rejection of the null hypothesis	0.0047	15.05

Table 7. Results of model fitting.

Variables	Beta	T	Sig	Result
β_0	$-1.52E^{-06}$	-1.394527	0.1835	Reject
pop	1.222000	8.65E+13	0.0000	No reject
GDP	$1.40E^{-18}$	3.096369	0.0074	No reject
TPES/GDP	63.25178	3.494407	0.0033	No reject
CO_2/TPES	0.002781	0.029283	0.0780	Reject
F	1.82E+28			
coefficient of determination	0.656			
	0.624	P-value	0.000	
Adjusted coefficient of determination				Significant

After testing the regression assumptions, the results of fitting the above regression equation are presented in Table 7. The F value (1.82) also indicates the significance of the whole regression model. In addition, the unadjusted coefficient of determination is 62%, indicating that the independent and control variables can exhibit the dependent variable as a percentage. The first hypothesis represents that the country population affects the amount of carbon dioxide production in Iran. Hence, using regression estimation from data panel method, it can be seen that the level of error is 0.000. So, by 99% confidence, this hypothesis can be confirmed representing that the population of the country influence on the carbon dioxide production in Iran. The second hypothesis expresses that GDP affects the amount of CO2 emission in Iran. Therefore, according to the results of estimating the model and the error coefficient (0.007), by 99% confidence level, this hypothesis is approved and will not be rejected. Therefore, GDP influences the amount of CO2 emission production in Iran. According to the third hypothesis, there is a significant relationship between CO_2 emission in Iran and some developed countries (Germany, USA, UK and France, Table 8).

Table 8. Results of model fitting.

Variables	Beta	T	Sig	Result
β_0	635.263	1.195	0.069	Reject
FRA	0.28	0.747	0.466	Reject
GER	-0.391	-4.217	0.000	Accept
UK	-0.034	-1.147	0.159	Reject
USA	-0.091	-1.708	0.108	Reject
F	17.544			Significant
coefficient of determination	0.82	P-value	0.000	
Adjusted coefficient of determination	0.77			

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181 Received: May 06. 2020 Accepted: Oct. 23. 2020
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As shown in Table 8, CO_2 emission in Germany exhibits a negative relationship with its emission in Iran. However, no significant relationship was found between other countries and Iran from this point of view.
According to the fourth hypothesis, there is a significant relationship between CO_2 emission in Iran and some developing countries (Bahrain, Qatar, UAE and Iraq, Table 9).

Table 9. Results of model fitting.

Variables	Beta	T	Sig.	Result
β_0	374.93	1.400	0.181	Reject
BAH	0.463	0.802	0.434	Reject
IRAQ	-1.055	-3.429	0.0037	Accept
QAT	6.417	1.147	0.269	Reject
UAE	8.590	10.55	0.000	Accept
F	44.242			Significant
coefficient of determination	0.92	P-value	0.000	
Adjusted coefficient of determination	0.90			

As shown in Table 9, CO_2 emission in Iraq and UAE over time exhibits a relationship to its emission in Iran, while it was not true for Qatar and Bahrain.

DISCUSSION AND CONCLUSION

The main purpose of this study was to investigate CO_2 emission and the factors affecting it as well as comparing its production levels in Iran and the other countries. In this regard, according to the analysis, it is concluded that CO_2 emission in Iran is affected by factors such as population and GDP. In addition, these results can be theoretically confirmed in this way that by increasing in the population and to meet their needs, it is necessary to increase the production of products, which in less developed- and developing countries is mainly provided by fossil fuels such as petroleum. Fossils are inclined. Also in developing countries, with the increase of GDP, the consumption of fossil fuels in these countries increases. Because the proper infrastructure for the optimal use of technology has not been properly questioned. So in Iran, by increasing population and GDP, CO_2 emission arises. However, in developed countries, due to availability of society and the government to new technologies, CO_2 emission is decreasing or under the control. According to the results of the third hypothesis in European countries, due to the large number of developed countries in the world, there is a decrease in their CO_2 emission. Since the GDP of many of these countries is increasing, and the policy in these countries is to increase capital, hence creating appropriate infrastructure for proper management of resources and consumption is suggested. On the other hand, in order to reduce CO_2 emission, it is necessary to draw long-term plans and transfer new technologies to the country to accelerate this trend. GDP should be managed in such a way that the new technologies enter the field. This means reducing CO_2 emission and replacing it with alternative technologies. It is suggested to facilitate this trend by aligning and cooperating with successful countries in the field of reducing CO_2 emission and using their experiences in this trend.

REFERENCES

Alam, S, Fatima, A & Butt, M 2007, Sustainable Development Degradation, *Journal of Asian Economics*, 18.

Azuma, Kenichi, Kagi, Naoki, Yanagi, U & Osawa, Haruki 2018, Effects of low-level inhalation exposure to CO_2 emission in indoor environments: A short review on human health and psychomotor performance, *Environment International*, 121: 51-56.

Brose, U, Martinez, ND & Williams, RJ 2003, Estimating species richness: sensitivity to sample coverage and insensitivity to spatial patterns. *Ecology*, 84: 2364-2377.

Falahip, F & Hekmati Farid, S 013, A study of factors affecting carbon dioxide emissions in the provinces of the Iran (Panel Data Approach), *Iranian Journal of Energy Economics*, 2: 6, 129-150 (In Persian).

Fu, Yinghao & Xiao, Congming 2018, Synthesis of oligo (carbon dioxide), *Journal of CO_2 Utilization*, 27: 42-47.

Hadian, E & Ostadzad AH 2013, Estimation of the optimal level of pollution tax in Iranian economy, *Economic Growth and Development Research*, 3: 57 - 74.

Keskin, GA, İlhan, OS, Aydınc, N & Ekinci, E 2015, A comparative study of production–inventory model for determining effective production quantity and safety stock level, *Applied Mathematical Modelling*, 39: 6359-6374.

Caspian J. Environ. Sci. Vol. 19 No. 1 pp. 173~181 Received: May 06. 2020 Accepted: Oct. 23. 2020
DOI: Article type: Research

Mdehheb, Z, Elkihel, B, Bouamama, M, Hammouti & Delaunois, F 2020, The environmental management system and its application impacts on the business economy in the eastern region of Morocco. *Caspian Journal of Environmental Sciences*, 18: 13_20.

Mundaca, L & Markandya A. 2015, Assessing regional progress towards a 'Green Energy Economy. *Applied Energy*, http://dx.doi.org/10.1016/j.apenergy.2015.10.098.

Oduber, F, Calvo, AI, C. Blanco-Alegre, A, Castro, AM, Vega-Maray, RM, Valencia-Barrera, D, Fernández-González & Fraile, R 2019, Links between recent trends in airborne pollen concentration, meteorological parameters and air pollutants, *Agricultural and Forest Meteorology*, 264: 16-26.

Saleh, I, Shabani Z, Sadat Barikani, SH & Yazdani, S 2009, Investigating the Causal Relationship between GDP and Greenhouse Gas Volume in Iran (Case Study of Carbon Dioxide Gas), *Journal of Agricultural Economics and Development*, 17: 19 - 41.

Shahiki, T, Mohammad, N, Norvarzi, A & Rahimi, GA 2013, Economies of scale, optimal production level and elasticity of substitution in Iran, *Quarterly Journal of Environmental Economics and Energy*, 2: 6.

Shi, A 2003, The impact of population pressure on global carbon dioxide emission, 1975-1996: Evidence from pooled cross-country data, *Ecological Economics*, 44: 29-42.

Tsankova, G, Richter, M, Stanwix, PL, & May EF 2019, Densities and dielectric permittivities for (carbon monoxide + carbon dioxide) mixtures determined with a microwave re-entrant cavity resonator, *Journal of Chemical Thermodynamics*, 129: 114-120.

Vessally, E, Mohammadi, R, Hosseinian, A, Edjlali, L & Babazadeh, M 2018 Three component coupling of amines, alkyl halides and carbon dioxide: An environmentally benign access to carbamate esters, *Journal of CO_2 Utilization*, 24: 361-368.

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ارزیابی سطح تولید دی اکسید کربن در ایران با رویکرد اقتصادسنجی

کورش آسایش

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چکیده

هدف اصلی تحقیق حاضر بررسی تولید دی اکسید کربن و عوامل تأثیرگذار بر آن و مقایسه تولید دی اکسید کربن در ایران و جهان است. نتایج نشان می دهد که با افزایش جمعیت و برای رفع نیازهای آنها لازم است تولیدات محصولات بیشتر شود که این خود در کشورهای کم تر توسعه یافته و یا به عبارتی کشورهای در حال توسعه به سمت سوخت های فسیلی متمایل می‌شود. همچنین در کشورهای در حال توسعه با افزایش تولید ناخالص داخلی مصارف سوخت های فسیلی در این کشورها افزایش می‌یابد، زیرا زیرساخت‌های مناسب برای استفاده بهینه از فناوری به طور مناسب شکل نگرفته است. در ایران نیز به همین صورت با افزایش جمعیت و تولید ناخالص داخلی، میزان دی اکسید کربن افزایش می یابد. ولی در کشورهای توسعه یافته به دلیل اینکه فناوری پیشرفته در اختیار جامعه و دولت قرار دارد، میزان دی اکسید تولیدی در حال کاهش و یا کنترل است. پیشنهاد می شود که زیر ساخت های مناسب در راستای مدیریت صحیح منابع و مصارف ایجاد شود و همچنین در راستای کاهش تولید دی اکسید کربن لازم است برنامه‌ریزی‌های بلند مدتی انجام شود و با انتقال فناوری به کشور و بومی سازی آن به کمک در این راستا شتافت و با همکاری با کشورهای موفق در عرصه کاهش و کنترل دی اکسید کربن و با استفاده از تجربیات گذشته کشورهای موفق در این راستا این امر را تسهیل کرد.

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