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Assessing Turkey's Environmental Performance: Insights from the Environmental Performance Index (EPI)

Türkiye'nin Çevresel Performansının Değerlendirilmesi: Çevresel Performans Endeksi (ÇPE) ile Elde Edilen Bulgular

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Abstract: The study delves into Turkey's environmental performance using the Environmental Performance Index (EPI) data from 1995 to 2022. Using data from the Environmental Performance Index (EPI) for the years 1995 to 2022, the study explores Turkey's environmental performance. It searches at several factors, such as climate change, environmental health, and ecosystem vitality, and it clarifies Turkey's position relative to other countries. The EPI scores—which are derived from 40 indicators spanning three policy objectives—are examined to identify patterns and areas in need of development. Signs of progress, particularly in waste management and recycling initiatives, are highlighted along with challenges in waste management, environmental health, and mitigating climate change. However, challenges like declining water and air quality and unsustainable agriculture currently exist. While discussing the shortcomings of the EPI approach, such as missing data and ranking computation, the article also highlights the significance of thorough research in comprehending and addressing environmental concerns. An alternative approach to ranking nations and carrying out additional environmental performance analysis is presented: the TOPSIS method. With its insights into Turkey's environmental challenges and advancements over time, the article is an informative resource for policymakers, researchers, and stakeholders interested in environmental sustainability and policy development.

Keywords: Environmental Performance Index, Environmental Concern, TOPSIS, Sustainability

JEL Classification: Q56, D70, Q01

Öz: Çalışma, 1995'ten 2022'ye kadar olan Çevresel Performans Endeksi (ÇPE) verilerini kullanarak Türkiye'nin çevresel performansını inceliyor. 1995'ten 2022'ye kadar olan Çevresel Performans Endeksi (ÇPE) verilerini kullanan çalışma, Türkiye'nin çevresel performansını araştırıyor. İklim değişikliği, çevre sağlığı ve ekosistem canlılığı gibi çeşitli faktörleri ele alarak Türkiye'nin diğer ülkelere göre konumunu netleştiriyor. Üç politika hedefine yayılan 40 göstergeye dayanan ÇPE puanları, gelişim gerektiren alanları ve eğilimleri belirlemek amacıyla inceleniyor. Özellikle atık yönetimi ve geri dönüşüm girişimlerinde ilerleme belirtileri vurgulanırken, atık yönetimi, çevre sağlığı ve iklim değişikliğini hafifletme konusunda devam eden zorluklara da dikkat çekiliyor. Ancak, su ve hava kalitesinin düşmesi ve sürdürülemez tarım gibi zorluklar hâlâ varlığını sürdürüyor. Makale, eksik veri ve sıralama hesaplaması gibi ÇPE yaklaşımının eksikliklerini tartışırken, çevresel sorunları anlamada ve ele almada kapsamlı araştırmanın önemini de vurguluyor. Ülkeleri sıralamak ve ek çevresel performans analizi yapmak için alternatif bir yöntem olarak TOPSIS yöntemi sunuluyor. Türkiye'nin çevresel zorlukları ve zaman içindeki gelişmelerine dair içgörüler sunan makale, çevresel sürdürülebilirlik ve politika geliştirme konularına ilgi duyan politika yapıcılar, araştırmacılar ve paydaşlar için bilgilendirici bir kaynak niteliğindedir.

Anahtar Sözcükler: Çevresel Performans Endeksi, Çevresel Sorunlar, TOPSIS, Sürdürülebilirlik

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1. Introduction

Globally, the Environmental Performance Index (EPI) is a crucial instrument for assessing and contrasting national environmental performance. The World Economic Forum worked with researchers at Yale University and Columbia University to develop the Environmental Performance Index (EPI), which provides a thorough evaluation across a range of environmental metrics. With the use of indicators like biodiversity preservation, air and water quality, and efforts to mitigate climate change, the index offers a comprehensive picture of a country's environmental policies and results. This assessment encourages healthy competition among nations to adopt and put into practice more successful environmental strategies in addition to helping policymakers identify areas for improvement. Additionally, the EPI is essential in promoting accountability and increasing public awareness. The index encourages citizens to actively participate in environmental advocacy and policy discussions by providing easily comprehensible data on environmental performance. It encourages people to demand more robust environmental protections and sustainable practices from their governments by acting as a catalyst for public discourse. Moreover, the EPI publicly ranks nations according to their environmental performance, holding governments responsible for their environmental pledges. Governments are encouraged to prioritize environmental issues because of this transparency, which also makes it easier for nations to collaborate and cooperate internationally to address common environmental challenges. In general, the Environmental Performance Index is a valuable tool for global environmental stewardship and sustainable development, acting as more than just a ranking system. The EPI advances laws and practices that put environmental sustainability and conservation first by assessing each nation's environmental performance and encouraging public awareness and accountability. The Environmental Performance Index (EPI) remains a crucial instrument in directing decision-making and promoting constructive transformation towards a more sustainable future, even in the face of urgent environmental concerns.

Turkey builds significant weight on the EPI because it provides a thorough evaluation of the nation's environmental laws and regulations. The EPI provides useful insights into Turkey's areas of strength and weakness by assessing its performance across a range of environmental metrics. This helps policymakers prioritize interventions and formulate strategies for sustainable development. Turkey is confronted with serious environmental issues, including habitat

degradation, air and water pollution, and the effects of climate change. An essential tool for tracking development and pinpointing areas in need of improvement is the Environmental Performance Index (EPI). In addition, the EPI makes cross-national comparisons easier, allowing Turkey to assess its environmental performance against other countries and acquire best practices. The EPI is essential in providing accountability, raising public awareness, and directing evidence-based decision-making in Turkey's efforts to strike a balance between economic growth and environmental sustainability. This is accomplished to ensure a healthier, cleaner, and more sustainable future for the country's citizens.

In the existing literature, research on EPI has gained importance in recent years. Since there are many parameters in the EPI score, including main and sub-parameters, it has been observed that different parameters are emphasized in various studies. Haque and Ntim (2018) utilize data from 2245 UK firm-year observations spanning 2002–2014 to demonstrate that while the Climate Change Act (CCA) positively influences carbon reduction initiatives (CRIs), the actual environmental performance, measured by greenhouse gas (GHG) emissions, is more significantly affected by corporate governance mechanisms, highlighting the importance of governance in driving substantive environmental improvements. Research and development (R&D) investment positively impacts firm environmental performance, particularly in terms of reducing energy and carbon emissions intensities, as Alam et al. (2019) show through empirical analysis spanning 2004–2016 across G–6 countries. This research offers important insights for regulators, business managers, and policymakers. Using secondary data from the World Bank, Khan et al. (2020) investigated the relationships between public health spending, logistics performance indices, renewable energy, and ecological sustainability in ASEAN nations. According to their findings, using renewable energy in logistics can have a positive effect on both the environment and the economy, and more environmental sustainability may improve both economic growth and human health. These findings can help policymakers plan investments that will support sustainable economic development. To evaluate the environmental performance of Pakistan's major economic sectors, Shah and Longsheng (2020) introduce the Slack-Based Environmental Performance Index (SBEPI). They find that all sectors perform poorly and show little signs of improvement. They also show that the SBEPI is superior to traditional environmental indices and provide policy recommendations for improving sectoral environmental performance. Considering the environmental effects of China's coal mining

industry, Zhang et al. (2021) offer a novel method for evaluating productivity and efficiency in the sector using a bootstrapped Malmquist environmental performance indicator. Their results emphasize the necessity of targeted technological advancements and efficiency gains in particular regions—Hunan, Chongqing, Jiangxi, for example—to improve environmental performance and foster the growth of regional synergies. Wang et al. (2021) examine panel data from 148 nations covering the years 2001 to 2018, concluding that globalization has a positive effect on environmental performance, with the political, social, and economic aspects of globalization all having a major impact. These findings offer important new insights into the connection between environmental quality and globalization. The sensitivity of the Environmental Performance Index (EPI) to subjective weights is analyzed by Pinar (2022) using the stochastic dominance efficiency methodology. The results show significant differences in environmental performance rankings among 180 countries, highlighting the significance of sensitivity analysis to improve the transparency and reliability of composite indices. The Environmental Human Index (EHI) has been questioned by Phillips (2023) as a tool for assessing sustainability; conceptual and operational problems are highlighted. The Sustainability Dynamics Framework (SDF) is suggested, and it is applied to data from the Environmental Performance Index (EPI) and the Human Development Index (HDI). The SDF shows strong sustainability in the UK from 1995 to 2020 and highlights the significance of a consistent, all-encompassing framework for assessing sustainability outcomes. Adeel-Farooq et al. (2023) investigate the impact of financial development, economic growth, energy consumption, and urbanization on the environmental performance of five ASEAN economies from 2003 to 2016, finding that financial development positively influences environmental performance while energy usage and urbanization have negative effects, highlighting the importance of policies promoting environment-friendly projects and renewable energy to achieve sustainable economic development.

According to the literature review, it has been decided to analyze The EPI scores of Turkey. The EPI performance scores have been thoroughly examined in this study to comprehend the environmental work done in Turkey from 1995 to 2022. A TOPSIS analysis had been carried out using the 40 performance indicators to rank the nation's performance over the specified years. By using this analysis, the findings will offer more information about Turkey's environmental trends than just the sum of the country's EPI scores.

The research, which ranks Turkey's environmental performance using a TOPSIS analysis and looks at the country's EPI scores from 1995 to 2022, provides several significant insights and implications.

- Firstly, the study offers a thorough understanding of Turkey's progress and trends in addressing environmental challenges by analyzing the country's environmental performance over a significant period. Turkey's environmental policies and practices can be examined through a longitudinal analysis to identify trends, oscillations, and areas for development or regression. For identifying practical tactics and interventions to improve environmental sustainability, policymakers, researchers, and environmental advocates must have a thorough understanding of these trends.
- Second, a more comprehensive evaluation of Turkey's environmental performance than just the total EPI scores are possible when a TOPSIS analysis is applied to the EPI performance scores. Turkey's environmental policies and practices can be analyzed to identify specific strengths and weaknesses by considering 40 performance indicators of 2022 EPI study. This thorough analysis can identify Turkey's strong points and areas for development, offering insightful information for focused interventions and changes to policy.
- Furthermore, the results of this study can help Turkey's environmental sector formulate evidence-based policies and make decisions. Policymakers can allocate resources more effectively and enact targeted policies to improve Turkey's environmental performance by determining the most important areas for intervention and the best improvement strategies. In Summary, with its insights into Turkey's environmental challenges and advancements over time, the article is a useful tool for policymakers, researchers, and stakeholders interested in environmental sustainability and policy development.

2. Analysis on Turkey Data

The material of the study comprises the complete set of EPI scores and components between 1995 and 2022, organized across three policy objectives, eleven issue categories, and forty indicators under The EPI framework (Wolf et al, 2022). After data analysis TOPSIS method is used to evaluate 40 performance indicators to rank the nation's performance over the specified years. Among MCDM methods, the TOPSIS method is one that is frequently employed. The steps of this technique, which was created by Hwang and Yoon in 1981, are as follows: First, the

decision-makers create the decision matrix. For each alternative, decision scores ranging from 1 to 10 are assigned based on predetermined criteria. The matrix is normalized in step two, and the weighted normalization matrix is created in step three. The weighted normalization matrix is a subjective step in this process. The next steps involve the preparation of ideal and negative ideal solution sets as well as the calculation of ideal and negative ideal distance values. The ultimate stage of this approach involves calculating the ideal solving relative proximity and determining the weights of the available options (Hwang and Yoon 1981).

EPI scores are the indicators of how well a country sets its policies toward environmental sustainability goals. EPI score consists of 40 performance indicators that take into account climate change performance, environmental health and ecosystem vitality. 180 nations are ranked according to their EPI scores, which can be used to track each country's environmental performance (EPI-Data, 2022). A nation's overall EPI score is determined by calculating its weighted performance across 40 environmental indicators. According to the findings of 2022, Turkey has been positioned at 172nd place out of 180 countries, thus emerging as the lowest-ranking nation within its regional category of Eastern Europe, which includes 19 countries in all (EPI, 2022). In EPI overall score calculation, 40 performance indicators have been categorized under three headings as shown in Table 1.

Table 1. Categorization of EPI score under 3 main headings

Policy Objective	**Abbreviation**	**Issue Category**	**Abbreviation**	**Indicator**	**Abbreviation**
Climate Change	PCC	Climate Change Mitigation	CCH	Black Carbon Growth Rate	BCA
				CO2 Growth Rate	CDA
				CH4 Growth Rate	CHA
				F-Gas Growth Rate	FGA
				Projected GHG Emissions in 2050	GHN
				GHG Emissions per Capita	GHP
				GHG Intensity Trend	GIB
				CO2 from Land Cover	LCB
				N2O Growth Rate	NDA
Environmental Health	HLT	Air Quality	AIR	CO Exposure	COE
				Household Solid Fuels	HAD
				NOx Exposure	NOE
				Ozone Exposure	OZD
				PM2.5 Exposure	PMD
				SO2 Exposure	SOE

				VOC Exposure	VOE
		Sanitation & Drinking Water	H2O	Unsafe Sanitation	USD
				Unsafe Drinking Water	UWD
		Heavy Metals	HMT	Lead Exposure	PBD
		Waste Management	WMG	Controlled Solid Waste	MSW
				Ocean Plastic Pollution	OCP
				Recycling Rates	REC
Ecosystem Vitality	ECO	Biodiversity & Habitat	BDH	Biodiversity Habitat Index	BHV
				Marine Protected Areas	MPA
				Protected Areas Rep. Index	PAR
				Species Habitat Index	SHI
				Species Protection Index	SPI
				Terrestrial Biome Protection (global)	TBG
				Terrestrial Biome Protection (national)	TBN
		Ecosystem Services	ECS	Grassland Loss	GRL
				Tree Cover Loss	TCL
				Wetland Loss	WTL
		Fisheries	FSH	Fish Stock Status	FSS
				Fish Caught by Trawling	FTD
				Marine Trophic Index	RMS
		Acid Rain	ACD	SO2 Growth Rate	SDA
				NOX Growth Rate	NXA
		Agriculture	AGR	Sustainable Nitrogen Mgmt. Index	SNM
				Sustainable Pesticide Use	SPU
		Water Resources	WRS	Wastewater Treatment	WWT

Based on EPI (2022), it appears that Turkey faces substantial challenges with regard to ecosystem vitality and climate change, as indicated by its rankings of 176th and 166th respectively. These rankings suggest that there are issues with biodiversity loss, forest area depletion, and an increase in acid rain, likely aggravating to the deterioration of the ecosystem. On the other hand, comparatively higher ranking of 60th on environmental health suggests that there may be some effective governmental regulations in place to deal with specific environmental issues. This could imply that despite difficulties associated with climate change and ecosystem vitality, efforts to improve environmental health, such as pollution control programs or waste management projects, have been relatively successful.

In this study, EPI performance scores have been analyzed in detail to understand the environmental effort performed in Turkey between years 1995 to 2022. Using the 40 performance indicators, TOPSIS analysis had been performed to rank the country performance over the given years. Employing this analysis, the results will provide a more comprehensive picture of Turkey's environmental trends beyond the single figure of overall EPI scores. Even though the EPI analysis had been conducted and presented on the yearly reports, country rankings had been provided based on the overall EPI scores. Looking at specific indicators, researchers can determine which aspects of environmental performance have improved or worsened over time, which can also provide stakeholders and policymakers valuable insights. Also, it has been realized that some data for the scores are missing which could potentially end up with misleading conclusions when the overall ranking has been considered. In such cases, our methodology can be considered as an alternative method to address missing data and assess the robustness of the analysis. Research such as this one is essential to comprehending the course of environmental initiatives in a nation over time and pinpointing places in need of development. To offer trustworthy insights for decision-makers, it is crucial to make sure that the research is carried out meticulously, taking into consideration data limits and potential biases.

To apply the TOPSIS method, scores for 40 environmental metrics from EPI study between 1995 to 2022 has been gathered (EPI-data, 2022). In order to predict future trends, 2027 values have been calculated for each metric using regression. Therefore, there are 29 values for each metric, representing annual performance over the specified period. The performance numbers had been normalized. Employing the weights provided in EPI-Appendix (2022), normalized numbers had been multiplied. Table 2 presents both percentage and global weights for each metric, along with indications of the preferred direction of improvement.

Table 2. Percentage weights and global weights of each environmental indicator

Policy Objective	Weight	Issue Category	Weight	Indicator	Weight	Global Weight	Direction
PCC	38	CCH	100	BCA	2,6	0,9873	negative
				CDA	36,3	13,7843	negative
				CHA	8,7	3,3037	negative
				FGA	3,7	1,4050	negative
				GHN	36,3	13,7843	negative
				GHP	2,6	0,9873	negative
				GIB	3,9	1,4810	negative
				LCB	3,9	1,4810	negative

				NDA	1,8	0,6835	negative
HLT	20	AIR	55	COE	2	0,2198	negative
				HAD	38	4,1771	negative
				NOE	5	0,5496	negative
				OZD	5	0,5496	negative
				PMD	47	5,1664	negative
				SOE	2	0,2198	negative
				VOE	2	0,2198	negative
		H2O	25	USD	40	1,9986	negative
				UWD	60	2,9979	negative
		HMT	10	PBD	100	1,9986	negative
		WMG	10	MSW	50	0,9993	positive
				OCP	25	0,4996	negative
				REC	25	0,4996	positive
ECO	42	BDH	43	BHV	3	0,5414	positive
				MPA	22,2	4,0065	positive
				PAR	14	2,5266	positive
				SHI	8,3	1,4979	positive
				SPI	8,3	1,4979	positive
				TBG	22,2	4,0065	positive
				TBN	22,2	4,0065	positive
		ECS	19	GRL	12,5	0,9968	negative
				TCL	75	5,9808	negative
				WTL	12,5	0,9968	negative
		FSH	11,9	FSS	36	1,7980	negative
				FTD	28	1,3985	negative
				RMS	36	1,7980	negative
		ACD	9,5	SDA	50	1,9936	negative
				NXA	50	1,9936	negative
		AGR	9,5	SNM	50	1,9936	negative
				SPU	50	1,9936	negative
		WRS	7,1	WWT	100	2,9799	positive

Table 3 displays the TOPSIS-derived results and rankings for each year. The analysis reveals that the highest EPI performance occurred in 2012, while the lowest was observed in 2005.

Table 3. TOPSIS results and yearly rankings of EPI scores

Year	C*	RANK
1995	0,3466	19
1996	0,3437	21
1997	0,3416	22
1998	0,3384	24
1999	0,3391	23
2000	0,4209	17
2001	0,3466	20
2002	0,2974	25
2003	0,2601	26
2004	0,1776	28
2005	0,1493	29
2006	0,2329	27
2007	0,4135	18
2008	0,5171	16
2009	0,5726	15

Year	C*	RANK
2010	0,6994	14
2011	0,7723	6
2012	0,8178	1
2013	0,8027	2
2014	0,7833	4
2015	0,7333	12
2016	0,7412	11
2017	0,7844	3
2018	0,7830	5
2019	0,7435	7
2020	0,7434	10
2021	0,7434	8
2022	0,7434	8
2027	0,7323	13

Additional research was done on the TOPSIS numbers to comprehend the areas that want development on a deeper level. The weighted normalized figures from the previously described TOPSIS analysis were used to recalculate TOPSIS scores for every "issue category." Table 4 shows the average of these recalculated scores across five-year intervals. In Table 5, according to the scores, rankings are provided.

Table 4. Recalculated TOPSIS figures for Issue Categories

Policy Objective	Abbreviation	Weight	Issue Category	Abbreviation	Weight	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019	2020-2022	2027
Climate Change	PCC	38,0	Climate Change Mitigation	CCH	100,0	0,2949	0,2619	0,3451	0,8243	0,8125	0,7990	0,8113
Environmental Health	HLT	20,0	Air Quality	AIR	55,0	0,9167	0,6374	0,4753	0,4706	0,2869	0,1907	0,0032
			Sanitation & Drinking Water	H2O	25	0,9748	0,8252	0,5749	0,4249	0,3123	0,2726	-
			Heavy Metals	HMT	10	0,9319	0,7385	0,5662	0,4606	0,2914	0,2117	-
			Waste Management	WMG	10	0,0473	0,1478	0,2106	0,5106	0,6926	0,3805	0,7656
Ecosystem Vitality	ECO	42,0	Biodiversity & Habitat	BDH	43	0,1501	0,4536	0,5987	0,6998	0,7222	0,6824	0,9363
			Ecosystem Services	ECS	19	0,1787	0,0935	0,3355	0,4469	0,6181	0,8232	0,8976
			Fisheries	FSH	11,9	0,1948	0,2225	0,4662	0,7330	0,8020	0,8150	0,8527
			Acid Rain	ACD	9,5	0,9997	0,6945	0,5038	0,4966	0,3750	0,7006	0,2941
			Agriculture	AGR	9,5	0,7589	0,6256	0,5069	0,3653	0,1929	0,1929	-
			Water Resources	WRS	7,1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 5. Ranking based on TOPSIS figures for Issue Categories

Policy Objective	Abbreviation	Weight	Issue Category	Abbreviation	Weight	1995-1999	2000-2004	2005-2009	2010-2014	2015-2019	2020-2022	2027
Climate Change	PCC	38,0	Climate Change Mitigation	CCH	100,0	6	7	5	1	2	4	3
Environmental Health	HLT	20,0	Air Quality	AIR	55,0	1	2	3	4	5	6	7
			Sanitation & Drinking Water	H2O	25	1	2	3	4	5	6	7
			Heavy Metals	HMT	10	1	2	3	4	5	6	7
			Waste Management	WMG	10	7	6	5	3	2	4	1
Ecosystem Vitality	ECO	42,0	Biodiversity & Habitat	BDH	43	7	6	5	3	2	4	1
			Ecosystem Services	ECS	19	6	7	5	4	3	2	1
			Fisheries	FSH	11,9	7	6	5	4	3	2	1
			Acid Rain	ACD	9,5	1	3	4	5	6	2	7
			Agriculture	AGR	9,5	1	2	3	4	5	5	7
			Water Resources	WRS	7,1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

There is only one issue category in the field of climate change that is mitigation strategies-focused. The data analysis indicates that the EPI measures peaked between 2010 and 2014. This means that each nation's projected greenhouse gas emissions by 2050 will have a significant impact on how effective its mitigation efforts are against climate change. Notably, Figure 1's alignment with GDP statistics suggests that this category's performance is positively correlated with the welfare of the national economy. Turkey's GDP is noteworthy for reaching its greatest point between 2010 and 2014.

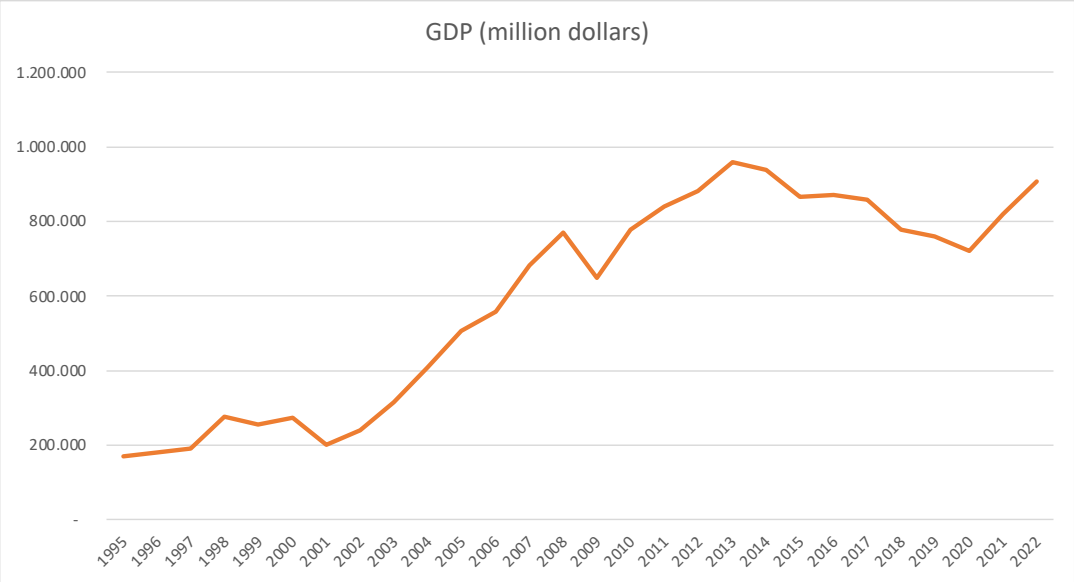

Figure 1. Yearly GDP numbers for Turkey between 1995-2022

Source:World Bank national accounts data

In the environmental health of Turkey, concerning trends are apparent: air quality, drinking water quality, and sanitation standards are deteriorating, while heavy metal exposure levels are on the rise over the years. Nonetheless, there has been a noticeable increase in government activities aimed at decreasing the production of solid waste and increasing recycling in order to address waste management challenges in recent years.

Numerous indicators of an ecosystem's vitality include its biodiversity, fish stock figures, and trees and grassland coverage, all of which, based on the data given, have improved over time. Indicators for sustainable agriculture and acid rain, however, are getting worse. Additionally, the numbers related to wastewater treatment have not changed over time, making rankings impossible to determine.

3. Implications

According to the findings of the study, there could be some managerial and policymaker implications. If the country rankings of the EPI reports have been analyzed, it can be easily seen that there exists a correlation between economic welfare and climate change performance. Policymakers should prioritize the initiatives aimed at reducing greenhouse gas emission and implementing sustainable solutions. Government policies should invest renewable energy sources and put incentives to use energy efficiency measures. These measures would both contribute to environmental protection and economic growth.

Turkey has major problems in air, water and sanitation quality, which could be improved by strict regulations and enforcement mechanisms. Policymakers should consider implementing regulations to reduce emissions from industrial sources, to increasing sanitation infrastructures, and to promote cleaner energy alternatives. During this process, policymakers needs to collaborate with the industry representatives and non-governmental organizations to develop effective policies.

The deterioration in the quality of the air, water, and sanitation despite the rising waste management scores points to difficulties in enforcing the regulations. Policymakers should be investing in awareness campaigns for the population and encourage the waste disposal behavior and circular economy.

Positive trends in ecosystem vitality are suggested by the improvement in habitat metrics and biodiversity. However, scores of acid rain and unsustainable agriculture are getting worse, which means that conservation measures must be proactive. Initiatives to preserve and restore natural ecosystems should be given top priority by policymakers. Examples of such initiatives include the creation of protected areas, reforestation programs, and sustainable land management techniques. The success of these initiatives can be increased by working together with indigenous groups, conservation organizations, and local populations.

The sustainability of the environment is seriously threatened by climate change, necessitating long-term planning and adaptation measures. Climate resilience and adaptation strategies, such as infrastructure spending, emergency preparedness, and ecosystem-based methods, should be given top priority by policymakers. In the face of climate uncertainty, resilience can be increased and sustainable development can be ensured by including climate considerations into policy and planning procedures.

It requires close cooperation and engagement between various sectors and stakeholders to address complicated environmental concerns. To create inclusive and long-lasting solutions, policymakers should actively collaborate with businesses, communities, academic institutions, and non-governmental organizations. Establishing forums for discussion and cooperation can

help with information exchange, creativity, and group efforts to achieve environmental sustainability objectives.

All the abovementioned suggestions can be done by close tracking of the measures of the EPI study. Policymakers should invest in the correct monitoring and evaluation systems to provide them the correct figures. Currently study has a number of missing and incorrect figures. The misleading numbers should be corrected to guide the policymaker to identify the emerging issues and evaluate the effectiveness of the existing policies and programs.

4. Conclusion

Based on the Environmental Performance Index (EPI), this article offers a thorough examination of Turkey's environmental performance. Using data from 1995 to 2022, it looks at a number of topics, such as ecosystem vitality, environmental health, and climate change. 180 countries throughout the world are ranked using the EPI scores, which are based on 40 performance characteristics. Turkey's rankings and performance across different categories are discussed, highlighting areas of improvement and challenges.

The study delves into the categorization of EPI scores, identifying policy objectives and issue categories. It examines Turkey's standing in relation to these criteria, highlighting issues with waste management, environmental health, and mitigating the effects of climate change.

Detailed analysis is provided for each issue category, a thorough analysis is given, looking at historical trends and pinpointing areas in need of development. The drawbacks of the EPI approach are also covered in the essay, with special attention to missing data and ranking computation. It also presents the TOPSIS approach, which may be used to rank countries and do additional environmental performance analysis.

Key findings highlight challenges faced by Turkey in areas such as air and water quality, heavy metal exposure, and sustainable agriculture. However, there are also signs of progress, particularly in the field of waste management and recycling initiatives. The article concludes by emphasizing the importance of comprehensive and meticulous research in order to comprehend and address environmental concerns.

Overall, this article provides insightful information about Turkey's environmental performance, emphasizing both areas that need improvement and areas that have already been addressed. It serves as a useful resource for policymakers, researchers, and stakeholders interested in environmental sustainability and policy development.

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