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Assessing Vietnam's provincial Green Index Through the Component of Minimizing Environmental Pollution and Negative Impacts of Climate Change

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Abstract

Minimizing environmental pollution and negative impacts of climate change is one of four components of the provincial green index. This is considered a solution to the problem of economic development, but still ensures environmental sustainability. This index will become a useful support tool for local authorities in directing and operating activities, including identifying strengths that need to be promoted and weaknesses that need to be overcome related to the field of sustainable development and green

growth. The article aims to evaluate the provincial green index of provinces in Vietnam in 2022, to evaluate the index of reducing environmental pollution and negative impacts of climate change of provinces and cities in 2022, thereby examining the causes leading to different results between provinces, and learn about policies to help provinces achieve sustainable development goals through improving the index of reducing environmental pollution and negative impacts of climate change.

Keywords: PGI, Provincial Green Index, Environmental Pollution, Climate Change

1. Introduction

Minimize environmental pollution and negative impacts of climate change Measuring basic infrastructure and public services provided by the provincial government to minimize risks caused by natural disasters and climate change for business operations. Providing public infrastructure and services can be considered the most basic responsibility of provincial governments, even included in central planning. In the context of increasing natural disaster and climate change risks and the growing private economic sector in Vietnam, the responsibility of local governments has become increasingly greater in recent years because they are expected to solve infrastructure needs, support businesses in preparing, responding, and minimizing the growing impacts of climate change (floods, rising sea levels, droughts, etc.) for production and business activities. Through the index of Reducing Environmental Pollution and Negative Impacts of Climate Change to encourage and encourage provinces and cities in Vietnam to pay more attention to economic development associated with environmental protection, Providing timely information to support provincial and city governments in making policies related to investment and the environment, selecting environmentally friendly investment projects; promote the building of an environmentally friendly business ecosystem; orient investors to be conscious of environmental protection; promote more green, more environmentally friendly projects.

Therefore, the goal of this article is to evaluate the environmental pollution reduction index and negative impacts of climate change in provinces and cities in 2022, thereby examining the causes leading to different results among provinces, and learn about policies to help provinces achieve sustainable development goals through improving the index of reducing environmental pollution and negative impacts of climate change.

2. Theoretical basis

The Provincial Green Index is a set of indicators that evaluate and rank the quality of local environmental governance from the perspective of business practices such as the level of application of environmentally friendly technology by businesses, and the level of governance and environmental behavior of businesses, the level of concern and willingness to invest in environmental issues of local governments and many other important environmental issues. The Provincial Green Index includes 4 component indices made up of 44 indicators measuring the quality of environmental governance in provinces and cities in the direction of linking environmental protection with economic development. The methodology of the PGI index is built with the same steps

as the PCI index and Infrastructure index, often called the 3-step process by the research team. Data collection is the collection of data to calculate indicators from two main sources, "soft" data collected from the annual PCI survey for domestic private enterprises and FDI enterprises and "hard" data collected through published official sources. Building component indexes means implementing techniques to adjust the value of each evaluation criterion on a 10-point scale. After standardizing the indicators, the research team builds component indexes that are related to each theoretically related to reflect important aspects of environmental governance. Determining the overall PGI Index is the step of assigning weights to each component index according to their level of importance in relation to important outcome/performance variables.

Minimizing environmental pollution and negative impacts of climate change is one of the four components of the PGI index. This component index measures basic infrastructure and public services provided by the provincial government to minimize risks caused by natural disasters and climate change to business operations. Providing public infrastructure and services can be considered the most basic responsibility of provincial governments, even included in central planning. In the context of increasing natural disaster and climate change risks and the growing private economic sector in Vietnam, the responsibility of local governments has become increasingly greater in recent years because they are expected to solve infrastructure needs, support businesses in preparing, responding, and minimizing the growing impacts of climate change (floods, rising sea levels, droughts, etc.) for production and business activities. Component index 1 includes the following indicators: Overall environmental quality in the province is good or very good (% of enterprises); The environment in the province is not polluted or slightly polluted (% of businesses agree); Business activities of enterprises are not affected by pollution levels (% of enterprises agree); The situation of enterprises polluting the environment is common in the province (% of enterprises agree); Relocating investment to localities with less natural disaster risk (% of enterprises); Natural disasters and climate change cause difficulties for business operations (% of businesses); Data from the Ministry of Natural Resources and Environment: Number of air quality monitoring stations in urban areas of type IV or higher per 10,000 urban population.

This component index measures three edge dimensions. Dimension 1 focuses on businesses' assessments of the provincial government's efforts to reduce environmental pollution. Dimension 2 measures the provincial government's efforts to minimize and mitigate the negative impacts of natural disasters on businesses. The third dimension uses a benchmark to evaluate these efforts from available hard data.

3. Index for reducing environmental pollution and negative impacts of climate change in Vietnam in 2022

Fig 1 shows the scores of the index "Reducing environmental pollution and negative impacts of climate change" in 2022 in 10 provinces. Among them, the 5 provinces and cities with the highest index on the ranking of

63 provinces and cities are Bac Ninh, Tra Vinh, Lang Son, Quang Ninh, and Binh Phuoc. The 5 provinces and cities with the lowest index on the ranking of 63 provinces are Dak Lak, Hai Phong, Ho Chi Minh City, Nam Dinh, and Hanoi. Bac Ninh scored 6.85 points, while Dak Lak only scored 3.07 points. The average score of this index across the country is 3.45 points. There is a large difference between the province ranked 1 and the province ranked 63. With its geographical location and specific natural conditions, Vietnam is a country vulnerable to the impacts of climate change, with manifestations such as: Unusual floods, droughts, rising sea levels, extreme weather phenomena, rising temperatures... According to the annual assessment of countries most affected by extreme weather events in the period 1997 - 2016, Vietnam ranked 5th in the 2018 Global Climate Risk Index and 8th in the 2018 Global Climate Risk Index.

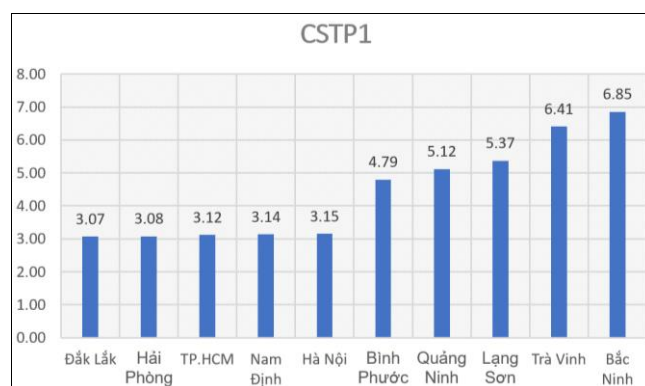


Fig 1: Index for reducing environmental pollution and negative impacts of climate change in 2022

Dimension 1 of the index "Reducing environmental pollution and negative impacts of climate change" focuses on businesses' assessments of the provincial government's efforts to reduce environmental pollution. The first dimension, pollution reduction, includes four indicators determined from PCI 2022 survey data for domestic private enterprises and FDI enterprises. The four indicators include: The overall environmental quality in the province is good or very good, the environment in the province is not polluted or slightly polluted, the business activities of the enterprise are not affected by the level of pollution, and enterprises causing environmental pollution are common in the province. The first indicator comes from a question in the PCI 2022 survey asking businesses to evaluate the overall environmental quality in the province. This indicator is measured by the proportion of businesses evaluating the environmental quality in the province as "good" or "very good". Bac Ninh is the province considered to have the best index of "Reducing environmental pollution and negative impacts of climate change" in the country with scores of 4 indicators of the first dimension being 51%, 30%, 26%, 67%. Dak Lak is the province assessed to have the lowest index of "Reducing environmental pollution and negative impacts of climate change" in the country with scores of 4 indicators of the first dimension being 39%, 20%, 34%, 72%.

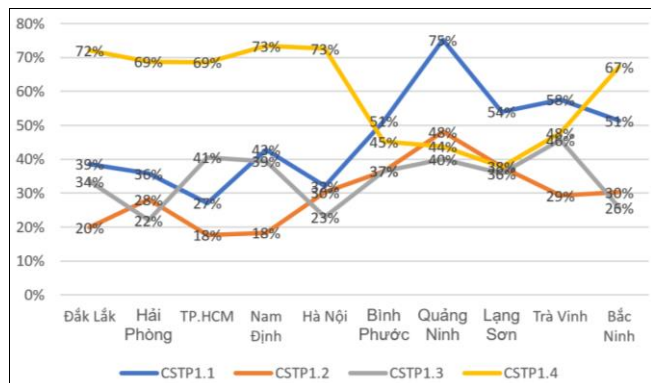


Fig 2: Score for dimension 1 of the index "Reducing environmental pollution and negative impacts of climate change"

Dimension 2 measures the provincial government's efforts to minimize and mitigate the negative impacts of natural disasters on businesses. In the first indicator, the research team used the question: If there is a plan to expand investment and business to another province, which locality will the enterprise choose to invest in because the geographical location has less risk of natural disasters and more climate change. The proportion of businesses answering "intending to move investment locations" to a specific province is considered a measure of that locality's environmental safety. For the second indicator, the proportion of businesses reporting that natural disasters and climate change are a barrier to business operations is used as a measure. PGI 2022 survey data shows that only 0.5% of businesses in the median province (Hung Yen) answered "yes" to their intention to move their investment location to another province. Long an is the province with the highest percentage of people wanting to move their investment location to another province at 3%. Among the 5 provinces and cities with the lowest index of "Reducing environmental pollution and negative impacts of climate change", there are 2 provinces that do not intend to move their business locations to other provinces: Hai Phong and Ho Chi Minh City (rate 0%). Among the 5 provinces and cities with the highest index of "Reducing environmental pollution and negative impacts of climate change", there is 1 province that intends to move its business location to another province, Lang Son (rate of 1%).

For the indicator "Natural disasters and climate change cause difficulties for business operations", the highest rate is 24% (Kom Tum) and the lowest is 1% (Tien Giang). Survey data shows that 6% of businesses in the median province choose "natural disasters, climate change" when asked "which of the following difficulties is your business currently facing in production and business activities?" ". In the 5 provinces and cities with the highest index of "Reducing environmental pollution and negative impacts of climate change", the proportion of businesses saying that natural disasters and climate change are a barrier to business activities in Quang Ninh it is 8%, Binh Phuoc (6%), Lang Son (6%), Bac Ninh (3%), and Tra Vinh (2%). In the 5 provinces and cities with the lowest index of "Reducing environmental pollution and negative impacts of climate change", the proportion of businesses stating that natural disasters and climate change are a barrier to business activities in Dak Lak is 7%, Nam Dinh (6%), Hai Phong (5%), Hanoi (3%), and Ho Chi Minh City (2%).

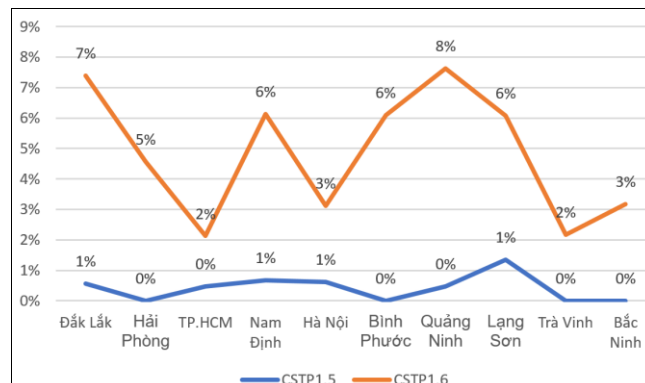


Fig 3: Score for dimension 2 of the index "Reducing environmental pollution and negative impacts of climate change"

The third dimension uses a benchmark to evaluate these efforts from available hard data. The final dimension of component index 1 uses only one hard data indicator from the Ministry of Natural Resources and Environment's PEPI 2021 survey - the number of automatic air quality monitoring stations in urban areas of type IV and above 10,000 urban residents. This dimension is assigned a weight of 40% in component index 1, higher than the other two dimensions with a weight of 30% respectively. Bac Ninh achieved the highest score because of the importance of the hard data indicator "number of automatic monitoring stations for air environment quality" (0.52 points). Bac Ninh has made many efforts in monitoring and minimizing the risk of environmental pollution from craft villages and the rapid development of industrial zones and clusters in the province. Most provinces and cities across the country have a very low number of air quality monitoring stations such as Dak Lak, Hai Phong, Ho Chi Minh City, and Nam Dinh. Provinces with a very high number of air quality monitoring stations include Binh Phuoc, Quang Ninh, Lang Son, Tra Vinh, and Bac Ninh.

Table 1: Number of air quality monitoring stations in urban areas of type IV or higher per 10,000 urban population

Province	Number of air quality monitoring stations in urban areas of type IV or higher per 10,000 urban population
Đắk Lắk	0,00
Hải Phòng	0,00
TP.HCM	0,00
Nam Định	0,00
Hà Nội	0,01
Bình Phước	0,19
Quảng Ninh	0,20
Lạng Sơn	0,26
Trà Vinh	0,41
Bắc Ninh	0,52

Component index 1 "Reducing environmental pollution and negative impacts of climate change" is calculated on a scale from 1 (lowest) to 10 (highest), with no locality achieving a minimum score. Actual survey scores range from 3.07 to 6.85, and most centrally run cities have low scores.

4. Conclusion

Minimizing environmental pollution and negative impacts of climate change is one of four components of the provincial green index in Vietnam. This is the first set of indicators surveyed in 2022. Survey results in 63 provinces

and cities providing infrastructure and public services can be considered the most basic responsibility of the provincial government. From detailed analysis of the component index scores "Reducing environmental pollution and negative impacts of climate change", in the coming time, provinces and cities need to drastically increase the scores of PGI's component indexes. In general, and the component index "Reducing environmental pollution and negative impacts of climate change" in particular. Special attention must be paid to implementing appropriate policies to reduce environmental pollution and the impact of climate change for businesses; Further enhance the role of the provincial government in promoting green practices, helping production and business activities of enterprises continuously develop in a sustainable direction. In particular, authorities at all levels and functional sectors will promote their role in promoting and even leading businesses to pursue strategies to become role models in environmental protection, such as guiding business owners make operating decisions that can position their business as a leader in energy efficiency or the use of sustainable, renewable energy. In the context of increasing natural disaster and climate change risks and the growing private economic sector, the province needs to focus on further increasing the capacity to meet business expectations in terms of supply and demand infrastructure, support businesses in preparing, responding, and minimizing the growing impact of climate change (floods, sea level rise, drought...) on production activities, business.

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