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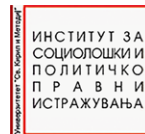
GOVERNANCE OF ENVIRONMENTAL CHALLENGES IN POST-PANDEMIC ERA

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Investment in Natural Capital as a Factor for Sustainable Post-COVID 19 Recovery*

Abstract

The COVID-19 pandemic has become an unprecedented phenomenon in the modern history of the world economy, causing the deepest decline in the economic activity since the mid-20th century. As a result, countries had to implement measures to prevent the spread of coronavirus infection. This crisis has been distinguished not only by a significant decline in economic activity, wide territorial coverage and underlying causes that lie outside the economy, but also by a variety of recovery paths in different countries and regions due to their structural heterogeneity. Large scale restrictions imposed to curb the coronavirus disease have significantly affected the performance of enterprises in most sectors of the economy. Public-sector investments in green infrastructure are considered to be of key importance for short-term economic recovery around the world as they have the potential to drive demand for new skills and technologies. The authors highlight the economic, environmental and health benefits of natural capital investment as essential, not only for the post-COVID recovery of sustainable countries, but also for the mitigation of consequences of possible future pandemics. Within the scope of the analysis of positive effects of this type of investment, the authors showcase the 'greenness' of pandemic recovery among a selected group of countries.

Keywords: COVID-19 pandemic, anti-crisis measures, green recovery, green transition, natural capital investment

Introduction

Since the World Health Organization declared the coronavirus pandemic on March 11, people have been forced to live in emergency conditions as the spread of the infection affected all

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aspects of their lives. Countries had to introduce measures aimed at maintaining physical distance between people and restricting their movement, as well as reducing certain economic activities. The overall goal was to contain the number of infections and prevent further spread of the COVID-19 pandemic. Large-scale social restrictions had a significant impact on the performance of companies in most sectors of the economy. Tertiary sector companies faced serious financial destabilisation or even closure, while a significant number of industrial companies were forced to make adjustments in their work organisation. Consequently, global investment levels and potential output declined during the pandemic, although this was less pronounced than during the Great Recession (Doleshel and Manu, 2021). The vast majority of countries are characterised by a high degree of interconnectedness and involvement in world economic relations, which certainly affected the speed and depth of the crisis during 2020 and its 'aftershock' in the second half of 2021.

Although investigations into the origin of COVID-19 conducted at the global level have not led to the adoption of a unified stance on the source of infection and the ways it spreads among people, the scientific community is of the opinion that individuals are responsible for this pandemic. This primarily refers to their destructive impact on natural habitat changes, biodiversity loss and ecosystem disruption. SARS-CoV-2 is a zoonosis – a disease transmitted from animals to humans, largely attributed to the destruction of ecosystems.

COVID-19 highlights the critical association between the health of nature and human well-being, raising questions about the depletion of natural capital. Natural capital can be defined as "our planet's stock of natural resources, both renewable and non-renewable". It provides us with the variety of ecosystem services such as water, food, fibre, fuel and wood, regulates environmental conditions and supports recreation, along with other cultural practices (Woetzel et al. 2020). According to the World Economic Forum (WEF) estimates, more than half of global GDP is moderately or highly dependent on nature and its services. In addition, there are over 1.2 billion jobs in nature-based sectors worldwide, such as farming, fisheries, forestry and tourism. Their normal functioning depends on healthy and resilient ecosystems (Lieuw-Kie-Song

& Perez-Cirera, 2020). Considering the aforementioned facts, it is of crucial importance to take into account these dependencies and links when developing policies, strategies and action plans to preserve natural wealth for future generations.

Unfortunately, people continue to neglect the importance of natural capital by engaging in activities which lead to its degradation. The Dasgupta Review (2021) highlights that the global value of stock of natural capital per capita has fallen by 40% over the past 25 years. Moreover, large portions of natural capital are under the threat of deforestation or natural disasters. Climate change is also the main culprit for the acceleration of natural capital depletion. According to the Global Assessment Report on Biodiversity and Ecosystem Services released in 2019, human activity has endangered about 25% of our assessed plant and animal species. Additionally, in low-income countries, dependence on natural capital accounts for approximately 23% of their wealth (World Bank, 2021). The degradation of nature (including assets like forests, water, fish stocks, minerals, biodiversity and land) and climate change continues, which indirectly or directly affects state power. A number of poor and vulnerable countries are facing the risk of their ecosystems collapsing due to a decline in biodiversity and related ecosystem services. This results from the fact that investing in nature still remains marginal to economic decision-making, and countries make little effort to change the current situation (Zvezdanović Lobanova et al., 2018; Zvezdanović Lobanova et al., 2021). Taking into account the adverse effects of global warming, key greenhouse gas emitting countries should make decisive steps forward in order to mitigate human impact on the climate (Zvezdanović Lobanova & Lobanov, 2023).

Literature Review

The natural capital depletion is a result of growing number of factors. Global demand for nature far exceeds what the ecosystem can regenerate in a single year. Consequently, we are facing increasing environmental indebtedness. The costs of this overconsumption are becoming more visible day by day and they are reflected in deforestation, water scarcity, degradation of productive

land, food shortages, loss of biodiversity and accumulation of carbon dioxide in the atmosphere (World Economic Forum, 2015). According to the Living Planet Report 2020, human activities with a destructive effect on nature, pose a serious threat to both wildlife populations and human health. Unfortunately, these interventions in natural ecosystem create a transmission pathway for the spread of disease. Decreasing barriers between humans and wildlife increase the risk of zoonotic disease (Everard et al., 2020). This occurs as a result of natural resource degradation which is crucial in managing the transmission.

The COVID-19 pandemic has had a profound effect on the environment and has affected all aspects of people's well-being. Lawler et al. (2021) indicate that this pandemic is intricately linked to the current problems such as biodiversity loss and ecosystem health. Therefore, they also point out that it is necessary to apply integrative approach (One Health approach), which takes into account the close relationship between the health of our planet and the human health. This concept implies that people's health is closely linked to the health of animals and our shared environment. A similar viewpoint is reflected in research conducted by Talmage et al. (2022), who believe that natural and cultural capital could play a significant role in addressing serious challenges caused by the COVID-19 pandemic. They emphasise that it is crucial to reimagine the connection between nature and culture and to bolster sustainability. Countries are unlikely to achieve the United Nations' Sustainable Development Goals (SDGs) and the targets outlined by the Global Health Security Agenda if they fail to adopt an integrated approach to mitigate the effects of disease emergence relating to environmental change (Calabrese et al., 2020). Moreover, the long lasting negative economic impact of this pandemic will affect state influence growth, market concentration, geopolitical tensions, de-globalisation, education, investment and labour market.

Hepburn et al. (2020) demonstrate that policies focused on building efficiency retrofits, clean physical infrastructure, investment in education and training, natural capital investment and clean R&D have high potential in both economic multiplier and climate impact metrics. The authors stress the necessity of implementing natural capital policies that provide for ecosystem

resilience and regeneration, including the restoration of carbon-rich habitats and climate-friendly agriculture.

Despite the fact that COVID-19 anti-crisis measures have plunged the global economy into a deep contraction and have significantly altered the global energy outlook, they have also provided environmental benefits. While the lockdown measures were in force, restrictions imposed on human activity generated benefits for the biodiversity (Corlett et al., 2020). One group of authors (Zambrano-Monserrate et al., 2020; Berman and Ebisu, 2020; Zander et al., 2020) point out that the COVID-19 pandemic had positive effects on the environment, such as the improvement of air quality improvement, cleaner beaches and a reduction of environmental noise level. Industrial facilities and power plants stopped their production and the use of vehicles decreased considerably. This led to an intense decline in the concentrations of particulate matter and nitrogen dioxide (NO₂) in China and the reduction of air pollution in Europe (Kumar et al., 2020). Unfortunately, COVID-19 lockdown had a negligible effect on climate change mitigation as the intensive use of fossil fuels continues. As a unique social experience, the coronavirus lockdown has also influenced our perception of nature since people began to appreciate spending more time outdoors.

An increasing number of researchers (Gillespie et al., 2021; Akinsorotan et al., 2021) take the position that this crisis could be the trigger of invention, suggesting that it should be able to provide the reorganisation of agriculture, ecosystem restoration, short-term disruption in wildlife trafficking, reduction in air and water pollution, as well as wealth distribution, which could enhance environmental protection and prevent climate change. Openness to innovation, a push for digitization, the stability of value-added chains, risk diversification, promotion of human capital, etc., are some of the positive long-term effects of the coronavirus pandemic (Gromling, 2021). This pandemic has highlighted the necessity of changing the current economic model which is based on fossil resources and addicted to 'growth at all costs', and transitioning towards a circular bioeconomy dedicated to sustainable well-being (Palahi et al., 2020). It is believed that the circular bioeconomy could be crucial for achieving the SDGs, the aims of the Paris Climate Agreement as

well as the post-COVID-19 recovery and economic transformation. Galanakis et al. (2022) propose COVID-19 recovery approach which includes technological innovations, food systems, rural economies, environmental considerations, 'biocities' and tourism to create a bioeconomy. Unfortunately, both the implementation of this approach and the maintenance of biodiversity conservation, are hampered by problems such as increased human dependence on natural resources, indiscriminate exploitation of wildlife resources, staff absenteeism and/or poor performance (Akinsorotan et al., 2021).

Natural Capital

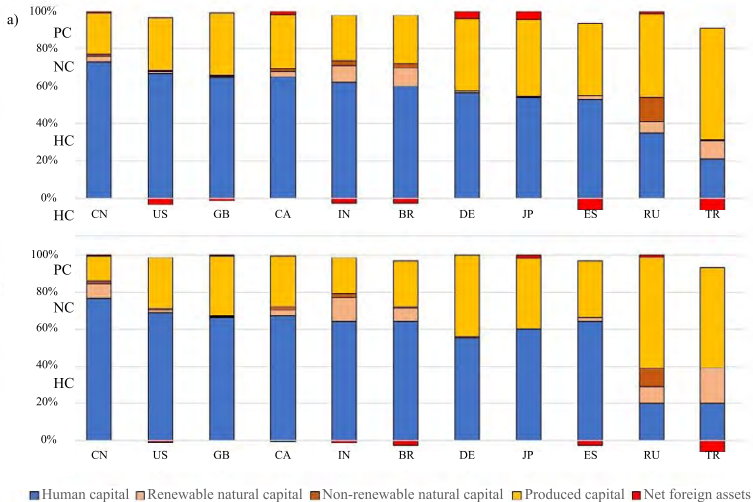
Disregard for sustainable development principles and weak state control over natural resources lead to their predatory exploitation and inevitable depletion. This represents a significant risk to national economic security and ultimately provokes a deterioration of the standard of living. The most serious challenges include agricultural land degradation, mineral resources depletion, water pollution, deforestation, biodiversity loss and reduction of the number of wildlife species. Changes like these are very difficult to assess economically, making it challenging to identify threats to natural capital (Petrović & Lobanov, 2021).

The establishment of prerequisites for the transition to circular economy is an extremely important aspect of natural capital conservation (it allows the reuse of goods through partial processing). Efficient use of the available resource potential, the introduction of resource-saving technologies and the establishment of the circular economy foundations will ultimately increase the level of economic security and reduce public and private costs associated with the exploitation of natural resources in both developed and developing countries (Petrović & Lobanov, 2022). It is necessary to develop incentives for the application of circular economy principles, primarily, in large developing countries that consume considerable amounts of natural raw materials to support their economic growth. Otherwise, insufficient efforts placed in resolving problems related to processing and disposal of industrial and domestic waste, will cause a gradual degradation of the territory, including a decrease in its economic and residential potential.

According to the World Bank’s estimates, natural capital accounts for about a quarter of the total wealth in developing countries. In most of these countries, there is an absolute decline in natural capital, which is not offset by the accumulation of other types of national wealth – human capital and other social intangible assets (for example, the development of education and health systems) and produced capital (industrial and transport infrastructures). A number of scientific papers indicate a direct relationship between the overall level of well-being and the effective application of measures aimed at preserving natural capital, as well as the availability of an appropriate institutional framework.

Our calculations illustrate that changes in the wealth structure in the majority of developed and developing countries are slow (see Figure 1). Based on the World Bank’s data, we analysed the wealth structure of eleven countries in 2000 and 2018.¹

Figure 1. The composition of total wealth in selected countries in 2000(b) and 2018(a), %



Source: Author’s work based on the World Bank’ data

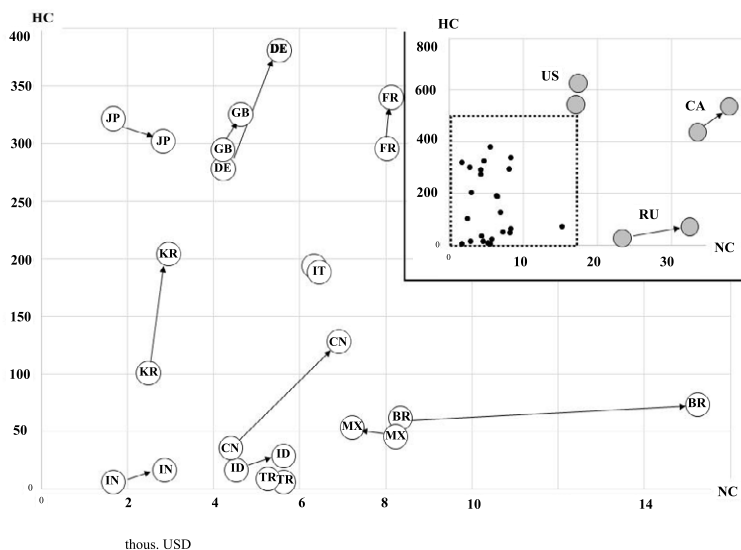
¹ According to the World Bank’s methodology, total wealth is calculated as the sum of human capital (value of future earnings for the working population over their lifetimes), produced capital (value of machinery, buildings, equipment, etc.), renewable and nonrenewable natural capital, and net foreign assets.

The share of accumulated human capital reaches 60-65% both in developed countries (such as the USA, Canada, Japan, UK, Germany) and in some key developing countries (China, India, Brazil), and it has not changed much in the last twenty years (Zvezdanović, 2022). In the case of above-mentioned developing countries, this is mainly due to the absolute number of skilled labour resources, while in the case of developed countries, this is caused by the advancements in health and education systems. In turn, the share of human capital in Turkey remained at the level of 20%, while in Russia, it almost doubled to 40%. Production capital plays an important role in developed countries with industrial specialisation (e.g. Germany and Japan – up to 40%), as well as in countries which actively attracted investments in infrastructure projects (Russia and Turkey – 45–50%). As for natural capital, its low share in a number of developed countries (less than 1–2%) is explained not only by the actual scarcity of natural resources (Japan), but also by the predominant reliance on human and industrial capital (USA, UK, Germany). In turn, the share of natural capital in the wealth of India, Brazil and Turkey reaches 10–15%, in Russia – 20%. It is noteworthy that in all the countries listed above, with the exception of Russia, renewable natural capital (land and forest resources) noticeably prevails over non-renewable natural capital (mineral resources).

The level of provision of national wealth components can be assessed using per capita indicators. Let us consider, for example, the change in human capital per capita and natural capital per capita in the fifteen largest global economies in the 21st century (from 2000 to 2018).

The highest value of human capital per capita was recorded in the United States (USD 621,000) and Canada, while the highest value of natural capital per capita was recorded in Canada and Russia. The relative supply of natural capital in the 21st century increased significantly in these two countries – from USD 34 to 38,000 in Canada, and from USD 24 to 33,000 in Russia. Other countries are less endowed with these two types of wealth. Natural capital per capita ranges from USD 3,000 in Japan, the Republic of Korea, and India to USD 15,000 in Brazil, while human capital per capita ranges from USD 11,000 in Turkey to USD 382,000 in Germany. Brazil reached the most visible success in increasing the level

Figure 2. Human capital per capita and natural capital per capita in top-15 national economies in 2000 and 2018 (thousand USD)



Note: JP – Japan; GB – United Kingdom; CN – China; IN – India; IT – Italy; DE – Germany; TR – Turkey; KR – Korea; ID – Indonesia; MX – Mexico; BR – Brazil; FR – France; US – United States; CA – Canada; RU – Russia.

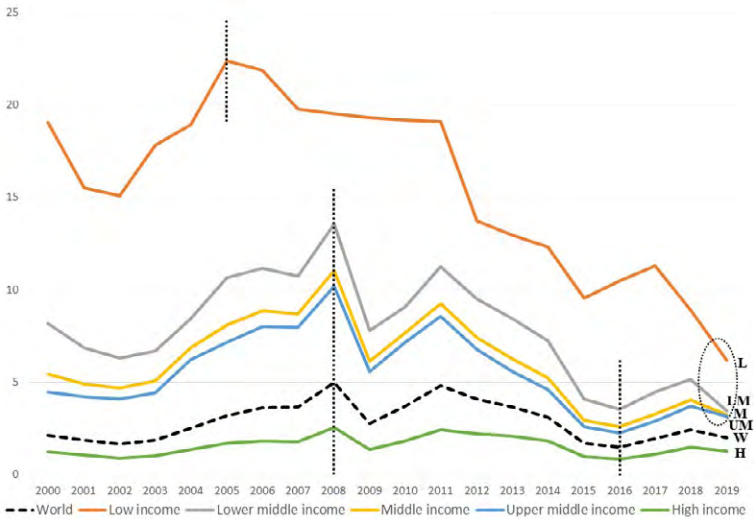
Source: Author's work based on the World Bank's data

of provision with natural capital in the 21st century (besides Russia and Canada), while Canada, USA, Germany, Republic of Korea and China recorded comparable results in terms of human capital.

An important indicator of a country's natural resource endowment is the ratio of natural rent to GDP, which shows the contribution of the resource base to economic growth.² In particular, the World Bank's experts include the rents derived from the exploitation of oil, natural gas, coal and other mineral resources, as well as from the use of forest resources in the assessment of total natural resources rents.

² Natural resources rents are calculated as the difference between the price of a commodity and its production cost.

Figure 3. Total natural resources rents to GDP in different groups of countries in the period 2000–2019 (%)

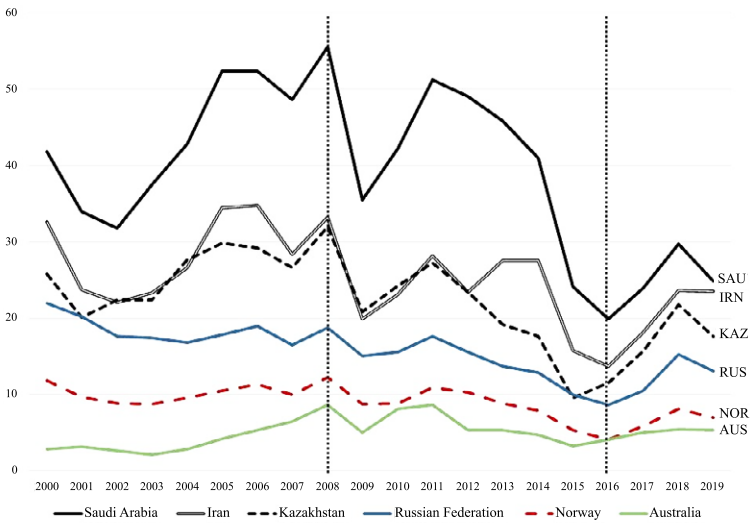


Source: Author's work based on the World Bank's data

As of the end of 2010s, in several Asian and African countries specialised in oil and gas extraction, natural resources rents reached 30–40% of GDP. According to our calculations, this indicator for the global economy grew until the crisis of 2008–09 and then declined by the mid-2010s from 5 to 1.5% of GDP. Similar trends were observed for income-differentiated groups of countries as well. Notably, a convergence occurred: in 2008, this indicator for high-income and lower-to-middle income countries differed by 11% (13.5 and 2.5%), but in 2019 – only by 2% (3.5 and 1.3%). In the world's poorest countries which are dependent on the natural resources exploitation (lower-income countries), the total natural resources rents to GDP ratio decreased from 22.3 to 6.2% in the period 2005–2019.

A downward trend in the contribution of the natural resource base to economic growth was also observed in countries belonging to the group of major producers of hydrocarbons. Following the crisis in the late 2000s, the total natural resources rents to GDP in Saudi Arabia fell from 56 to 25% over a decade, in Iran

Figure 4. Total natural resources rents to GDP in selected countries in the period 2000–2019 (%)



Source: Author's work based on the World Bank's data

– from 33 to 24%, in Kazakhstan – from 32 to 18%, in Russia – from 19 to 13%. For comparison, in a number of other countries specialised in the export of mineral resources, the ratio of natural rent to GDP remains low (for example, in Australia and Norway – about 5–6%).

Natural Capital Investments during the Pandemic

The benefits of natural capital investments could have a significant role not only in fostering sustainable post-COVID-19 recovery but also in averting future pandemics. The research conducted by GGKP (2021) found that the benefits of meeting selected targets of the SDGs linked to natural capital, far outweigh the financial costs. These benefits can be grouped into three main categories:

1. Economic benefits. This type of investment is perceived to have a high economic multiplier effect, as well as strong potential to crowd-in private investment (O'Callaghan

and Murdock, 2021). According to the WEF's White Paper (2022), investments in nature could generate over USD 10 trillion in new annual business value and create more than 395 million jobs by 2030. The financing of natural capital projects, such as afforestation and natural capital restoration programmes, can lead to the creation of new jobs characterised by low-skill labour requirements, which could have a positive impact on the vulnerable population sectors (O'Callaghan et al., 2021).

Natural capital investments also have a positive impact on vulnerable industries, highly dependent on nature - agriculture, tourism, food and beverages, water supply, etc. It is a widespread belief that investment in nature could help countries that rely heavily on tourism and hospitality - sectors most affected by the negative effects of the coronavirus pandemic (Lobanov et al., 2022). Tourism revenues make up a significant share of the GDP in certain developing countries. The imposed restrictions, especially in the service sector, have not only significantly weakened international trade and tourism demand, but have had a negative impact on household income and the activities of small and medium-sized enterprises.

2. Health benefits. Natural capital investments also have the potential to improve people's well-being and ensure healthy lives (Kim and Maia, 2021). By conducting activities aimed at reducing global air pollution, boosting biodiversity, increasing food security, providing access to safe and readily available water, as well as facilitating access to high-quality green and blue spaces in cities (parks, riverbanks and coastlines), people's physical and mental health as well as their social well-being would be significantly improved. For example, benefits generated from using local green spaces for social interactions, relaxation, physical exercise and mental restoration may contribute to reduced risks of childhood obesity, lower rates of depression in adults and better cardiovascular health (European Environment Agency, 2022). The severity of COVID-19 infection may be exacerbated in countries with the highest PM2.5 levels. The research conducted by Wu et

- al. (2020) indicates that high levels of air pollution may increase the risk of dying from COVID-19 infection.
3. Environmental benefits. Investments in natural capital could directly or indirectly reduce the climate risks and promote green economy. Building and preserving natural capital are especially important for countries struggling with floods (e.g., India, Bangladesh, China, Vietnam, Pakistan, and Indonesia) and wildfires (e.g., US, Australia, and Brazil) (Kim and Maia, 2021). For example, climate change is causing more frequent and extremely high temperatures, thus further worsening the conditions and drying vegetation, making it more susceptible to burning, which contributes to greater fire intensity. This type of investment could boost the resilience of the affected countries and help combat climate change in the future.

Environmental fiscal policies aimed at restoration have been recognised as crucial for fostering accountable and sustainable COVID-19 relief and recovery. However, the funds allocated for green spending were not on the expected levels. Natural capital investment opportunities were limited because the pandemic minimised further financing of projects related to environmental preservation, which could have consequences in the coming years. Despite the growing interest in green recovery initiatives and an increasing number of funds established for their implementation, countries are still not on the right track to reorient their economies toward green future.

According to the Global Recovery Observatory³ analysis of stimulus spending for 2020, the 50 largest economies have set aside USD14.6tn in fiscal measures to address the crisis, of which USD 11.1tn was dedicated to immediate rescue efforts, USD1.9tn to long-term recovery measures, and USD 1.6tn was categorised as

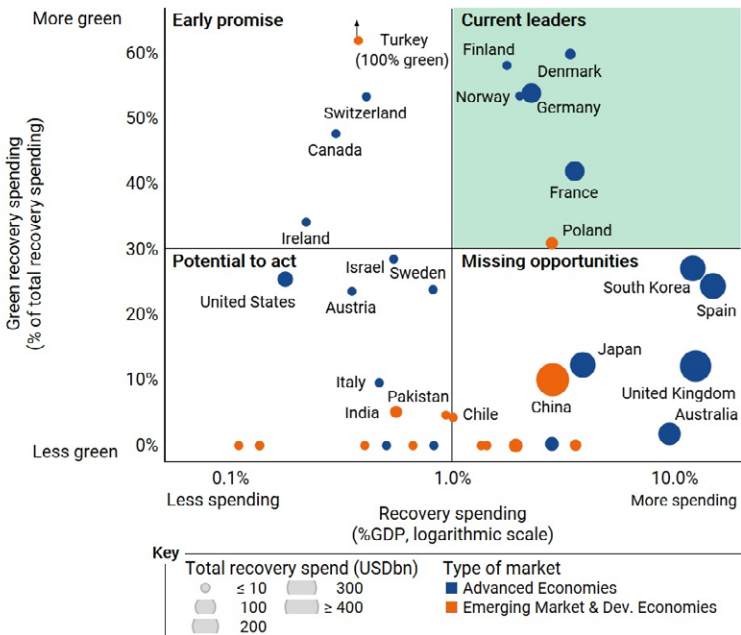
³ The Global Recovery Observatory is an initiative which keep track of global government spending (fiscal rescue and recovery spending) during the COVID-19 crisis in 89 economies (50 leading economies and/or countries in Latin America and Caribbean region). This is joint initiative between the University of Oxford and the Green Fiscal Policy Network (the United Nations Environment Programme (UNEP), the International Monetary Fund, and the Deutsche Gesellschaft für Internationale Zusammenarbeit).

'unclear spending'. Considering the total spending, only USD 368bn was allocated to green initiatives focused on reducing greenhouse gas emissions and protecting natural capital. Essentially, a small number of governments in high-income countries earmarked less than 3% of COVID recovery spending for the green economy. Estimates by O'Callaghan et al. (2021) suggest that only 3% of recovery spending has a positive impact on natural capital, while up to 17% may cause negative influence, mainly through expanded road transportation and defence services. According to the UNEP (2021), in 2020, countries allocated their COVID-induced spending as follows:

- green energy spending (new renewable generation, hydrogen power, transmission infrastructure) USD 66.1bn;
- green transport spending (investment in public transport, cycling and walking infrastructure, electric vehicle transfers) USD 86.1bn;
- green building updates and energy efficiency spending USD 35.2bn;
- natural capital (ecosystem regeneration initiatives and reforestation) USD 56.3bn;
- green research and development (renewable energy technologies and technologies for decarbonizing sectors) USD 28.9bn.

Looking at the total amount of recovery spending and green initiative spending packages as % of total recovery spending, we see the positioning of four types of countries in Figure 5. The countries positioned in the upper right corner are denoted as global leaders because they have made significant progress toward a green and resilient recovery from COVID-19 (Belgium, Denmark, Finland, Germany, France, Norway, and Poland). South Korea, Japan, Spain and United Kingdom are marked as countries that have missed their opportunities for green recovery. The largest share of green recovery spending as % of total recovery spending has been recorded in Canada (55%), Germany (46%), Japan (43%), USA (43%) and France (38%). As expected, advanced economies have allocated significantly larger resources in both short-term rescue measures and long-term recovery measures compared to Emerging Markets and Developing Economies. In addition, green spending is

Figure 5. Green recovery spending as a % of total recovery spending, versus recovery spending as % GDP



Note: The x-axis represents the value of government COVID-19 recovery spending as a % of GDP. The y-axis represents green recovery spending as a % of total recovery spending. The size of the bubble represents total recovery spending in US billion dollars.

Source: O'Callaghan and Murdock (2021).

concentrated in wealthier countries and populations, threatening to reinforce dangerous pre-pandemic inequities (UNEP, 2021).

Governments should consider possible benefits from natural capital investment and try to address crucial challenges such as climate change, biodiversity conservation and attainment of the SDGs. The alarming fact is that countries were not able to achieve many of the SDGs even before the outbreak of the pandemic. Therefore, investing in nature is necessary in order to achieve the SDGs and the Paris Climate Agreement goals and support poverty reduction (Steele, 2017). In this regard, the Glasgow Climate Pact was reached at the UN Climate Change Conference in Glasgow in November 2021. This new global agreement obliges the signatories to

accelerate their actions towards the goals of the Paris Agreement and UN Framework Convention on Climate Change. The signatory countries are expected to urgently reduce emissions and increase spending for developing countries which bear greater costs related to limiting global warming. Within the European Union, member states have adopted two strategies which place great emphasis on natural capital and the circular economy: the EU Biodiversity Strategy for 2030 and the EU Forest Strategy for 2030. In addition, through the World Bank's Wealth Accounting and Valuation of Ecosystem Services Global Partnership, countries are encouraged to realise the potential of their renewable natural capital in order to ensure environmentally sustainable and resilient COVID-19 recovery.

Concluding Remarks

The outbreak of the global health crisis caused by the COVID-19 has paralysed economies around the world, causing huge economic losses. At the same time, countries are facing an economic recession and climate change acceleration; hence, the need to achieve a green and sustainable recovery from COVID-19 is becoming increasingly important. Since the world is approaching 'critical point of no return' on climate change, it is necessary to change the existing models of economic growth that rely on over-exploitation of natural resources. Modification of unsustainable patterns of resource consumption is possible with investments in nature, green business, and transition to green economy. Post-COVID-19 recovery should be based on natural capital, meaning that countries should conserve nature in their recovery strategies by applying policies which envisage natural capital spending, such as the support for forestry, waterways, and general conservation initiatives. COVID-19 recovery packages based on natural capital investment should be set up to include solutions that can stimulate the economic recovery and simultaneously provide a positive impact on environment. The benefits of natural capital investment would be multiple, including reduction of climate risks, job creation, development of new skills, crowd-in effect on private investment, greater opportunities for innovation, transformation of agro-food industry, reduction of economic and social inequalities, etc.

Countries should find tools which facilitate the integration of natural capital into economic decision-making, as well as ways to finance these investments from different sources (public and private; domestic and international finance). Carbon reduction initiatives should play a significant role in future strategies, enabling the transition of current economies towards sustainable, resilient, climate-neutral, green and circular economies. Comprehensive responses to this crisis must be based on policies and activities directed towards the protection and restoration of natural systems, making us more resilient to the impacts of climate change. Anti-crisis policies should introduce nature-positive recovery measures to mitigate the inevitable negative consequences on human health and the real economy, both in developed and developing countries.

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