

Regional integration and environmental sustainability during the COVID-19 pandemic: Evidence from South Asia

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Abstract

South Asia, a sub-region with nearly a third of the world's population living in extreme poverty and hunger, has been affected by the COVID-19 pandemic in an unprecedented way. The pandemic has undermined the progress achieved by the subregion towards attaining sustainable development goals. This study argues that fostering environmental sustainability in the South Asian region is crucial to "Building Back Better" while taking cognisance of future climate-related risks. With the low level of preparedness, the collapse of global supply chains, and restrictive regional integration, the individual country in the region lacks the fiscal and technical capacity to implement sustainable development goals effectively. Therefore, based on the analytical approach to regional integration, this paper explores the potential role of regional integration in ensuring environmental sustainability in South Asia. Additionally, this study illustrates how the COVID-19 pandemic has affected several environmental aspects at the regional level, such as clean energy, disaster risk reduction, and waste management, and shows how regional cooperation can address these challenges post pandemic. While previous studies mainly focus on regional integration in the European Union, this study targets the crucial importance of regional cooperation in South Asia in achieving environmental sustainability.

1 | INTRODUCTION

The outbreak of the COVID-19 pandemic, which initially emerged as a health emergency, eventually evolved into a gigantic human tragedy with unprecedented socio-economic effects. As governments across countries adopt strict lockdowns to contain the spread of the virus, economic activities have faltered globally, thus disrupting global and regional supply chains. Such actions have led to millions of people rendered jobless with the rising incidence of poverty, inequality, and hunger. Furthermore,

the pandemic poses severe challenges towards the progress of economic, social, and environmental sustainability worldwide, undermining the effective implementation of the United Nation's (UN) Sustainable Development Goals (SDGs) (United Nations, 2020, p.5; Leal Filho et al., 2020; Pan & Zhang, 2020). Despite perceiving the unfavourable effect of the crisis on several sustainable development goals, the UN remains optimistic as it introduces a novel plan to "Defeat the virus and build a better world" (World Bank Group, 2015). Overcoming such a massive pandemic calls for a regionally coordinated, financially inclusive, international solidarity with decisive and sustained innovative policy actions.

The outbreak of the pandemic has affected several goals of the SDGs, most prominently no poverty (Goal 1), zero hunger (Goal 2), good health (Goal 3), quality education (Goal 4), and decent work (Goal 8). Van Lancker and Parolin (2020) on education, Paslakis, Dimitropoulos, and Katzman (2020) on hunger and food security, and Ratten (2020) on entrepreneurship are some of the notable studies that have empirically investigated how the underlying goals of SDGs got affected by the crisis. While the studies mentioned above mainly focused on the socio-economic aspect of sustainable development, this paper extends an analytical approach and demonstrates how the COVID-19 pandemic disrupted environmental sustainability in one of the most poorly connected regions such as South Asia.

Amidst the pandemic, South Asia, a subregion with a quarter of the world's total population, has witnessed inadequate public health infrastructure, pervasive informality in economic activities and employment levels, fragmented coverage of social protection, and widening gender gaps. Experts view that with the growing incidence of poverty and widening inequality, the crisis is likely to influence the gains in poverty reduction and undermine the progress made by the region towards achieving SDGs. Simulations-based results conducted within the framework of UNESCAP-SANEM South Asia Computable General Equilibrium (CGE) suggest that approximately 132 million people in the region could be pushed into extreme poverty (\$1.9/day). The bulk of the poverty would be in India, followed by Bangladesh, Pakistan, Nepal, and Sri Lanka, reversing the hard-won gains in poverty reduction from the past decade (UNESCAP, 2020). In addition, the coastal parts in the region have been marked by multi-hazard risk hotspots, where the COVID-19 pandemic compounds environmental degradation coupled with disaster risk. The disaster-related risk factors, thus, pose a challenge to the environmental sustainability in the region.

Environmental sustainability (ES), one of the fundamental pillars of sustainable development, aims to use natural resources for human needs within the ecosystem's regenerative capacity without diminishing biological diversity along with perpetual enhancement of environmental quality (Morelli, 2011; Murshed, Chadni, & Ferdaus, 2020a). The level of pollution, the extent of natural resource depletion, and the frequency and intensity of natural disasters portray the status of ES in a particular region (Shah et al., 2019; Sethi, Chakrabarti, & Bhattacharjee, 2020). Unfortunately, all these aspects are in a dismal state in South Asian countries due to monotonic fossil fuel dependency, lax environmental regulations, population explosion, and imprudent use of natural resources to increase economic well-being. Ultimately, the region also has to face the adverse consequences of climate change, compounded by these unsustainable and environmentally unfriendly development pathways. Existing literature in the context of the South Asian region emphasises the role of the renewable energy transition, strict eco-sustainable policies, regulatory pressure, and resilient infrastructure for promoting climate mitigation, adaptation, and thereby ES among South Asian countries (Khan et al., 2020; Murshed, 2020a; Murshed, Haseeb, & Alam, 2021; Nepal et al., 2021).

Given this background, we are motivated by the following insights to highlight the importance of regional integration in ensuring environmental sustainability in the South Asia region. First, a regionally integrated approach within the South Asian countries and with the rest of the world is expected to mitigate environmental degradation and accelerate economic growth in the post-COVID-19 era (Pattanaik, 2020). Disasters and untreated medical waste continuously endanger the environment in the climate-vulnerable region due to a lack of environmental management capacity at the individual country level in the region. Therefore, to deal with the challenges laid down by the pandemic, active participation and cooperation among SAARC countries and their interaction with the civil

societies in South Asian regional cooperation and integration seems to be of crucial importance. Greater sub-regional cooperation among the member countries is vital not only to manage the effect of the pandemic but also to recover the crisis sustainably.

Second, regional integration plays a crucial role in accelerating economic growth, reducing poverty and addressing some of the prolonged challenges associated with regional public goods (RPGs) management in South Asia. In the South Asian region, many of the environmental RPGs overlap with global public goods (GPGs). Due to the dominance of GPGs, RPGs have received lower priority in the allocation of resources and regional cooperation among South Asian countries. However, in the wake of the COVID-19 pandemic, it is imperative to move towards a regionally integrated approach as global actions on mitigating the pandemic and environmental crises may be delayed. Furthermore, there is an urgent need to follow a sustainable development framework for long-term sustainable recovery, capable enough to handle multiple current and future crises. For instance, clean and affordable energy and disaster risk reduction infrastructure could be regionally developed without relying on global environmental agreements.

Third, South Asia has not achieved full potential in regional trade due to inadequate infrastructural connectivity, high tariffs, non-tariff barriers, and the mutual distrust among SAARC members (Kathuri, 2018). Informal trade has become a permanent feature of the intraregional trade in South Asia due to disproportionately high trading costs within the regional block (Taneja and Bimal, 2020). Moreover, the lack of cooperation among South Asian countries on common environmental problems begets inter-state conflict related to food-energy-water security. It, in turn, hinders trade, development, and social peace. Hassan et al. (2017) advocates the fusion of developmental and environmental factors into regional cooperation for achieving sustainable development goals. In this regard, Murshed and Dao (2020) reveal that improvement in export quality within the region through research and development reduces CO₂ emissions and fosters environmental sustainability.

Furthermore, regional trade integration is a reasonable means to trigger renewable energy transition (RET) and promotes international inbound tourism demand in South Asia, which requires a considerable increase in regional trade integration (Murshed et al., 2020b; Murshed, 2021). Such interaction and incorporation of environmental and development objectives in the regional trade lower the burden on scarce domestic resources inflicted by the pandemic compounded with inadequate financial and technical support from the developed world to the transition economics to address developmental and environmental issues simultaneously. Recovery from the pandemic entails more natural resources, calling for regional cooperation for “Building Back Better”. The Asian Development Bank (ADB) Strategy 2020 has acknowledged the significance of regional cooperation for sustainable recovery. It is committed to induce significant resources to scale up its support for regional cooperation and integration (Asian Development Bank, 2020).

In this study, we mainly focus on how regional integration through the provision of RPGs can ensure environmental sustainability in the region during the COVID-19 era. This paper focuses on the environmental aspect of SDGs and does not examine all the goals of SD; we consider the environmental aspect because its relevance to COVID-19 is very crucial (Munasinghe, 2020). Notably, we analyse the role of regional cooperation, an essential partnership (Goal 17) for progressing towards the goals of clean water and sanitation (Goal 6), clean and affordable energy (Goal 7), and climate action (Goal 13) in the South Asian region. We conclude this paper by highlighting a few regional cooperation initiatives taken by the South Asian region during the pandemic.

Given these motivations, the study explores the role of regional cooperation in ensuring environmental sustainability in South Asia for the post-COVID-19 period. The main contribution of the paper can be specified as follows. First, this study is the first to analyse the implications of regional integration in environmental sustainability within regional public goods and the SDGs framework. Second, previous studies mostly focus on the potential role of the European Union (EU) in dealing with the pandemic (Sabat et al., 2020; Motta and Peitz, 2020). This study, however, targets the contribution of the South Asian Role for Regional Cooperation (SAARC) in achieving environmental sustainability for one of the hard-hit and poorly integrated regions. Third, this study discusses how the pandemic

outbreak has affected several environmental issues such as clean energy, disaster risk reduction, and waste management and demonstrates how a regionally integrated approach can tackle these problems.

The rest of the paper is structured as follows. Section 2 provides a brief glimpse of the COVID-19 pandemic. Section 3 extends the analytical framework to explore the role of regional integration in environmental sustainability. Section 4 discusses the implications of regional integration in SA. Finally, section 5 concludes the paper by extending some policy implications.

2 | AN OVERVIEW OF COVID-19 PANDEMIC IN SOUTH ASIA

The South Asian region, which contains a third of the world's people living in extreme poverty and pervasive informality in economic activities and employment, has been severely affected by the outbreak of the pandemic. Regarding the total COVID-19 cases, India, Pakistan, Bangladesh, and Nepal are the countries in the region that have surpassed China recently. As of 17 March 2021, the region has witnessed 10,442,111 COVID-19 cases, which accounts for approximately 17.10 percent of global COVID-19 cases. Among all the countries, India alone has reported 25,111,753 cases accounting for 15.31 percent of the world's cases (Worldometer, 2021). The South Asia sub-region has entered the crisis with a low level of preparedness, and such preparedness has resulted in the region's slow progress in achieving SDGs. The region has to deal with the crisis at a time with many existing deprivations such as the growing incidence of poverty and hunger, gaps in public health infrastructure and access to basic facilities like clean drinking water and sanitation. Table 1 summarises the COVID-19 cases and some indicators of its preparedness in dealing with the pandemic. Among all the countries in the region, India is the worst affected country with a rapid increase in total COVID-19 cases and deaths.

The region spends less than 1 percent of GDP on health compared to the world average of 5.8 percent, and 7.52 and 4.8 percent for OECD and East Asian countries, respectively. Low expenditure on health as a percentage of GDP has also resulted in poor public health infrastructure. Table 1 illustrates the health infrastructure measured in terms of hospital beds, nurses and midwives, and physicians by 1,000 populations. We notice a growing gap in terms of public health infrastructure in the region compared to the global average. Gaps in the health infrastructure have been exposed in addressing the pandemic. Furthermore, the region does not extend sufficient access to basic sanitation facilities and alternative working arrangements during the containment zone. On average, Bhutan, Maldives, and Sri Lanka are well-managed and better equipped in terms of these basic amenities compared to the other economies in the subregion. With a few densely populated urban cities (e.g., Dhaka, Delhi, Bangalore, Mumbai), the transmission of the virus has become widespread, especially among the marginalised and vulnerable section of the population. The slum dwellers and domestic migrant workers, who have underprivileged access to basic health care and sanitisation, have suffered most.

The subregion has undertaken a series of stringent measures to contain the pandemic, including extended lockdowns, closing their international borders, imposing a complete ban on international and domestic travels, and suspending religious and public gatherings. Table 2 shows the measures taken by the respective countries in the South Asian region to contain the spread of the virus. It can be observed that Nepal and Afghanistan are the countries with the highest stringency measures. The stringency scores of these two countries are 93 and 94, respectively, followed by Bangladesh (82), Pakistan (80), India (79), and Sri Lanka (77).

Like other regions, the outbreak of the pandemic is testing the resilience of the economies in the region that had continued to grow at reasonable growth rates after the Global Financial Crisis (GFC). Lockdowns and several other measures taken to curb the spread of the virus cast a heavy shadow on these economies. A significant percentage of the population in the subregion is engaged in the informal sector of the economy that facilitates no social security coverage. Lack of access to social security services and lack of national social protection make the labour force susceptible to

TABLE 1 The preparedness of the South Asian region for the COVID-19 pandemic

	COVID-19 cases										
	Health System										
	Total Cases	Total Deaths	Case/I M	Government Health expenditure (% of GDP)	Hospital bed (per 1,000 people)	Nurses and midwives (per 1,000 people)	Physicians (per 1,000 people)	Basic drinking water services (% of population)	Basic sanitation services (% of population)	Open defecation (% of population)	
Afghanistan	63,819	2751	1608	0.491	0.472	0.172	0.271	57.59	38.75	15.49	
Bangladesh	780,857	12181	4701	0.471	0.672	0.263	0.464	96.59	43.78	2.88	
Bhutan	1296	01	1164	2.49	1.75	1.28	0.31	95.38	65.67	1.56	
India	25,111,753	276196	8944	0.91	0.70	1.37	0.74	89.81	50.48	35.17	
Maldives	44523	97	81125	5.21	4.30	5.65	2.57	98.42	96.20	1.13	
Nepal	464218	5215	15687	1	0.30	2.31	0.67	87.13	51.28	30.54	
Pakistan	880362	19617	3919	0.72	0.60	0.52	0.91	90.31	54.45	16.31	
Sri Lanka	145,202	981	6756	1.62	3.55	1.92	0.84	87.39	93.41	1.29	
South Asia	27,489,574	316,058	117,148	0.89	0.67	1.14	0.74	89.81	50.65	29.28	
OECD members	46,140,480	1,050,896	33,624	7.52	4.13	9.29	2.81	99.23	98.06	0.28	
East Asia & Pacific	47,191,198	614,105	32,617	4.54	3.67	2.85	1.48	90.92	79.43	3.18	
World	164,272,596	3404279	21074.6	5.80	2.70	3.44	1.45	88.05	69.94	11.54	

Source: Author's calculation from worldometer and World Development Indicators (WDI) (accessed at <https://databank.worldbank.org/source/world-development-indicators>).

TABLE 2 Measures taken by the governments in South Asia to combat COVID-19

Countries	Stringency level#	Lockdown measures (duration)	International Borders/travel restrictions	Air Travel	Land Transport	Maritime Transport
Afghanistan	84	Complete lockdown from 24 March till 24 May	Closed, open only for immigrants	PR	PR*	ND
Bangladesh	82	From 26 March to 16 May and extended further till 30 May	Closed	Domestic flights opened from 1 June. International flights closed till 15 June. Cargo flights only	Freight trains	EG only***
Bhutan	74	Restriction on entry of tourists from 6 March; 23 March – international borders sealed lockdown from 11 April to 21	Closed	Not allowed	EG only**	NA
India	79	25 March to 31 May lockdown extended till 30 June in containment zones. Many activities are allowed after 8 June 2020	Closed	Domestic flights resumed but PR for international flight	PR	ND
Maldives	NA	Public Health Emergency was declared on 19 March. Lockdown from 1 April to 12 June in Greater Male	Closed	Permission required	NA	A
Nepal	93	23 March to 2 June. Further extended to 14 June	Closed	Permission required	Conflicting information	NA
Pakistan	80	1 April to 9 May. Lockdown lifted	Closed	International flights allowed. Cargo flights only	P	A
Sri Lanka	77	Public holiday declared from 15 March. Lockdown from 20 March to 11 May.	Closed	Cargo flights	P	ND

Source: UNESCAP based on Oxford COVID-19 Government Response Tracker, IMF Policy Responses to COVID-19 and various national sources.

Note: #; Updated as on 10 June 2020.

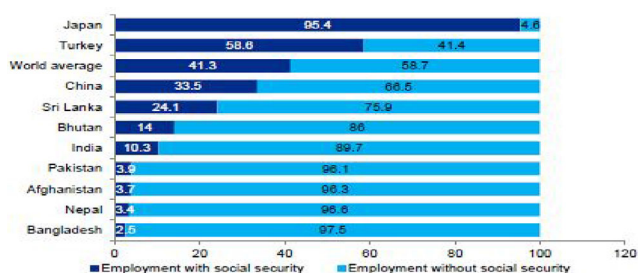
P = Prohibited; ND = No Data; A = Allowed; N/A = Not Applicable; *PR = Passive restriction enforced by neighbour countries at border; **EG = Essential Goods .

FIGURE 1 Social security coverage in South Asia and selected other countries (share of total employment)

Source: UNESCAP SSWA (2018a) based on World Bank data.

Notes: The world average is based on the available data for countries for around 2010. Employment with social security refers to the share of the labour force actively contributing to old-age pension schemes

[Colour figure can be viewed at wileyonlinelibrary.com]



economic shocks and affect the livelihoods of the people. Figure 1 shows the social security coverage for the South Asian region and some other selected economies. In a survey conducted by the UNESCAP-SSWA among the countries in the region, it was shown that closure of business and production units was the major reason for the economic contraction in the region, followed by unavailability of the workforce, drop in demand for goods and services, disruption of supply of raw materials, and cashflow and logistic challenges. Figure 2 shows the survey percentages. The impact of COVID-19 is likely to be magnified for certain sections of the population, including slum dwellers, women, older persons, and persons with disabilities.

To control the pandemic, apart from initiating country-specific containment measures, governments from the respective countries have attempted to coordinate a response through its regional organisation, SAARC. Under the leadership of Prime Minister Narendra Modi, the SAARC COVID-19 Emergency Fund was created as a joint emergency fund to deal with the crisis. As of April, India, Sri Lanka, Pakistan, Bangladesh, Afghanistan, Nepal, Maldives, and Bhutan have contributed US\$10 million, US\$5 million, US\$3 million, US\$1.5 million, US\$1 million, \$US200,000, and \$US100,000 to the emergency fund, respectively. Bhutta et al. (2020) emphasised that SAARC countries work in unison regardless of initial inertia and varied response to avoid the unprecedented health crisis.

3 | THE ANALYTICAL FRAMEWORK

3.1 | Regional cooperation and integration (RCI)

The Asian Development Bank (ADB) defines RCI as a process by which national economies become more interconnected to foster growth and reduce development gaps through the initiative of building high-quality cross-border infrastructure, trade integration, intraregional supply chains, and strong financial links. Additionally, the process encourages the provision of regional public goods, enabling slow-moving economies to gain momentum for their expansion (ADB, 2017). Countries benefit from close RCI when they share common interests and values, complementary rather than competitive economics, external demand for regional goods, services, and infrastructure (Van Nieuwkerk 2020). Furthermore, RCI vitalises small nations' voices in the region and reduces negotiation costs with the rest of the world.

One of the biggest challenges for SDGs in the post-COVID-19 era will be to operationalise it for making a significant transition among communities and businesses across countries. As the crises progress, there has been a greater need to overcome obstacles to foster sustainable development, which is crucial for tackling growing economic, social, and environmental problems comprehensively. The set of principles upon which the SDGs are based would also profoundly affect national and international governance. Financial resources, technical know-how, good governance, and integrated decision-making to hold SDG principles together are vital for operationalising sustainability.

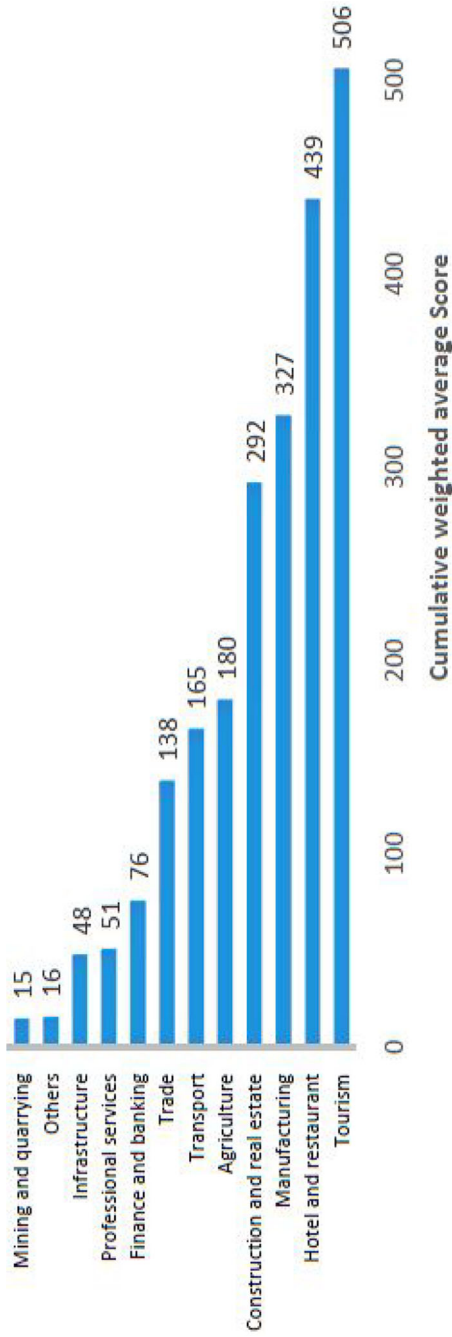


FIGURE 2 Most affected sectors due to COVID-19 in South Asia

Source: UNESCAP-SSWA online survey.

Note: Horizontal axis denotes the relative score

[Colour figure can be viewed at wileyonlinelibrary.com]

An integrated decision-making approach will also ensure environmental sustainability into the economic and social developmental process without burdened governments and policymakers to consider each aspect separately and independently. A major pitfall behind achieving sustainable development in the past is the failure of the regional organisations and communities to translate the specific targets into actions in an integrated manner.

Sustainable development requires an integrated approach encompassing different sectors that could be promoted through the RCI strategy (Dernbach, 2003). However, the current RCI process, particularly in Asian countries, is driven by the objective of economic growth and investment, ignoring the social and environmental dimension of sustainable development (IGES, 2015). The excessive focus on trade and investment liberalisation in the RCI process escalates international competition to attract investments, which may lead to the adoption of lax environmental and social controls. It could jeopardize environmental sustainability through over-exploitation of natural resources, increased pollution, health-threatening emissions, social marginalisation, human rights violations, and demeaned employment conditions. Though the pandemic has temporarily reduced emissions due to limited economic activity, the use and exploitation of natural resources are continuously happening for fighting the health crises in the form of hazardous waste and disposal of harmful medical waste, disinfectants, and masks (Rume et al., 2020). Hence, there is an urgent need to exploit RCI instruments across the globe for greener recovery. It could provide immediate, region-specific, and easily monitorable solutions for complex health and environmental issues.

3.2 | Regional public goods (RPGs)

The provision of RPGs plays a vital role in explaining several thematic issues, including trade and integration, economic policy coordination, protection of health and environmental issues, and production of knowledge (Estevadeordal et al., 2004, p.209). Specifically, ecological problems generate negative externalities that do not know geographical boundaries and often affect the entire region. For example, forest fires in Indonesia affected the quality of life in Singapore. In times of natural disaster and pandemic, the repercussions of cross-border environmental problems in a region that infringes on other national boundaries adversely impact the living standards and quality of life of other countries in the region. Based on the theoretical arguments, this paper explores how RPGs in the form of controlling communicable disease and environmental problems benefit cross-border countries in a region.

South Asian countries provide a fertile ground to explore the role of regional integration in the provision of several RPGs. This is primarily because the region has close geographical proximity, shares common socio-economic development principles, and embraces a broad cultural homogeneity. Despite these favourable conditions, the region has unexplored potential for strengthening RCI for the provision of RPGs. Shackled cross-border transportation infrastructure, opaque para-tariffs outside the preview of SAFTA, and mutual distrust among countries inhibit the RCI process in the region (Kathuri, 2018). However, the operationally convenient approach by Devlin and Estevadeordal (2004) demonstrates the crucial role of RPGs in strengthening RCI in South Asia and unleashing its unexplored benefits. It is argued that RPGs, such as the control of transmittable diseases, effective environmental management, and good governance, provide ample rationale to consider it at the sub-regional level in the context of South Asia. For example, benefits that might occur from controlling a communicable disease would redound more to the countries in South Asia than the countries outside the region. Moreover, due to the ample scope of externalities, the simultaneous provisions of RPGs in the region will bring more considerable outcomes than the sum of the parts. Lelieveld et al. (2020) argued that the risk of mortality from excess air pollution is increasing amid the COVID-19 crisis. Therefore, in this era of COVID-19, abatement of air pollution can have a positive spillover effect on the border countries in the region.

3.3 | The interrelationship between RCI, RPC, and environmental sustainability

Human destruction of natural habitat is considered to be a primary cause of transmission of the virus. Thus, the pandemic is a wake-up call for leaders and policymakers to protect the environment and the essential services it provides to support society and the economy. Also, the devastating impacts of the pandemic are giving indications to policymakers to reduce vulnerability to future dangerous shocks for building resilient communities. These two lessons are consistent with the two key policy responses to foster environmental sustainability –mitigation and adaptation (Munasinghe, 2020)

Climate mitigation action involves shifting to cleaner energy sources, increasing energy efficiency, reducing carbon intensities, and afforestation. Reducing soil and water pollution can also consume a considerable amount of CO₂ emissions from the atmosphere. Climate adaptation action includes building robust economic and social infrastructure to tackle climate change consequences, particularly pre- and post-disaster risk prevention. There are two channels through which RC can revive the economy in tandem with environmental protection. First, trade and investment, an important aspect of RCI could increase the nation's capacity to protect the environment through income augmentation following the environmental Kuznets curve, clean technology transfer, and infusion of better environmental management practices (Frankel, 2009). Adopting uniform environmental codes, standards, and laws could be a win-win situation for all trading partners to revive regional trade that accounts for environmental protection. Second, the provision of RPGs with the objective of climate mitigation and adaptation could foster sustainable environmental recovery.

4 | PRACTICAL IMPLICATIONS OF RCI ON ENVIRONMENTAL SUSTAINABILITY: EVIDENCE FROM SOUTH ASIA

South Asia is facing a plethora of environmental challenges due to geographical location and climate change. The region is experiencing weather condition variability, extreme climate events, and disasters, adversely affecting the poor and most vulnerable. In addition, the pandemic has exacerbated the livelihood problems, exposing these poor communities to greater risk and palpable uncertainty. RCI is helping South Asian countries to fight health crises by sharing medical knowledge, medicines, medical equipment, and vaccine. We argue the unprecedented health crisis has provided an opportunity to expand and strengthen the RCI platform to tackle environmental challenges.

Studies using pre-pandemic data have revealed various channels through which environmental sustainability could be enhanced among South Asian countries, highlighting the potential for tapping RCI. Murshed (2020a) and Murshed et al. (2020b) find the instrumental roles of ICT trade as improving energy efficiency, increasing renewable energy consumption in total energy consumption, and enhancing access to cleaner cooking fuels and technology. Shah et al. (2019) and Murshed et al. (2021) have mentioned the potential of effectively utilising an enormous amount of untapped renewable energy sources in the region through cross-border energy trade and trans-regional energy investment. Knowledge sharing regarding eco-sustainable and regulatory policies by the governments across the region's corporate sector has also been identified as a potential channel to augment green business practices (Khan et al., 2020). Moreover, many studies favoured regional channels of trade and investment over global flows for the renewable energy transition in the region to reduce the time lags of technological diffusion associated with foreign direct investment (FDI) inflows (Murshed, 2021).

Following the recommendations of the aforementioned empirical studies, the next section attempts to understand the role of RCI in sustainable environmental recovery post COVID-19 through the provision of RPGs in the following sectors.

4.1 | Clean energy

Recovery from the pandemic will entail more energy demand to provide robust health and digital infrastructure (United Nations, 2020). IEA's pre-pandemic projections for South Asian countries reveal that energy demand will be more than double in the coming decades (Sun et al., 2020b). Already energy-starved, the South Asian region faces twin challenges of low domestic energy capacity and monotonic dependency on fossil fuels, generally imported, which will likely dent the economies shackled by the pandemic's impact through generating substantial import bills (IRENA and DESA, 2019). The South Asian region needs to invest in technological innovation to enhance the efficiency levels for ensuring energy security (Murshed and Alam, 2021). The transition towards clean, reliable, and affordable energy sources is imperative to overcome the current challenges and to foster environmental sustainability. In addition, such energy transition is expected to tap sizeable renewable energy potential in the region and simultaneously reduce the harmful effects of fossil fuel price volatility on future sustainable economic expansion (Rahman et al., 2011; Murshed and Tanha, 2021; Destek and Aslan, 2017).

The geographical distribution of renewable energy sources is also crucial for energy trade within the region, suitable for diversifying the energy mix into a self-sufficient and sustainable one. For instance, Nepal and India, with vast hydropower potential (83000MW and 150000MW, respectively), can trade surplus electricity with Pakistan and Afghanistan that possess substantial solar power potential, based on the comparative cost advantage theory of international trade (Shukla et al., 2017). The intra-regional trade could be further extended to the neighbouring regions, such as South Asia, in collaboration with the Central Asian countries, planning a mega hydroelectricity power project, the Central Asia South Asia Interconnection-CASA 1000. This would generate an additional power supply of 1000 MW, and help to overcome the energy deficit of South Asia from the surplus regions of Central Asia (Abbas et al., 2018). Furthermore, such intra-regional energy trade could overcome the technical deficiencies associated with renewable energy technologies and help energy deficit countries import renewable energy from a neighbouring country without any time lag (Murshed et al., 2020c). Intra-regional direct investment in the RE sector will lead to technological spillovers and encourage energy infrastructure development (Murshed and Alam, 2021). Thus, the expansion of intra-regional energy trade and sharing it through an integrated regional power grid will form a sub-regional delivery system for low carbon energy, which is fundamental for achieving SDG targets. The major hindrances to renewable energy trade expansion in the region are high tariffs and other trade barriers levied on renewable energy imports (Murshed, 2020b).

In particular, RCI can help overcome technical, financial, and institutional barriers associated with renewable technologies through the following channels (Brunnschweiler, 2010). First, pooling financial resources for strengthening institutional arrangements and policy environment for fuller utilisation of renewable capacity (Sun et al., 2019). Second, collaborative research and development on harnessing the benefits of solar and wind technologies could lower the cost of R&D and enable the commercial maturity of the technology (Sun et al., 2020a). Third, joint investment in energy infrastructure (generation and transmission), particularly in backwards-border regions, could lower the supply cost and increase the feasibility of expensive projects beyond a single country's capacity. Fourth, joint capacity building for creating an enabling environment to attract private and foreign investment in the renewable energy sector in the region (Murshed et al., 2020c; Bose et al., 2019).

South Asia's regional energy sector cooperation, which solely focuses on energy security, is limited to conventional energy sources, and vast renewable resources remain untapped (Rahman et al., 2011). South Asia's first cross-border petroleum products pipeline was started before the pandemic between India and Nepal, focusing on conventional energy sources. Similar types of bilateral interconnection and power-trading arrangements between Bangladesh, Bhutan, India, and Nepal have been flourishing since the energy cooperation agreement signed by South Asian countries in 2014 (UESCAP, 2020). Amidst the pandemic, India and Bhutan signed the first joint venture hydroelectric project (June 2020),

which sets an example of regional cooperation for climate mitigation in the region. It will reduce India's dependency on coal power, thereby contributing to CO₂ reduction in the region and bringing additional revenue to Bhutan, making the project a regional public good. The project has also received first-ever local clean development mechanism benefits.

4.2 | Disaster risk reduction

In South Asian countries, climate-related natural disasters during the pandemic have added to the already distressing situation imposed by public health crises, undermining their capacity to respond. The interaction of biological and natural hazards complicates the disaster response measures, imposing a significant burden on already shackled critical infrastructure such as hospitals, safe shelters, utilities, transportation, water, and sanitation. In addition, the situation left many vulnerable communities (coastal communities) at risk of loss of livelihood and shelter, eroding the modest progress made by the governments to eradicate poverty and inequality (Swaigood and Srivastava, 2020).

Inadequate multi-hazard disaster preparedness in the region exposes the most vulnerable to cascading risks from climate extremes, natural disasters, and COVID-19 in South Asia. A policy brief (2/2020) based on ESCAP's policy study, "Protecting the most vulnerable to cascading risks from climate extremes and the COVID-19 in SA", reveals that COVID-19 hotspots are highly disaster-prone regions adjoining two countries. Thus, neighbouring countries in the region share both climate and biological disaster risks. Moreover, the region has to prepare to confront multiple disasters simultaneously, which require integration of different sectors, institutions, and infrastructure related to natural, biological, and other hazards. These considerations delineate the need to strengthen RCI to provide disaster risk reduction and reduce climate vulnerability, a regional public good (RPG). RCI needs to mobilise expertise and financial resources from renowned international organisations dealing with disaster risk reduction to create a resilient and robust infrastructure that can withstand complex and simultaneous disasters (Field et al., 2012).

During the pandemic, various instances show how regional cooperation can help in disaster risk management. In the case of cyclone Amphan, the joint program through the World Meteorological Organization and the United Nations Economic and Social Commission for Asia-Pacific (WMO/ESCAP) panel on tropical cyclones has facilitated the sharing of timely and accurate early warnings to save thousands of lives in Bangladesh and India from cyclone Amphan. Regarding locust swarms, India and Pakistan are coming together to fight the crop-devouring insects as it has put the food security of both regions at risk. Though such initiatives reduce the loss of human lives, the increasing economic impact is still a cause of concern (ESCAP, 2020). Therefore, RCI needs to deepen to accommodate multi-hazard risk reduction, prevention, and resilience approaches. The primary focus should be building resilient critical infrastructure, expanding disaster risk financing, and promoting insurance for multiple hazards risk, along with the universal provision of health care, social protection, and other essential services. In this context, ESCAP's Asia-Pacific Disaster Resilience Network (APDRN) is working with various stakeholders, including the World Meteorological Organization (WMO), United Kingdom Meteorological Office, and the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES).

4.3 | Waste management

Waste management is the rarely raised and discussed sector for regional cooperation in South Asia, even though it is intricately related to various SDGs (ADBI, 2020). The multiple declarations and action plans have acknowledged waste management as a critical area for climate mitigation that requires a regional response. However, it lacks proper implementation. Local governments (municipal bodies) are authorised to collect and treat colossal waste, which is generally beyond their physical and financial capacity. As a result, South Asia has the lowest waste collection rate, with only

44 percent of total waste generated officially collected by the government. In addition, waste is not treated in congruence with the scientific standards, primarily dependent on sea and landfill sites for municipal solid waste disposal, which in turn causes land degradation and marine pollution (Terazono et al., 2005).

The pandemic further aggravates the region's already staggering waste management process. The health crisis demands more plastic usage, such as PPE kits (personal protective equipment), masks, and gloves, resulting in more plastic waste (Sharma et al., 2020). The region needs to adopt effective and sustainable waste management practices for waste segregation, collection, treatment, disposal, and transport to manage swelling medical and future electronic waste. It requires investment in good facilities such as sanitary landfills and innovative technology, involving local governments and private players. Kojima (2019) affirms that waste treatment and disposal technologies exhibit economies of scale; the per-unit cost declines as treatment facilities become bigger. However, there is a trade-off with the cost of transporting waste to treatment sites. It means enormous investment and huge waste collection areas are prerequisites for availing benefits of economies of scale. Therefore, the region could exploit the RCI framework for waste management, particularly in border areas.

RCI could be instrumental in building professional capacity among small and rural municipal cooperations to strike a contract with private players and in their institutional ability to develop a regional waste management database. The database will help regulate the transboundary flow of waste material to protect ocean health and marine ecosystems in coastal areas. Moreover, inter-municipal cooperation in the region could sensitize households about waste segregation to promote the principles of reducing, reusing, and recycling. Such initiatives will help in transforming waste into a valuable resource. A notable example is waste-to-energy plants. To discuss the alarming increase in plastic waste witnessed during the pandemic and its safe disposal, an inter-governmental organisation of South Asian countries, the South Asia Cooperative Environment Programme, also known as SACEP, in collaboration with the International Society of Waste Management, Air, and Water (ISWMAW), has organised a webinar for sharing expertise related to waste management in the pandemic.

Apart from knowledge sharing, the region, without relying on international agreements, should adopt rules and regulations and formulate binding legal arrangements for waste management, including waste segregation, collection, treatment, disposal, and transportation, to prepare for multiple hazards in the future.

5 | FURTHER REGIONAL COOPERATION INITIATIVES IN SOUTH ASIA DURING COVID-19 OUTBREAK

As the outbreak of the virus transcends national boundaries, the importance of regional and sub-regional cooperation is increasingly realised. In a survey conducted by UNESCAP-SSWA, 81 percent of respondents find that regional cooperation in the South Asian region will have a significant impact in dealing with the COVID-19 pandemic. Intensified subregional cooperation is expected to effectively tackle the crisis and recover from the crisis in a sustainable manner to build a resilient future. In the wake of the pandemic, leaders from BIMSTEC expressed their concern and commitment to strengthen their cooperation to deal with the crisis together. Following are some additional regional cooperation measures taken during the pandemic.

5.1 | Regional cooperation for addressing the health crisis

Under the supervision of SAARC, leaders from the South Asian countries met through a virtual summit in March 2020 and formed a COVID-19 emergency fund. The chief aim of the meeting was to reiterate the importance of sub-regional cooperation and solidarity to address and mitigate the health and economic crisis posed by the pandemic. With the initial contribution of US\$10 million by India, the rest of the countries in the region have donated to the fund a total of US\$21.8 million. Following

the leaders' meeting, a subsequent meeting was held among the SAARC health ministers on 23 April 2020, convened by Pakistan. An electronic disease surveillance platform was created to track the outbreak of the virus in the South Asian region to facilitate online aid for emergency responses. Another initiative taken by India was creating an electronic platform called SAARC COVID-19 Information Exchange (COVINEX) Platform. The member countries of SAARC can use this platform to exchange pandemic related information and extend online training courses and e-learning modules for capacity building among the health professionals in the subregion.

5.2 | Regional cooperation for addressing financial needs

Amid the pandemic, the entire South Asian region has experienced severe fiscal stress and growing liquidity constraints to varying degrees. Therefore, strengthening the financial position at the regional level is of utmost importance. Since 1998, SAARC has constituted a forum with the central bank governors and finance secretaries called SAARCFINACE. Under the supervision of SAARCFINANCE, the Reserve Bank of India (RBI) issued a Regional Currency SWAP arrangement of US\$2 billion to address the temporary liquidity constraints affecting the SAARC members. Following India, the Maldives and Sri Lanka have drawn upon currency swap arrangement of US\$140 million and US\$400 million to scale up their foreign exchange reserves amid the pandemic (The Hindu, 2020).¹ The RBI is in the process of consideration to boost the corpus of the facility to US\$5 billion, taking into account the increasing requirements of the region during the pandemic. On the other hand, considering the development financing, SAARC has set up a SAARC Development Fund (SDF) with an initial capital base of US\$400 million (Noronha 2020). To mitigate the socio-economic consequences of the pandemic, the development fund has allotted US\$5 million for COVID-19-related projects in the region. These financial cooperation measures can assist the South Asian countries in addressing the temporary liquidity crunch, development finance, and policy coordination on stimulus issue.

5.3 | Regional cooperation for intra-regional trade

The outbreak of the pandemic has been particularly worrisome for global trade, which is predicted to shrink by 30 percent. The South Asian exporters have faced remarkable challenges due to the disruptions of global supply chains, cancellations of orders, and subdued demand in their export markets. International freight transport has been the hardest hit sector during the pandemic and the export sector will necessarily have to lead the way in post-COVID-19 recovery. In this regard, regional cooperation in the form of provisions for the South Asian Free Trade Area (SAFTA) and South Asian Agreement of Trade in Services (SATIS) should be strengthened to bring down the trade barriers and promote trade in services and mutual investments. UNESCAP has taken a wide array of measures to assist the South Asian region in terms of design and operationalisation of some of the sub-regional transport corridors of key importance. The major transport corridors like the Asian Highway (AH), Trans-Asian Railway (TAR) network, and other modes of transport networks are being developed under sub-regional organisations including BIMSTEC, ECO (Economic Cooperation Organization), and SAARC during the COVID-19 pandemic.

6 | CONCLUSION AND POLICY IMPLICATIONS

This paper analyses how an improvement in the socio-economic and environmental conditions in South Asia can be achieved through the strategy of regional integration, cooperation, and post pandemic engagement. The paper further explains the potential role of the RCI process and its crucial intermediary factors like trade, investment, and RPGs that extend the opportunity to South Asian

leaders to revive the economy by considering the environmental challenges of the region in the post-COVID-19 era. We argue that a coordinated regional strategy is the most feasible option available for developing countries to recover from the global pandemic, as it is difficult for a single country to fight the crisis alone. On the same lines, environmental solutions need innovative and transformative actions that are beyond the capacity of a single nation to find and implement. Moreover, environmental issues are characterised by short-term invisibility, particularly in geographically distant regions. However, the environment needs urgent attention as we already are on the brink of collapse, and further damages will be irreversible. Delayed action will be more costly and difficult to effectuate. The pandemic has already shown us the adverse consequences of unconscious and delayed actions when fighting the virus.

We highlight several policy suggestions regarding the global pandemic and its consequences on environmental sustainability. First, the implementation of post-COVID-19 RCI initiatives should follow the comprehensive sustainable development goals framework for the provision of RPGs and environmentally sustainable recovery. South Asian countries have immense potential, which is currently untapped, to deepen the RCI process through clean energy development, disaster risk reduction, and regionally integrated waste management systems. RCI could be used to strengthen institutional and policy arrangements across the region for the commercial adoption of clean energy. Solar and wind technologies could be adopted on a large scale through collaborative research and development, which reduces the technological dependency on the developed world. Investors can reap the benefits of economies of scale through large-scale regional investment in renewable energy projects.

Second, governments across the South Asian region have responded promptly and worked actively to combat the unprecedented situation caused by the COVID-19 outbreak. Though most of the initiatives taken to curb the pandemic are short-term in nature, there must be some long-term policy goals towards restoring the ecosystem, ensuring environmental sustainability, and building resilience throughout the region. Investment in financial resources in such a manner that can ensure a sustained socio-economic recovery aligned with the sustainable development goals is crucial. There should be a readjustment in government spending from non-developmental areas to mitigate inequalities and climate agenda to make the region more resilient, inclusive, and sustainable. Another policy concern should be promoting trade facilitation, digitalisation, and harmonisation along with social and environmental concerns into global supply chains. There is an immediate need to improve the efficiency of sustainability of trade and transport procedure through regionally coordinated investments.

Third, given the broad scope of regional cooperation in the region, several policy actions should be taken for South Asia to recover from the pandemic's adverse socio-economic and environmental effects. A wide range of policy instruments is also to be considered to ensure and achieve regional integration objectives. While it is desirable that the region needs to step forward to set up an emergency fund, the other requirements for the cooperation go beyond short-term measures. Stagnation in several policy initiatives on transport, energy connectivity, and regional trade under SAARC could be considered a constraint in this regard. Therefore, the region is in dire need to strengthen SAARC processes while also exploring alternative policy actions available under other regional organisations, including BBIN and BIMSTEC.

Fourth, the region should collectively specify regulations and impart training related to waste segregation, collection, treatment, disposal, and transport. Regional certification for the recycling of e-waste can be an approach to help the region identify responsible recyclers and to develop traceability throughout the recycling chain. The joint adoption of sustainable waste segregation practices could help in imbibing the principles of reducing, reusing, and recycling (3Rs) in the regional waste management system.

Finally, international agencies such as the International Monetary Fund (IMF), the United Nations (UN), and the Asian Development Bank (ADB) could be approached for financing some of the costs associated with RPGs that directly address the problems related to the COVID-19 crisis. A regional public good in the form of controlling the virus can be considered a very powerful instrument for strengthening cooperation at the regional level. The involvement of these international organisations

would also ensure open regionalism in the successful provision of RPGs in line with the related global protocols and frameworks.

This paper has some limitations. This paper strictly deals with the issue of regional integration and environmental sustainability during the COVID-19 pandemic. An empirical investigation of regional integration on achieving environmental sustainability in the region could be an interesting research discussion. However, due to the lack of data on regional integration and environmental sustainability during the COVID-19 period, we have adopted the analytical approach of the study.

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NOTES

¹ The Hindu (2020); Business Standard (2020b).

DATA AVAILABILITY STATEMENTS

The article does not contain any datasets.

PEER REVIEW

The peer review history for this article is available at <https://publons.com/publon/10.1111/issj.12291>

AUTHOR CONTRIBUTIONS

Panika Jain: . Bijoy Rakshit: . Bisma Raina: . Samaresh Bardhan:

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How to cite this article: Jain, P., Rakshit, B., Raina, B., & Bardhan, S. (2021). Regional integration and environmental sustainability during the COVID-19 pandemic: Evidence from South Asia. *International Social Science Journal*, 1–19. <https://doi.org/10.1111/issj.12291>