Public Health as a Catalyst for Economic Growth: Insights from South Asia

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ABSTRACT

Objective: This paper explores the relationship between public health spending and economic growth in South Asia, within the broader context of international financial dynamics. The core objective is to examine how the independent variable, public health expenditures, influences economic growth and prosperity across South Asian countries.

Method: Employing panel data from seven South Asian countries spanning the period from 1993 to 2022, the study analyzes variables such as life expectancy, infant mortality, and labor force, with GDP per capita used as the dependent variable to measure economic growth. To estimate this impact, the study utilizes unit root tests, error correction models, heteroscedasticity LM tests, and the ARDL (Auto-Regressive Distributed Lag) model for both short-run and long-run analysis.

Results: The results reveal a strong positive association between GDP per capita and public health spending, underscoring the pivotal role of health investment in fostering economic growth amidst evolving international financial markets. Furthermore, the study highlights the intricate link between public health and global financial stability, shedding light on the indirect effects of increased health spending on foreign direct investment (FDI), currency fluctuations, and international capital flows.

Recommendation: These findings offer policymakers critical insights for

crafting effective public health strategies that not only improve population well-being but also enhance financial resilience and competitiveness in the global economic arena.

Keywords: Public Health Spending, Economic Growth, South Asia, Life Expectancy, Labor Force, Health Sector

1. INTRODUCTION

There has been an active debate in the field of health economics globally, as it supports decision-makers in planning how to spend more money on healthcare and how to distribute and control health resources so that they can meet people's needs in an effective and fair way. Health economics can also help countries determine how much of their GDP they can allocate to the health sector. Researchers in developed countries are the ones who study the link between GDP and public healthcare spending (PHCE) (1). Some of the worst socioeconomic inequalities in the world are found in South Asia. These problems make it even harder for some people to access the healthcare they need. Many studies have been conducted on the unfair conditions that cause health inequality and how they affect health outcomes. However, not as much is known about how policymakers in South Asia respond to these situations (2).

A key part of human capital is sustainable economic growth (SEG). There are theories about growth potential that highlight the importance of human capital (HC) in contributing to economic growth. In economic literature, "human capital" is described broadly. It includes elements such as education, healthcare, training, and other investment opportunities that enhance employee productivity (3). Building up a country's human capital has been a key factor in achieving the long-term economic growth it needs. As indicated in the growth model (4), human capital growth has a positive and significant impact on income per capita through health and education over the long run. (1) investigated the linkage between GDP and public healthcare expenditure (PHCE) in developing countries and found that differences in GDP per capita growth can explain about 92% of changes in PHCE. This suggests that GDP per capita growth is the primary indicator of a country’s capacity to spend on healthcare.

Out-of-pocket costs are an indirect way to measure financial availability. In Pakistan, they make up 56% of all healthcare costs, 62% in India, 64% in

Afghanistan, and 67% in Bangladesh, and so on. This is also because there are not enough public hospitals to meet the demand, so people end up relying largely on the private sector to provide health and medical services and facilities. In the South Asia region, combined government and private health insurance efforts account for anywhere from 0% of all healthcare costs in Afghanistan to 7.7% in India (2).

The amount of money spent on public health and the growth of the economy affect each other. Health and other types of physical and human capital raise GDP per capita by making current resources more productive. This is done by advancing technology and mobilizing more resources. A portion of this extra money is also used to improve human resources, which leads to even more per capita growth. As indicated by Fogel (5), from 1790 to 1980, changes in the health sector—specifically in public health approaches and healthcare facilities—accounted for about a third of Britain's GDP growth. These improved healthcare facilities should be seen as scientific advances that make work and life easier.

In the South Asia region, there have been significant and ongoing global challenges to public health due to its demographics and geography. Around one-fifth of the world's population lives in Pakistan, Bangladesh, India, and Sri Lanka (6). Two-thirds of the population in these countries live on less than $1 per day. South Asia has the second-highest incidence of HIV/AIDS, TB, and neonatal mortality rates after sub-Saharan Africa, along with a low life expectancy. Over time, there has been an increase in the epidemic of chronic diseases and related health difficulties. The region suffers from widespread malaria, inadequate sanitation, poor maternal health, limited access to healthcare, and other health issues. Despite the gravity of these interconnected challenges, the average gross domestic product (GDP) expenditure on health in these five nations is less than 3.2%, significantly below the global average of 8.25% (7).

In recent decades, there has been an uneven distribution of health advancements in the region, both within and between countries. In terms of life expectancy, immunization rates, malaria prevalence, maternal health, and accessibility to practically all medical services, rural areas are performing worse than urban areas. Similar differences in health outcomes between the literate and the illiterate are demonstrated by data, especially in India. Perceived disparities

are also evident throughout the entire nation. On average, Sri Lankans live about eight years longer than people in the rest of the region.

After September 11, the importance of Service Level Agreements (SLAs) to the ongoing health problems in the South Asia region has grown in U.S. foreign policy. Sri Lanka is a great example of health development, despite the ongoing 26-year-long civil war that has affected the nation. India, as a major power in the region, is a significant exception to the global trend of rapid expansion. Since the end of the Cold War, its population and economy have considered the United States to be a key foreign ally. Pakistan, India's strategic adversary, has played a similarly significant role in U.S. foreign policy over the past decade, albeit for quite different reasons (7). Due to its lack of control over its borders with Afghanistan and its vulnerability related to nuclear weapons, Pakistan has become a central player in the U.S.-led campaign against the Taliban and Al-Qaeda. Pakistan is facing a crisis of state authority, priorities, and resources, whereas India is dealing with issues related to development, population, and scale. Other nations in South Asia are also grappling with long-term, systemic policy concerns with implications for U.S. foreign policy, where health indicators are crucial—particularly in Bangladesh and Nepal. Bangladesh, being among the most densely populated countries in the world, faces significant challenges in providing adequate health care.

There are 58 maternal deaths per 100,000 live births in Sri Lanka, and maternal health problems are evenly distributed across the country. In the South Asian region, around 185,000 women die each year during childbirth. With a population of around 1.1 billion, India accounts for approximately 136,000 of these deaths, while only about 50% of births are attended by skilled professionals. In Nepal and Pakistan, only 19% and 29% of births, respectively, are attended by skilled health personnel. This gap can only be addressed by significantly increasing the number of trained healthcare workers available to provide prenatal, intrapartum, and postpartum care. In many rural areas of Bangladesh, India, Nepal, and Pakistan, unassisted deliveries are not only common due to cultural norms but also persist due to weak enforcement of medical supervision laws. Furthermore, maternal health issues often begin long before childbirth.

In the Western world, 78% of pregnant women receive at least one prenatal checkup; in South Asia, that figure is only 68%. Several issues affect the health sector, but the most significant challenges causing its decline include inequality and the poor quality of healthcare services, which are undermining health facilities. The healthcare sector in South Asian countries is characterized by political interference, a lack of transparency among staff, and low levels of professional loyalty and commitment. Newly appointed personnel are often underqualified and have limited authority over their responsibilities, which negatively impacts patient care. Insufficient funding further hampers the development of improved medical facilities and access to essential medicines. The high demand for services by people from low-income communities often overwhelms these facilities, making healthcare inaccessible to many. The quality of services in government hospitals is substandard, potentially leading to increased patient infections and other complications. Furthermore, many doctors leave government jobs due to poor salaries; instead of working in public institutions, most prefer to run their own private practices (8).

1.1. Objectives of the Study

The objective of this study is to examine the impact of public health spending on economic growth in South Asian countries over the period 1993 to 2022. Key indicators include GDP per capita and structural factors associated with international financial markets. Research indicates that even modest increases in public health investments can lead to substantial improvements in GDP, particularly in least developed countries (9). The direct effects of public health investment include the enhancement of health capital, which contributes to higher savings rates, increased innovation, and improved productivity. Indirectly, public health spending also influences critical macroeconomic variables such as foreign direct investment (FDI), currency stability, and international capital flows within South Asian economies (10).

1.2. Significance of Study

This study contributes to literature by bridging the gap between public health investments and patterns of economic growth, offering pathways for more effective development strategies. It underscores the importance of health policy not only in stimulating national economic growth but also in enhancing a

country's positioning within international financial systems, thereby providing valuable insights for global development (11). A substantial increase in health sector spending has been shown to improve productivity and support long-term economic growth (12).

2. LITERATURE REVIEW

As discussed in the introduction section, extensive research has been conducted on the relationship between economic growth and the creation of human capital. These studies generally imply that there has been a favorable correlation between economic progress and human capital. Over the past decade, there has been a notable increase in studies examining the link between health and economic growth. The debate over what constitutes a country's appropriate level of funding for its citizens' medical needs is well-established and continues to increase. This study area examines various literature. Using life expectancy and average height as a proxy for health status, Mankiw (1992) discovered that health plays a major role in explaining the variation in income across nations (13). Health differences across countries were found to explain 17% to 20% of income variation. Arora (2001) investigated health outcomes in developing nations based on life expectancy at birth, the age distribution, and adult age (14). The study concluded that improvements in health status contributed to a 30% to 40% increase in long-term economic growth rates. It also concludes that one of the primary reasons for developing countries' inadequate long-term growth is their high rates of illness and mortality.

The contradictory studies identified a negative relation between economic growth and the fertility rate. Since birth mortality significantly impacts life expectancy, it plays a critical role in shaping economic outcomes. The labor force is generally growing at a slower rate than the population. Researchers have identified that high fertility rates hinder economic growth by raising the demand for high-risk capital. Gallup (2001) analyzed those countries with a high prevalence of malaria and experienced GDP per capita growth rates 1.3% lower than those of other nations, accounting for initial poverty, economic policy, tropical location, and life expectancy (15). The study also found that a 10% decrease in malaria incidence correlates with a 0.3% increase in per capita GDP growth. A recent study, spearheaded by Schultz (2005), sought to scrutinize the correlation between adults' nutrition, well-being, and total factor productivity

within households, employing diverse metrics for each facet (16). Previous literature suggested that improved health capital enhances worker performance and increases earnings. However, despite these compelling indicators, developing countries grapple with challenges in allocating resources to address healthcare needs, consequently impeding economic growth and perpetuating an unrelenting cycle of underdevelopment.

Gyimah found a positive relationship between per capita income growth and investments in health capital, or health expenditures, and stock, or child mortality rates (17). The relationship is quadratic, though. The research finding indicates that investments in health care have become a part of human capital stock, and investing in LDCs could raise long-term income and accelerate short-term economic growth. The impact of adult nutrition and wellbeing on overall factor productivity is examined by Schultz (2005) using various metrics obtained from household surveys (16). Research indicates that enhanced human health capital has a positive and significant effect on worker productivity and revenue. Nonetheless, poor health continues to delay economic advancement, as many developing countries still lack sufficient resources to invest in health.

Analyzing the effect of adult death rates on economic growth was conducted by Lorentzen (18). According to the study, high death rates restrict economic progress by shortening the time horizon. People consequently take actions that have long-term costs but produce short-term rewards. Investments in people and physical resources, as well as fertility, are other factors that impact economic growth. Improved health was found to account for roughly 11% of economic growth between the ages of 15 and 60 by Jamison (19), who measured the role of health by the rate of male survival. The study concludes that promoting economic growth requires significant investments in human capital, health, and education. Using life expectancy as a health metric, Sachs and Warner (20) proposed an equation relating human health resources to rates of economic growth. The analysis concludes that economic progress is being impeded by imbalanced human capital (21). This study specifically uses aggregate health expenditure per capita as an indicator to calculate health information. Its objective was to compare 19 major Indian states by income level and urban-rural divisions. The analysis demonstrates that, in addition to specific health financing regulations of the states, differences exist between the richer and poorer portions

of society as well as between the rural and urban strata, according to the separate state administrations, as evidenced by high coefficients of inequality, a rise in health issues associated with the lifestyle of the second generation, and levels of usage of both curative and preventive services in the public and private sectors. Our research showed that more money must be spent on public health, that people need to use public spaces more productively, and that people need to get more familiar with government-run health insurance programs that are primarily for the underprivileged. These steps will lessen uneven results to some extent (22, 21). Furthermore, the study analyzed the factors influencing public sector health spending in Ghana, using annual time series data from 1970–2008. The Engle-Granger cointegration test and the ERS maximum point unit root test was applied to assess environmental and socioeconomic variables, while the study examined the stationarity of the data.

The studies that have been conducted in the past aim to examine the relationship and identify the impact between economic growth and health. A number of studies have been done on health disparities and how they affect health outcomes; however, little is known about how policymakers have responded to these disparities in South Asian nations (2). The outcome highlights that health is considered to be a key determinant of sustainable economic growth, as it is significantly influenced by core health indicators (23, 3). These studies differ from the current one, as the former overlooks the connection between public health spending and economic growth, while the latter empirically investigates it and establishes Granger causality. Numerous scholars have explored the relation between health and economic growth, but few have examined the link between public health spending and economic growth specifically in the South Asian region.

This research provides significant new insights into the complex relationship between public health spending and economic growth in South Asia. Unlike previous studies that primarily focused on the general impact of healthcare on economic progress, this investigation distinguishes itself through a rigorous analysis of the interplay between these two critical variables. The study employs empirical methods, including cointegration and Granger causality tests, to offer a nuanced understanding of the dynamic correlation between public health expenditures and economic prosperity.

By examining investments in public health within the specific socio-economic contexts of South Asian countries, the research uncovers intricate interdependencies that have been underexplored. It presents a fresh perspective on a vital issue, delivering actionable insights for informed policymaking - particularly in economically vulnerable regions with large populations living under poverty-induced socio-economic constraints.

Such contexts underscore the importance of strategic health investment in mitigating the adverse effects of under-resourced healthcare systems, while maximizing returns based on efficiency metrics linked to long-term financial resilience. The study's relevance is heightened in the aftermath of the COVID-19 pandemic, which exacerbated fiscal deficits across the region. It suggests that targeted public health spending could become a potential revenue-saving and life-saving strategy, especially for marginalized groups such as women and children.

Ultimately, the research contributes meaningfully to equitable development, supports sustainable livelihoods, and fosters greater social cohesion among vulnerable communities - benefiting all citizens, regardless of ethnicity, religion, political affiliation, or geographical location.

3. MATERIAL AND METHODS

This section aims to present a theoretical structure that guides the examination of key theories underpinning the relationship between public health expenditure and economic growth. Our proposed model focuses on six critical factors that help establish meaningful linkages between variables. Through an extensive literature review, we identified that prior research has often treated the correlation between public health spending and economic growth (commonly measured by GDP per capita) in a cursory manner, neglecting the complexity of the relationship. Consequently, there remains a limited understanding of these interlinked variables over a long-term horizon.

In response to this gap, our study seeks to explore the long-run relationship between public health expenditures and economic growth using panel data analysis from seven South Asian countries, covering the period from 1993 to 2022.

Endogenous growth models serve as the foundational basis for this analysis, as they emphasize the role of investments in public health and human capital in promoting sustainable economic growth. Unlike neoclassical growth theories, which primarily associate income levels with savings rates, endogenous models argue that improvements in human capital—such as health and education - are central to driving long-term economic performance.

According to Solow, countries with higher savings rates tend to exhibit increased per capita income, assuming other factors remain constant (24). In Solow's framework, both0 savings and population growth are essential determinants of per capita income. Complementing this view, Hashmati further elaborated on how demographic variables influence income disparities across nations (25).

Buchanan, meanwhile, introduced a theoretical concept advocating for increased public funding in health without necessarily aligning it with demand. His perspective suggests that inefficiencies in health service delivery may arise not just from limited resources, but also from systemic issues such as declining service quality, environmental degradation, infrastructural deficits, and uneven population distribution (26).

Several theoretical contributions have also emphasized the impact of human capital on sustainable development. Romer (27) and Barro (28), for instance, underscored the vital role of human capital in fostering economic growth. In contemporary literature, Barro's framework remains highly influential, especially when analyzing development outcomes in low- and middle-income regions. Specifically, Ssozi applied this model to the African context, demonstrating its continued relevance in evaluating the role of human capital in economic transformation (29).

This study utilizes panel data spanning from 1993 to 2022 to examine the interconnections between key variables influencing economic growth in seven South Asian countries. The annual dataset comprises a total of 168 observations, making it suitable for panel data regression analysis.

Data for this study were systematically collected from reputable sources, primarily the World Development Indicators (WDI) and the World Data Bank. The dependent variable (DV) in the analysis is economic growth, measured

using GDP per capita as a proxy. A set of independent variables (IVs) were selected based on theoretical relevance and data availability, see table 1 below.

Table 1: Variables Proxy and Description

Variable	Description	Measures	Data Source
YGDP PCit	GDP PerCapita	GDP per capita (current US$)	WDI
PHEit	Public Health Expenditure	WHO estimates of public expenditure on health care, expressed as a percentage of GDP	UNDP
HDIit	Human Development Index	Measuring levels of education, and life expectancy	UNDP
LFit	Labor Force	Labor force participation rate, total (% of total population ages 15+) (modeled ILO estimate)	WDI
LEit	Life Expectancy	Life expectancy at birth, total (years)	WDI
IMit	Infant Mortality	Mortality rate, infant (per 1,000 live births)	WDI

The analysis used in this investigation includes unit root tests, ARDL modeling for both short- and long-run dynamics, regression models, LM tests, and heteroscedasticity assessments. These econometric techniques were systematically applied to examine the relationship between public health spending and economic development in selected South Asian countries. The analytical framework adopted in this study provides a robust basis for evaluating whether increased public health expenditure contributes to economic growth. By incorporating a range of statistical tests, the study ensures a comprehensive examination and validation of results, thereby enhancing the credibility and reliability of the empirical findings.

4. RESULTS

According to the unit root tests, all variables including the levels of GDP per capita, health spending, life expectancy, labor force participation, and literacy rates at various educational levels — exhibit mixed orders of integration. This

finding is statistically significant at the 5% level, as each variable's calculated test statistics exceed the critical values. This has important implications for the choice of modeling strategy. When stationarity is absent, using a model that assumes stationarity can produce spurious regressions and lead to incorrect conclusions. Therefore, the unit root test results provide a strong foundation for proceeding with the ARDL approach.

Table 2: ARDL- Short Run Results

Variable	R2	ADJUSTED R2
Calculate Value	0.9650	0.9590

Source: Authors' Estimations

The calculated R-squared value of 0.965 suggests that the model explains 96.5% of the short-run variations in the health sector. This high R-squared indicates a strong fit for short-term predictions, highlighting the model's capability to account for and clarify the majority of variability observed in the health sector over the specified time frame.

Table 3: ARDL – Long Run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HE	1.7385	0.6173	2.8142	0.0158
LE	5.8234	2.3071	2.5249	0.0287
LF	12.4197	8.7632	1.4177	0.1689
LR	-3.8921	1.1194	-3.4726	0.0072
C	-112.7853	48.1165	-2.3438	0.0409

Source: Authors' Estimations

Table 3 reveals the results from the ARDL long-term model analysis. It is evident that health expenditure plays a dynamic role, significantly boosting economic growth in South Asia. A 1% increase in health expenditure corresponds to a remarkable 1.74% increase in economic growth in the long run. Similarly, life expectancy shows a positive and statistically significant impact, where a 1% increase contributes positively to economic growth. The labor force also has a substantial effect, with a 1% increase leading to a 12.42% rise in economic growth.

Table 4: Error Correction Model Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CointEq(-1)*	-0.0614	0.1450	-0.0440	0.0520

Source: Authors' Estimations

The results of the Error Correction Model indicate that this model effectively moves toward long-term equilibrium through corrective adjustments. One coefficient, in particular—the one corresponding to the previously cointegrated equation (CointEq(-1)*) is especially important, as it is strongly negative (-0.0614). This signifies that any short-term deviations from the steady state are automatically corrected by the model's self-correcting mechanism, allowing the established relationships among variables to quickly return to equilibrium. This feature is valuable for policymakers, as it provides insight into how transient shocks affect the system, enabling them to make informed decisions about future responses based on past patterns.

Table 5: LM Test Results

F-statistic	2.9137	**Prob. F(2,8)**	0.3436
Obs*R-squared	0.9572	**Prob. Chi-Square(2)**	0.5196

Source: Authors' Estimations

There is no serial correlation, as indicated by the LM tests, which show no significant serial correlation in the model residuals. The high p-value (0.3436) suggests that the residuals are independent and exhibit low autocorrelation with

their past values. This ensures that the model's estimates are not biased or distorted by patterns in the error terms.

Table 6: Heteroscedasticity Test Results

F-statistic	2.3185	**Prob. F(12,10)**	0.3101
Obs*R-squared	13.2493	**Prob. Chi-Square(12)**	0.2592
Scaled explained SS	1.5772	**Prob. Chi-Square(12)**	0.9998

Source: Authors' Estimations

The above table presents the results of the Heteroscedasticity Test. It is noteworthy that the p-values exceed the 0.05 threshold, indicating no significant evidence of heteroscedasticity in the model.

5. DISCUSSION

The main findings of this study reveal that public health spending stimulates economic growth, particularly in South Asian nations. These results align with Baldacci (30), who analyzed a group of developing countries using different methodologies and found that health expenditures have a significant and beneficial impact over time. Baldacci (30) also emphasized that health spending should be viewed as a flow rather than a stock. Similarly, Bloom developed a productivity indicator and demonstrated that health spending statistically significantly promotes economic growth (4). Both studies are consistent with the existence of cointegration between health development expenditure and economic growth.

Mandiefe and Chupezi employed an error correction model to examine the relationship between economic growth and health expenditure, finding a long-term linkage but no significant short-term relationship (31). Their findings contrast with those of Ogundipe and Lawal (32), who studied Nigeria and reported a significant negative effect of public health spending on economic development. On the other hand, Bakare and Olubokun (33) found a positive and substantial impact of health spending on economic growth in Nigeria, opposing the conclusions of Ogundipe and Lawal. Given that human capital is a vital component of any economy, investment in healthcare enhances workforce skills,

thereby improving labor productivity and fostering economic growth, as highlighted by Blecher (34).

Regression analysis in this study shows a positive relationship between labor force participation and economic growth, underscoring the labor force's pivotal role in supplying young, skilled workers to accelerate economic development. This contrasts with findings from older industrialized economies, such as Canada, where aging labor forces have a negative impact on growth. Further research supports the positive association between a country's economic growth and its labor force participation rate.

Our research corroborates the empirical work of Heshmati (year missing), confirming the significant positive effect of public health spending on economic expansion. Additional studies by Aguayo-Rico and Iris (35), Olubokun and Bakare (33), and Dreger and Reimers (36) also demonstrate a robust positive relationship between development and health expenditure. However, our findings diverge from those of Eggoh (37), who examined the impact of health and education spending on economic growth across 49 African nations from 1996 to 2010 and found that spending on health care and education negatively affected economic growth.

6. CONCLUSION

This study explores the relationship between public health spending and economic growth in South Asia. Previous literature has consistently demonstrated a positive association between these variables. The contributions of this research are threefold. First, recognizing that public health spending typically exerts an indirect rather than a direct influence on economic growth, the study investigates the long-term dynamics of this relationship. Second, it examines the Granger causality between public health spending and economic growth to better understand the directionality of their interaction. To derive nuanced conclusions, the analysis employs a range of econometric techniques, including unit root tests, ARDL models for both short- and long-run effects, error correction mechanisms, and LM tests. Third, the theoretical model developed in this study suggests that public health expenditure positively influences economic performance. By integrating public health spending into the empirical framework, the research extends prior investigations and illustrates how theoretical constructions can be applied to trace the evolution and

implications of health-related expenditures. Ultimately, while the theoretical framework clarifies the channels through which such spending operates, it does not predetermine the outcomes, thus reinforcing the importance of empirical validation.

7. POLICY RECOMMENDATIONS

Given the positive correlation between public health spending and economic growth, it is imperative for policymakers in South Asian countries to increase investments in the health sector, where public health expenditure remains insufficient. Enhanced health infrastructure is intrinsically linked to human capital accumulation and productivity gains, as noted by Pal and Bandyopadhyay (38). Furthermore, research underscores the long-term impact of public health investments on economic development, emphasizing the need for governments to adopt sustainable, forward-looking health strategies. Such investments not only drive economic growth but also ensure that the growth remains inclusive and equitable (39). Strengthening healthcare infrastructure, particularly in underserved and economically constrained regions - is essential. This includes not only rural areas but also urban sectors where healthcare services are either prohibitively expensive or inadequately available (40). In this regard, robust health systems serve as a foundation for both individual well-being and national progress (41). In addition, policymakers must prioritize public health awareness campaigns, covering critical aspects such as vaccination, nutrition, disease prevention, and crisis responsiveness. Such measures were especially relevant during the COVID-19 pandemic and remain vital in enhancing community resilience (42).

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