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## Human Development Disparities in South Asia: A Panel Data Investigation of Afghanistan and SAARC Countries

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# Human Development Disparities in South Asia: A Panel Data Investigation of Afghanistan and SAARC Countries

## Abstract

This research examines enduring disparities in human development across the South Asian Association for Regional Cooperation (SAARC) nations, specifically highlighting Afghanistan's structural obstacles. This study utilizes a balanced panel dataset encompassing seven SAARC nations from 2000 to 2023, applying panel econometric techniques including a Fixed Effects model (validated through a robust Hausman test) and Pooled OLS estimators to analyze the influence of critical socioeconomic factors like life expectancy, average years of schooling, expected years of schooling, and gross national income per capita on the Human Development Index (HDI). Clustered standard errors at the country level are used to ensure the robustness of the results. The empirical findings indicate that all four factors exert statistically significant positive influences on HDI, affirming the essential role of health, education, and wealth in determining human development outcomes. The results indicate that Afghanistan consistently lags behind its regional counterparts, even when accounting for fundamental socioeconomic variables, implying that further structural impediments may be hindering its developmental advancement. These findings provide compelling evidence for policymakers to prioritize investments in health, education, and equitable income growth to bridge enduring development disparities and expedite progress towards the Sustainable Development Goals.

**Keywords:** Human Development Index, SAARC, Panel Data, Socioeconomic Determinants, Afghanistan

## Human Development Disparities in South Asia: A Panel Data Investigation of Afghanistan and SAARC Countries

### Introduction

Human development in south Asia and specially in Afghanistan that remains marked by profound disparities across key dimensions such as income, education, and health each of which is critical for sustainable socio-economic progress. Within Afghanistan wealth-related inequalities are especially evident in healthcare access where women from wealthier households are significantly more likely to seek healthcare for their under-five children compared to those from poorer households. This disparity is driven by factors including household income, rural

residency as well as differential access to education and digital technology which underscoring the urgent need for inclusive income-generation opportunities and community-based health awareness programmes to bridge these gaps (Murendo, 2025).

The broader South Asian region faces similar limitations in human capital development, regardless of its sizeable contribution to global economic growth, the quality of education as well as workforce skills in South Asia continues to lag behind that of more advanced economies such as China and South Korea that signaling a pressing need for the sustained improvements in educational quality and vocational training (Lee, 2017). Moreover, the region's progress towards the Sustainable Development Goal remains uneven with persistent variations in gender equality, access to quality education as well as poverty reduction across SAARC member states. reach to these targets by 2030 will require significant increases in public spending on health and education which coupled with institutional reforms to strengthen state capacity and policy implementation (Asadullah et al., 2019).

Children's health in Afghanistan is in a very bad condition along with the alarming rate of short stature among children a condition is strongly linked to the mother's level of education and the economic status of the household. This highlights the critical role of targeted nutrition services and educational interventions in combating child malnutrition as well as its long-term developmental consequences (Ashor et al., 2025). Recent restrictions on girls' education in Afghanistan pose an additional threat to the country's human development prospects by which perpetuating cycles of poverty and widening gender inequality as education for girls is widely recognized as a cornerstone of societal advancement and economic growth (Ahmad & Shastri, 2024).

Throughout South Asia, disparities in maternal and child health persist so evidence suggests that targeted strategies such as financial support as well as community-based education can help reduce these inequalities (Hasan et al., 2024). More broadly, improvements in health and education have a demonstrable impact on reducing income inequality and poverty which given the negative association between human capital deficits and economic disparities in SAARC countries (Wani, n.d.). Crucially, advancing female education has linked to improved reproductive health outcomes and lower fertility rates which in turn contribute to enhanced maternal and child health across the region (Sheikh et al., 2018).

Addressing these multidimensional inequalities requires comprehensive and context-appropriate policy interventions which focused on expanding access to education, strengthening health care systems as well as promoting inclusive economic empowerment.

By investigating these dynamics through robust panel data analysis as this study aims to examine the extent and nature of human development disparities in Afghanistan along with to other SAARC countries by a specific focus on income, education and health indicators which shed light on the socio-economic and policy determinants of human development inequalities in Afghanistan and other SAARC member countries as well as provide evidence-based insights to inform future strategies for inclusive and sustainable development across South Asia.

## 2. Literature review



Human development across Afghanistan and other (SAARC) countries is marked by sustained disparities in income, education and health three fundamental pillars that shape the quality of life and socio-economic progress. In Afghanistan, wealth-related inequalities are particularly evident in healthcare-seeking behaviors. women in wealthier households caring for children under five have significantly more access to health services than women in poorer households and also the factors such as household wealth, residence in rural areas, as well as access to education and technology exacerbate this gap (Murendo, 2025).

Education which widely recognized as a fundamental human right and a determinant of well-being remains severely constrained in Afghanistan. Historical and ongoing systemic discrimination against women and girls has drastically limited educational opportunities that undermining not only physical as well as psychological health but broader social development as well (Iacopino & Rasekh, 1998). Conflict, political instability and multidimensional poverty further compound this deprivation especially in rural areas where access to basic services such as schooling as well as healthcare is most restricted (Trani et al., 2013).

Within the broader SAARC context, human development is positively correlated with economic growth, gender empowerment, and improvements in educational attainment. however, deeply entrenched income inequality continues to specify progress which highlighting the dual challenge of fostering growth as well as ensuring its equitable distribution (Faisal& Khan, 2023)

The Human Development Index indicators for education, life expectancy as well as income that has historically functioned as a requirement for comparative development. However, it often obscures substantial intra-country disparities that leading scholars to advocate for inequality-adjusted measures to provide a more accurate reflection of developmental gaps (Urzúa & Vilbert, 2023; Bandoorkwala & Jagani, n.d.).

Empirical evidence from SAARC countries consistently suggests that targeted improvements in health and education have the potential to reduce income inequality and alleviate poverty as well as reaffirming the critical importance of strengthening these sectors (Wani, n.d.). Accurately measuring inequality within human development framework is so much challenging due to data limitations and the necessity for disaggregated and context-specific analyses. (Kovacevic, 2010).

The existing literature highlights the necessity for comprehensive policy responses that enhance equitable access to quality education and healthcare while fostering inclusive economic growth as well. Addressing ongoing disparities is crucial for Afghanistan where socio-economic and governance barriers persistently prevent progress. This study builds on these insights by applying robust panel data methods to explore the determinants of human development disparities across Afghanistan and its regional peers that contributing to the evidence base needed for informed as well as context-sensitive policy interventions.

### 3. Research Gap

Extensive research exists on various aspect of human development in South Asia; however, much of this work relies on case studies or descriptive analyses that lack systematic measurement and comparison of differences between countries through rigorous empirical

methods. Limited research exists that employs advanced panel data methods to analyze the interplay between health, education, and income relation to the expansion or reduction of human development gaps within the SAARC region. The persistent disparity between Afghanistan and its regional allies has not been thoroughly examined through a comprehensive and comparative panel data methodology. This study aims to address this gap through a panel data analysis, seeking robust empirical evidence regarding the factors as well as variations in human development disparities between Afghanistan and other SAARC countries over time.

#### 4. Methodology

This study uses a quantitative research design and a balanced panel data approach to examine the factors influencing human development in selected South Asian Association for Regional Cooperation (SAARC) countries from 2000 to 2023. The analysis investigates both between-country disparities and within-country variations in the Human Development Index (HDI) through descriptive statistics, correlation analysis, and panel econometric modeling.

Secondary data were collected from reputable international sources, primarily the United Nations Development Program (UNDP) Human Development Reports and the World Bank's World Development Indicators (WDI). The final balanced panel consists of seven SAARC countries: Afghanistan, Bangladesh, India, Maldives, Nepal, Pakistan, and Sri Lanka, with annual observations on HDI and its key components.

The dependent variable is the HDI, ranging from 0 to 1, which reflects the overall human development level of each country. The explanatory variables capture the three core dimensions of HDI: **health, education, and standard of living**. Life expectancy at birth is used to represent health outcomes. Educational attainment is measured using average years of schooling and expected years of schooling, while gross national income (GNI) per capita (in constant U.S. dollars) reflects the standard of living.

The empirical analysis is based on two primary model specifications. First, a **Fixed Effects (FE) panel regression** is employed to assess the impact of the main socioeconomic indicators on HDI while controlling for unobserved time-invariant country-specific characteristics. The baseline model is specified as follows:

$$HDI_{it} = \beta_0 + \beta_1 LifeExpectancy_{it} + \beta_2 AverageYearsSchooling_{it} + \beta_3 ExpectedYearsSchooling_{it} + \beta_4 GNIpc_{it} + \mu_i + \epsilon_{it}$$

where  $HDI_{it}$  denotes the Human Development Index for country  $i$  at time  $t$ ;  $LifeExpectancy_{it}$ ,  $AverageYearsSchooling_{it}$ ,  $ExpectedYearsSchooling_{it}$  and  $GNIpc_{it}$  represent the explanatory variables;  $\mu_i$  captures the unobserved country-specific effects; and  $\epsilon_{it}$  is the idiosyncratic error term.

Second, we used a Pooled Ordinary Least Squares (OLS) regression with country dummy variables to clearly show where Afghanistan stands in terms of development compared to other countries. This extended model finds the difference in HDI between Afghanistan and other SAARC countries after taking into account the main socioeconomic factors. It is written as:

$$HDI_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 D_{Afghanistan} + \mu_i + \epsilon_{it}$$

where  $X_{it}$  represents the vector of explanatory variables and  $D_{Afghanistan}$  is a dummy variable equal to 1 if the observation pertains to Afghanistan and 0 otherwise.

To ensure the robustness of the results, **standard errors were clustered at the country level** to correct for heteroskedasticity and serial correlation within panels. Furthermore, to verify the appropriateness of the Fixed Effects model over the Random Effects model, a **robust Hausman test** was performed using the `suest` approach in Stata. The test yielded a statistically significant result ( $\chi^2(5) = 31.84, p < .001$ ), providing strong evidence of correlation between the unobserved effects and the regressors. Consequently, the null hypothesis was rejected, and the Fixed Effects estimator was deemed appropriate.<sup>1</sup>

All econometric analyses were conducted using **Stata version 17** and **R**. Model performance was assessed using standard goodness-of-fit indicators, including  $R^2$ , adjusted  $R^2$ , the F-statistic, and Root Mean Squared Error (RMSE).

**Table 1. Pooled Descriptive Statistics of Key Human Development Indicators (2000–2023)**

| Country     | Variable                   | Obs | Mean     | Std. Dev. | Min      | Max      |
|-------------|----------------------------|-----|----------|-----------|----------|----------|
| Afghanistan | Human Development Index    | 24  | 0.457    | 0.0489    | 0.351    | 0.507    |
|             | Life Expectancy (years)    | 24  | 60.49    | 2.88      | 55.00    | 66.03    |
|             | Average Years Schooling    | 24  | 2.00     | 0.51      | 1.26     | 2.99     |
|             | Expected Years Schooling   | 24  | 9.14     | 1.65      | 5.86     | 10.79    |
|             | Gross National Income (\$) | 24  | 2477.32  | 574.26    | 1246.16  | 3245.79  |
| Bangladesh  | Human Development Index    | 24  | 0.580    | 0.0665    | 0.477    | 0.685    |
|             | Life Expectancy (years)    | 24  | 68.53    | 3.56      | 62.05    | 74.67    |
|             | Average Years Schooling    | 24  | 5.48     | 0.90      | 4.28     | 7.10     |
|             | Expected Years Schooling   | 24  | 9.93     | 1.60      | 7.57     | 12.31    |
|             | Gross National Income (\$) | 24  | 4803.12  | 1992.79   | 2324.92  | 8497.66  |
| India       | Human Development Index    | 24  | 0.598    | 0.0551    | 0.501    | 0.685    |
|             | Life Expectancy (years)    | 24  | 67.45    | 2.76      | 62.75    | 72.00    |
|             | Average Years Schooling    | 24  | 5.36     | 0.85      | 4.14     | 6.88     |
|             | Expected Years Schooling   | 24  | 11.16    | 1.37      | 8.33     | 12.96    |
|             | Gross National Income (\$) | 24  | 5601.41  | 1862.95   | 3069.55  | 9046.76  |
| Maldives    | Human Development Index    | 24  | 0.700    | 0.0407    | 0.639    | 0.766    |
|             | Life Expectancy (years)    | 24  | 76.72    | 2.86      | 70.89    | 81.04    |
|             | Average Years Schooling    | 24  | 5.33     | 1.53      | 3.47     | 7.41     |
|             | Expected Years Schooling   | 24  | 12.17    | 0.22      | 11.99    | 12.77    |
|             | Gross National Income (\$) | 24  | 16009.82 | 2058.05   | 12720.85 | 19525.31 |
| Nepal       | Human Development Index    | 24  | 0.549    | 0.0478    | 0.471    | 0.622    |

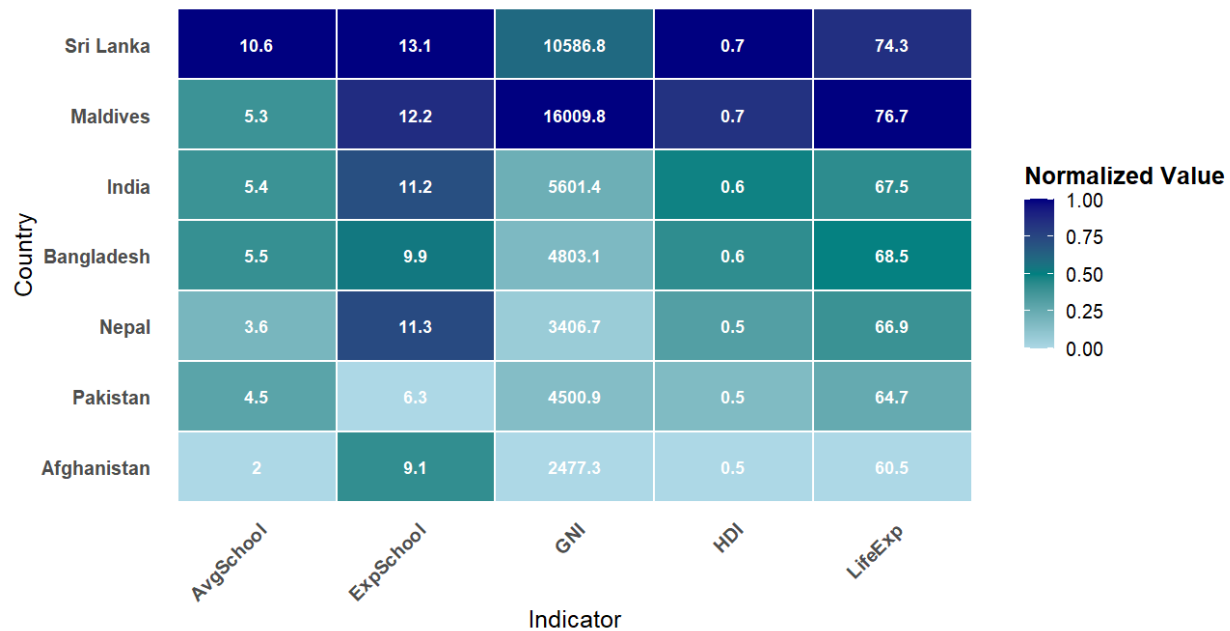
|                  |                            |    |          |         |         |          |
|------------------|----------------------------|----|----------|---------|---------|----------|
|                  | Life Expectancy (years)    | 24 | 66.93    | 2.15    | 62.64   | 70.35    |
|                  | Average Years Schooling    | 24 | 3.64     | 0.52    | 2.89    | 4.50     |
|                  | Expected Years Schooling   | 24 | 11.30    | 1.76    | 8.19    | 13.75    |
|                  | Gross National Income (\$) | 24 | 3406.68  | 828.02  | 2319.29 | 4725.93  |
| <b>Pakistan</b>  | Human Development Index    | 24 | 0.504    | 0.0337  | 0.436   | 0.544    |
|                  | Life Expectancy (years)    | 24 | 64.69    | 1.66    | 61.90   | 67.65    |
|                  | Average Years Schooling    | 24 | 4.52     | 0.48    | 3.32    | 5.16     |
|                  | Expected Years Schooling   | 24 | 6.31     | 1.09    | 4.66    | 7.90     |
|                  | Gross National Income (\$) | 24 | 4500.88  | 692.47  | 3467.72 | 5631.50  |
| <b>Sri Lanka</b> | Human Development Index    | 24 | 0.747    | 0.0299  | 0.695   | 0.782    |
|                  | Life Expectancy (years)    | 24 | 74.28    | 2.49    | 68.02   | 77.48    |
|                  | Average Years Schooling    | 24 | 10.55    | 0.12    | 10.35   | 10.82    |
|                  | Expected Years Schooling   | 24 | 13.10    | 0.34    | 12.38   | 13.58    |
|                  | Gross National Income (\$) | 24 | 10586.82 | 2877.26 | 6342.15 | 14380.41 |

## Interpretation of Descriptive Statistics

The descriptive data for the seven SAARC nations—Afghanistan, Bangladesh, India, Maldives, Nepal, Pakistan, and Sri Lanka—underscore significant variations in essential human development indices over the examined period. Afghanistan has the lowest mean Human Development Index (HDI) at 0.457, characterized by a short life expectancy of 60.5 years, minimal average years of education at 2.00 years, and the lowest Gross National Income (GNI) per capita at \$2,477. This illustrates the nation's enduring socio-economic difficulties and restricted access to educational and healthcare facilities. Sri Lanka has the highest mean Human Development Index (HDI) at 0.747, bolstered by the region's greatest average years of education (10.55 years) and predicted years of schooling (13.10 years). The life expectancy is reasonably high at 74.28 years, and the mean GNI per capita is around \$10,587, reflecting robust socio-economic circumstances. The Maldives has robust human development, shown by an HDI of 0.700, the greatest life expectancy in the group at 76.72 years, and the highest average GNI per capita at around \$16,010. This indicates that the Maldives has successfully converted its economic advancements into enhancements in education and healthcare. Bangladesh and India have similar HDI levels, measuring 0.580 and 0.598, respectively. Bangladesh has a somewhat greater life expectancy (68.53 years) but worse average and projected years of education relative to India, which boasts a higher GNI per capita (\$5,601) than Bangladesh (\$4,803). Nepal has a central position, with an HDI of 0.549, a modest life expectancy of 66.93 years, and an average of 3.64 years of education. Its GNI per capita is very modest at \$3,407, although exceeds that of Afghanistan. Pakistan's Human Development Index (HDI) is at 0.504, somewhat surpassing that of Afghanistan. The nation exhibits a life expectancy of 64.69 years, an average educational attainment of 4.52 years, and an anticipated schooling duration of only 6.31 years, indicating ongoing educational difficulties despite a reasonable Gross National Income (GNI) per capita of \$4,501. These numbers indicate substantial disparities in human development results across SAARC nations. Sri Lanka and the Maldives exceed the regional average in several areas, whilst

193 Afghanistan and Pakistan fall short, underscoring the influence of political stability, governance,  
194 and economic capability on human development statistics.

195 **Figure 1. Heatmap of Average Development Indicators by Country (2000–2023)**



196  
197 *Source: Author's calculations based on UNDP (2023) and World Bank WDI data.*

198 The heatmap presents a normalized comparison of key human development indicators like  
199 Average and Expected Years of Schooling, Gross National Income (GNI) per capita, HDI and  
200 Life Expectancy across seven SAARC countries. Darker shades reflect higher values, enabling  
201 quick visual assessment of each country's relative performance.

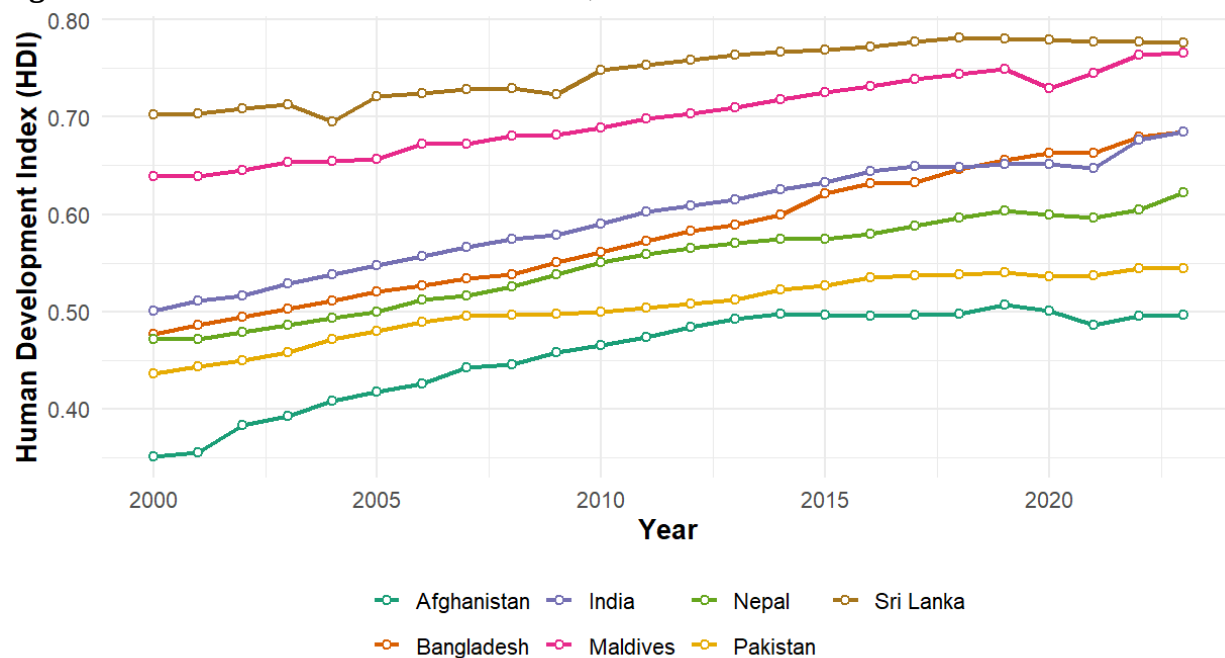
202 Sri Lanka and Maldives stand out with consistently high scores. Sri Lanka excels in education  
203 and health, while Maldives leads in income and life expectancy. India and Bangladesh show  
204 moderate development, with balanced but improvable indicators. Nepal displays a gap between  
205 expected and actual education, highlighting challenges in retention. Pakistan shows weak  
206 performance across most indicators, particularly in education and health.

207 Afghanistan ranks lowest across nearly all dimensions. Its minimal educational attainment, low  
208 income, and poor life expectancy reflect chronic underdevelopment, likely due to governance  
209 failure and prolonged conflict.

210 Overall, the heatmap highlights stark disparities within SAARC, emphasizing the need for  
211 country-specific strategies to achieve equitable human development.

212

213 **Figure 2. HDI Trends in SAARC Countries, 2000–2023**



214

215 *Source: Author's calculations based on UNDP (2023) and World Bank WDI data.*

216 **Figure 2** presents the trends in the Human Development Index (HDI) for seven South Asian  
217 countriesAfghanistan, Bangladesh, India, Nepal, Pakistan, Sri Lanka, and the Maldivesover the  
218 period 2000–2023. The trajectories reveal considerable cross-country disparities, alongside a  
219 general upward trend in HDI across the region.

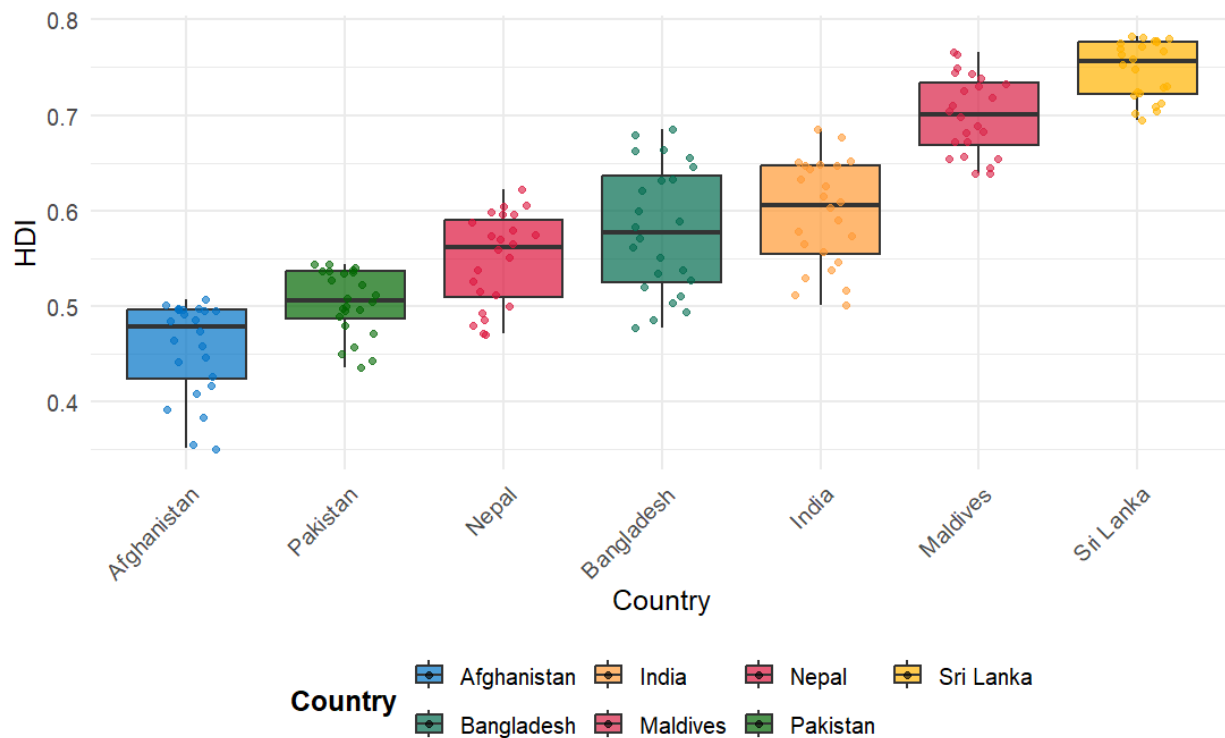
220 Sri Lanka and the Maldives consistently record the highest HDI values, maintaining levels above  
221 0.70 throughout the observed period, with gradual improvements over time. India demonstrates  
222 steady progress, rising from an HDI of around 0.50 in 2000 to nearly 0.70 in 2023, converging  
223 with the higher-performing countries. Bangladesh and Nepal also exhibit notable upward  
224 trajectories, reflecting substantial improvements in education, health, and income dimensions,  
225 though they remain slightly below India.

226 Pakistan shows a slower rate of progress compared to its neighbors, with HDI levels hovering  
227 around 0.55 in recent years. Afghanistan records the lowest HDI values across the entire period,  
228 starting at approximately 0.35 in 2000 and reaching around 0.50 by 2023, though with visible  
229 stagnation and fluctuations in the later years.

230 Overall, the figure highlights both the steady regional progress in human development and the  
231 persistent developmental gaps between higher-performing (Sri Lanka, Maldives) and lower-  
232 performing countries (Afghanistan, Pakistan).

233 **Figure 3: HDI Distribution by Country (Boxplot)**





**Figure 3** presents the distribution of the Human Development Index (HDI) for seven South Asian countries from 2000 to 2023. Clear disparities are observed across countries, with Afghanistan consistently recording the lowest values and Sri Lanka the highest.

Afghanistan's HDI distribution remains at the lower end (median ~0.47), reflecting persistent structural challenges and stagnation. Pakistan performs slightly better, with values clustered around 0.50–0.54, though progress appears modest compared to regional peers.

Nepal and Bangladesh demonstrate more pronounced improvements. Nepal's median HDI (~0.57) highlights moderate progress, while Bangladesh exhibits substantial gains (median ~0.59, upper range close to 0.68), signaling notable advancement in health, education, and income. India shows a stronger upward trajectory (median ~0.62), converging toward the higher-performing countries in the region.

At the upper end, the Maldives and Sri Lanka consistently outperform their neighbors. The Maldives maintains high HDI levels (median ~0.70), while Sri Lanka stands out as the best performer, with a median of ~0.77 and values clustering near 0.80.

Overall, the figure underscores both the shared progress in human development across South Asia and the persistent developmental divides—particularly between the lower-performing (Afghanistan, Pakistan) and higher-performing (Sri Lanka, Maldives) countries.

## Table 2: Correlation Matrix

| Variable | Coefficient | Std. Error | t-Statistic | p-value |
|----------|-------------|------------|-------------|---------|
|----------|-------------|------------|-------------|---------|

| Variable                 | HDI       | Life Expectancy | Avg. Years Schooling | Exp. Years Schooling | GNI    |
|--------------------------|-----------|-----------------|----------------------|----------------------|--------|
| HDI                      | 1.0000    |                 |                      |                      |        |
| Life Expectancy          | 0.9542*** | 1.0000          |                      |                      |        |
| Average Years Schooling  | 0.8446*** | 0.7152***       | 1.0000               |                      |        |
| Expected Years Schooling | 0.8221*** | 0.7408***       | 0.5560***            | 1.0000               |        |
| Gross National Income    | 0.8365*** | 0.8946***       | 0.5515***            | 0.5793***            | 1.0000 |

**Note:**\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ . All reported correlations are statistically significant at the 1% level ( $p < 0.01$ ).

## Interpretation

The correlation matrix illustrates the strength and direction of relationships among the primary variables analyzed in this study. The Human Development Index (HDI) exhibits a strong positive correlation with Life Expectancy (0.9542), suggesting that enhancements in health outcomes are closely linked to elevated levels of human development among SAARC countries. HDI demonstrates a significant positive correlation with Average Years of Schooling (0.8446) and Expected Years of Schooling (0.8221). This underscores the essential function of educational attainment, both real and projected, in improving overall human development. Additionally, the Human Development Index (HDI) exhibits a significant positive correlation with Gross National Income (GNI) per capita, quantified at 0.8365. This highlights the critical role of income and economic capacity in facilitating enhanced human development outcomes. Analysis of the interrelationships among the independent variables indicates a strong correlation between Life Expectancy and GNI (0.8946), implying that increased income levels are generally associated with improved health outcomes and extended lifespans. The moderate positive correlation of 0.5560 between Average Years of Schooling and Expected Years of Schooling indicates a degree of consistency, while also highlighting discrepancies between expected and actual educational outcomes. Both schooling variables exhibit moderate correlations with GNI, suggesting that economic factors affect access to and completion of education. The results indicate that health, education, and income dimensions are interrelated and collectively influence variations in human development levels within the region. The strong correlations indicate that policies targeting any specific dimension are likely to produce beneficial spillover effects on the others, thereby enhancing the multidimensional nature of sustainable development.

**Table 3: Fixed Effects Regression with Country Dummy Variables (Reference: Afghanistan)**



|                        |            |            |       |       |
|------------------------|------------|------------|-------|-------|
| Life Expectancy        | 0.0044     | 0.0003     | 13.87 | 0.000 |
| Ave Years of Schooling | 0.0131     | 0.0006     | 20.94 | 0.000 |
| Exp Years of Schooling | 0.0173     | 0.0004     | 39.86 | 0.000 |
| GNI (per capita)       | 0.00000491 | 0.00000030 | 16.35 | 0.000 |
| Bangladesh             | 0.0175     | 0.0021     | 8.15  | 0.000 |
| India                  | 0.0161     | 0.0018     | 8.97  | 0.000 |
| Maldives               | 0.0097     | 0.0030     | 3.24  | 0.001 |
| Nepal                  | 0.0007     | 0.0016     | 0.45  | 0.653 |
| Pakistan               | 0.0349     | 0.0024     | 14.29 | 0.000 |
| Sri Lanka              | 0.0091     | 0.0039     | 2.36  | 0.019 |
| Constant               | -0.0066    | 0.0158     | -0.41 | 0.679 |

281

| Model Summary           | Value                 |
|-------------------------|-----------------------|
| Observations (N)        | 168                   |
| R <sup>2</sup>          | 0.9987                |
| Adjusted R <sup>2</sup> | 0.9986                |
| F-statistic             | 11,875.43 (p < 0.001) |
| Root MSE                | 0.00399               |
| Reference category      | Afghanistan           |

282 Note: Dependent variable: Human Development Index (HDI). Observations (N) = 168; R<sup>2</sup> = 0.9987; Adjusted R<sup>2</sup> =  
283 0.9986; F-statistic = 11,875.43 (p < 0.001); Root MSE = 0.00399. Afghanistan is the reference category for country  
284 dummies.

285

## 286 Interpretation

287 Table 3 presents the pooled Ordinary Least Squares (OLS) estimates for the factors influencing  
288 the Human Development Index (HDI) among seven SAARC countries, with Afghanistan serving  
289 as the reference category. The model accounts for 99.87% of the total variation in HDI (R<sup>2</sup> =  
290 0.9987), with an F-statistic of 11,875.43 (p < 0.001), indicating strong joint significance of the  
291 explanatory variables. The findings indicate that all four primary socioeconomic factors—life  
292 expectancy, average years of schooling, expected years of schooling, and gross national income  
293 per capita—exhibit statistically significant and positive effects on HDI at the 1% level. A one-  
294 year increase in life expectancy correlates with a 0.0044-point increase in HDI, after controlling  
295 for additional variables. Every additional year of average schooling increases the Human  
296 Development Index (HDI) by approximately 0.0131 points, whereas each additional year of  
297 expected schooling contributes around 0.0173 points. The GNI per capita coefficient, while  
298 numerically modest, exhibits a positive and significant effect, indicating that increased national  
299 income correlates with improved human development outcomes. The inclusion of country  
300 dummy variables quantifies the adjusted gap between Afghanistan and its regional peers.  
301 Bangladesh and India exhibit markedly higher HDI levels than Afghanistan, with estimated  
302 differences of approximately 0.0175 and 0.0161 points, respectively. Maldives and Sri Lanka

demonstrate superior performance compared to Afghanistan, exhibiting notable and statistically significant differences of approximately 0.0097 and 0.0091 points, respectively. Pakistan exhibits the most significant adjusted gap, with a Human Development Index (HDI) approximately 0.035 points greater than that of Afghanistan, assuming other factors remain constant. Nepal's coefficient is not statistically significant, suggesting that after applying socioeconomic controls, the average HDI of Nepal does not differ meaningfully from that of Afghanistan. The findings indicate that health, education, and income levels are essential factors in human development; however, Afghanistan's ongoing developmental deficits also stem from structural and institutional obstacles that hinder the conversion of socioeconomic advancements into sustainable enhancements in human welfare.

**Table 4: Fixed-Effects Regression Results for Determinants of Human Development Index**

| Variable                    | Coefficient | Robust Std. Error | t-value | p-value |
|-----------------------------|-------------|-------------------|---------|---------|
| Life Expectancy             | 0.0044      | 0.0007            | 6.46    | 0.001   |
| Average Years of Schooling  | 0.0131      | 0.0009            | 14.71   | 0.000   |
| Expected Years of Schooling | 0.0173      | 0.0009            | 19.40   | 0.000   |
| Gross National Income (pc)  | 0.0000049   | 0.0000009         | 5.69    | 0.001   |
| Constant                    | 0.0060      | 0.0365            | 0.16    | 0.875   |

| Statistic                        | Value   |
|----------------------------------|---------|
| Observations                     | 168     |
| Groups (Countries)               | 7       |
| Within R <sup>2</sup>            | 0.9931  |
| Between R <sup>2</sup>           | 0.9871  |
| Overall R <sup>2</sup>           | 0.9882  |
| F (4,6)                          | 1470.11 |
| Prob > F                         | 0.000   |
| $\rho$ (Intra-class correlation) | 0.8994  |

**Note:** Between-country SD ( $\sigma_u$ ): 0.0119; Within-country SD ( $\sigma_e$ ): 0.0040; Intraclass correlation ( $\rho$ ): 0.8994;  $n = 168$ ,  $F(4,6) = 1470.11$ ,  $\text{Prob} > F = 0.0000$ .

### Interpretation

The fixed effects regression analysis demonstrates that all four explanatory variables—life expectancy, average years of schooling, expected years of schooling, and gross national income per capita—have statistically significant and positive effects on the Human Development Index (HDI) across the observed South Asian countries. Specifically, holding other factors constant, a one-year increase in life expectancy is associated with an average increase of approximately 0.0044 units in HDI ( $p < 0.01$ ). Similarly, each additional year of average schooling raises the HDI by about 0.0131 units ( $p < 0.001$ ), while an increase in expected years of schooling adds approximately 0.0173 units to HDI ( $p < 0.001$ ). Gross national income per capita also has a

positive but smaller marginal effect: an increase of 1 unit in GNI per capita is associated with a 0.00000491 unit increase in HDI ( $p < 0.01$ ). The overall model fit is excellent, the within R-squared is 0.9931, indicating that the model explains approximately 99% of the within-country variation in HDI. The intraclass correlation ( $\rho = 0.8994$ ) indicates that nearly 90% of the total variance is due to unobserved, country-specific effects, which supports the choice of the fixed effects estimator for this panel dataset. The between-country standard deviation ( $\sigma_u = 0.0119$ ) is notably larger than the within-country standard deviation ( $\sigma_e = 0.0040$ ), reinforcing the presence of significant heterogeneity across countries. The high F-statistic ( $F(4,6) = 1470.11, p < 0.001$ ) confirms that the model is jointly significant. These findings highlight the crucial role of health, education, and income in shaping human development outcomes in the region and underscore the importance of policies that simultaneously address these dimensions to achieve sustainable improvements in human well-being.

## Discussion

The empirical results of this study demonstrate that improvements in health, education, and income levels are critical and interrelated drivers of human development outcomes in South Asia. The positive and statistically significant effects of life expectancy, average years of schooling, expected years of schooling, and gross national income per capita on the Human Development Index (HDI) confirm that human development is multidimensional and cannot be adequately explained by economic indicators alone. This finding is consistent with previous research emphasizing the need for integrated approaches combining social sector investments with economic growth to achieve sustained improvements in people's capabilities and well-being. Improvements in life expectancy signify enhanced access to healthcare and nutrition, as well as overall advancements in living standards and social situations. The significant effects of both average and predicted years of schooling underscore the transformational function of education in broadening individual prospects, improving employability, and promoting social mobility. Income growth directly enhances living standards and access to services; nevertheless, the results emphasize that its impact is most pronounced when accompanied by advancements in health and education. This underscores the fundamental principle of the human development approach: people's capabilities require investments beyond economic resources alone. This research reveals that, even after controlling for essential socioeconomic factors, Afghanistan remains well behind its regional counterparts in human development. The pooled OLS estimates and the country-specific effects identified by the Fixed Effects model indicate a persistent structural disparity that cannot be entirely explained by variations in income, health, or education alone. This indicates that supplementary structural elements may affect the efficacy with which nations may translate enhancements in health, education, and wealth into elevated HDI results. These findings indicate that policy frameworks designed to bridge the human development gap must prioritize enhancing educational access, fortifying health systems, and establishing inclusive economic opportunities for the most disadvantaged people. In environments such as Afghanistan, it is essential to address obstacles that limit the efficacy of social sector initiatives.

## 370 Conclusion

5 371 This study examined the impact of key socioeconomic factors on the Human Development Index  
372 (HDI) in Afghanistan and other SAARC countries for the period 2000 to 2023. The panel data  
2 373 results demonstrate that life expectancy, average years of schooling, expected years of schooling,  
374 and gross national income per capita each have a positive and statistically significant effect on  
375 HDI, confirming that improvements in health outcomes, educational attainment, and income  
376 growth are vital drivers of human development across South Asia. Even after considering these  
377 fundamental socioeconomic factors, Afghanistan's Human Development Index (HDI) is still  
9 378 markedly lower than those of Bangladesh, India, Maldives, Pakistan, and Sri Lanka. The ongoing  
379 development gap indicates the presence of structural barriers unique to Afghanistan that may  
380 obstruct the effective conversion of socioeconomic advancements into sustained enhancements  
381 in human well-being. The significant country-specific effects identified through Fixed Effects  
30 382 estimation suggest that establishing robust foundations in health, education, and income is  
383 essential for attaining inclusive and sustainable development outcomes. This study offers  
9 384 empirical evidence regarding the determinants of human development in the SAARC region,  
385 quantitatively assessing the effects of health, education, and income, while emphasizing  
386 Afghanistan's persistent development gap. The findings highlight the necessity for policymakers  
387 to implement multidimensional strategies that enhance human capital and eliminate barriers,  
388 ensuring that advancements in social sectors lead to widespread improvements in human welfare  
389 throughout the region.

## 390 391 Policy Implication

392 This analysis, grounded on empirical data, underscores many pragmatic policy paths to enhance  
393 human development results across South Asia, especially in nations that persistently  
394 underperform relative to regional averages. The substantial influence of life expectancy on HDI  
395 underscores the need of investing in healthcare systems. Policymakers must to enhance access to  
396 vital healthcare services, improve maternal and child health outcomes, tackle avoidable illnesses,  
397 and fortify rural health infrastructure. These measures may directly enhance life expectancy and  
398 general well-being, particularly in situations where health indices fall short of the area norm. The  
21 399 significant impact of both average years of schooling and expected years of schooling illustrates  
400 the essential function of education in advancing human development. Governments have to  
401 augment investment in basic and secondary education, promote understanding about the  
402 significance of education, diminish dropout rates, and guarantee fair access for everyone,  
403 particularly for girls and marginalized populations. Enhancing teaching quality, revising  
404 curriculum to align with the changing demands of the labor market, and broadening vocational  
405 and technical education may significantly augment education's contribution to development. The  
35 406 substantial correlation between gross national income per capita and HDI highlights the ongoing  
407 need of fostering equitable economic development. Policymakers need to promote economic  
408 diversity, provide employment opportunities, and assist small and medium-sized firms to  
409 enhance family incomes. Enhancing local livelihoods, developing pertinent skills, and increasing  
410 market access may facilitate the conversion of development into substantial enhancements in  
411 living conditions.

3 412 This study's results indicate that targeted investments in health, education, and income  
413 opportunities are essential for closing development gaps and attaining sustainable enhancements  
42 414 in human development in South Asia.

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