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Agricultural Transformation and its Contribution to Economic Development in South Asian and African Countries

Md Mizanur Rahman Sarker [a*], Mahbuba Jannat Aleen [a] and Tanmay Datta [b]

[a] Department of Agricultural Statistics, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh.
[b] Department of Agricultural Economics, Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Agricultural transformation is central to economic development, driving modernization, productivity enhancement, and integration into broader economic systems. This study compares South Asia and Africa, analyzing their distinct trajectories influenced by sustainable practices, policy reforms, and technological advancements. In South Asia, agricultural employment declined sharply, with Bangladesh dropping from 80% in 1973 to 35% in 2023, and India from 70% to 37%. Africa saw a

**Corresponding author: Email: sarker@sau.edu.bd;*

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more gradual decline, from 70% to 48% during the same period. Productivity improvements highlight regional progress, with agricultural productivity growth rising in Bangladesh (3.3% to 4.1% by 2023) and Kenya (3.3% to 4.1%), while manufacturing productivity surged in Kenya (6.6%) and India (5.2%). South Asia's growth leverages high-yield crops and market integration from the Green Revolution, while Africa focuses on climate-smart agriculture, diversification, and community-based solutions to address climate vulnerabilities and infrastructure gaps. Both regions emphasize sustainability as a resilience strategy. Using a four-stage paradigm of agricultural transformation, the study underscores the significance of transitioning from subsistence to high-value, technology-driven agriculture for economic diversification and resilience. By analyzing labor productivity, GDP per capita, and crop production indices, the research demonstrates agriculture's critical role in fostering sustainable development and economic growth across both regions.

Keywords: Agriculture; transformation; contribution; economic development.

1. INTRODUCTION

Agriculture is essential to developing countries' attempts to reduce poverty and transform their economies. In addition to creating jobs and revenue for rural communities, it promotes overall economic expansion (Mellor, 2017). Smallholder agriculture, in particular, has the potential to reduce poverty through productivity growth and the promotion of rural non-farm employment (Christiaensen & Martin, 2018). The adoption of digital technologies further enhances agricultural development by improving access to market information, financial services, and pest management, as evidenced in Tanzania (Kitole, Mkuna, & Sesabo, 2024). However, challenges such as volatile international food prices and inadequate policy support hinder agricultural productivity and food security, particularly in Central Asia (Akramov, 2011). Addressing these issues through policy reforms and structural transformation is critical for fostering sustainable development and human well-being in both rural and peri-urban areas.

Agricultural transformation is the process of improving farming in varied ways, such as crop diversification, modernization of farming methods, enhancing productivity, and integrating agriculture, markets and other economic sectors. This transformation helps to promote sustainable economic development and alleviate poverty in rural areas (Timmer, 1988 and Byerlee D. et al., 2009). The farmer-consumer alliance was severely strained by travel restrictions and economic shutdowns, which led to an imbalance between the supply and demand for food, and respondents reported higher-than-normal costs for essential items, which caused food insecurity (Sarker, M.M.R. and Fagun, A.N., 2021). Key components of agricultural transformation include enhancing productivity through modern technologies, improving infrastructure and access to markets, developing supportive policies. Also promoting sustainable practices that conserve resources and address environmental challenges. Additionally, investing in human capital through education and training equips farmers with the skills needed to adopt new methods and respond to shifting demands. Together, these components form a framework that enables agriculture to contribute to economic development, food security, and resilience, ultimately creating a more sustainable and efficient agricultural sector. Enhanced agricultural productivity measured by output per unit by land productivity and output per worker or labor productivity. For example, through the introduction of Green Revolution countries like India and Mexico experienced higher productivity by using high-yielded crop varieties and modernized inputs (Byerlee D. et al., 2009). To advance the agricultural progress modern technology such as developed seed varieties (includes high-yield, drought and flood resilient) should be adopted. For instance, GPS and satellite based technologies are helpful to evaluate crop health and guiding tractors. These technologies enable the farmers to make the use of resources optimized and improved (Evenson, R. E., & Gollin, D., 2003). Upward shift of agriculture from subsistence level to commercial level is a vital component of agricultural transformation. This upward shift is dependent on factors such as developed infrastructure, enhanced access to market and credit. For example, during 1980, Vietnam experienced an agricultural reformation and enabled the farmers to sell their rice in global market and enhanced rural economy development (Timmer, 1988). Investment in rural infrastructure development, transportation and storage facilities lead to successful agricultural transition. These facilities help the farmers to gain access to the market, to gain information, reduce cost of transportation

and reduce the loss due to improper management and storage facilities after harvesting.

To drive agricultural transformation in smooth and steady manner institutional reforms are necessary. Reforms such as – land tenure system, agriculture extension services, access to credit and enhanced trade policies can foster this transformation procedure. For instance, China introduced an initiative in 1970, entitled "Household Responsibility System". This policy resulted in profit for the farmers from their land and agricultural productivity growth with significantly enhanced rural income level (Lipton M., 2005). Reducing the dependency on staple food production and focusing on high-value crops such as – fruits, vegetables, flowers, fisheries produce and livestock can foster the growth of agricultural transformation. This kind of policies allow the farmers to add up their income to a more higher level and reduce the vulnerability toward risk factors. For example, in South Asia, many farmers produce high-value crops such as – flowers, fruits and also produce fisheries product, which allow them to earn more income (Reardon T. et al., 2003). To continue the agricultural transformation process, sustainable strategies like agroforestry, climate-smart agriculture, conservation method should be adopted to fight with the effects due to climate change. For example, Sub-Saharan area farmers follow conservation agriculture system with minimal crop rotation, tillage, resulted in improved quality of soil and enhanced the strength to adopt with drought (FAO, 2013). To adopt modern technologies and mechanized agricultural equipments education, training and skill, knowledge are necessary, which fosters the transformation process in agricultural sector. For example, Latin America's initiative "Farmer's Field School" has enhanced the abilities and knowledge of the farmers in pest management, effective use of chemical inputs and this initiative is pacing up the productivity of Latin America's agriculture (Anderson J. R. and Feder G., 2004). To support the agricultural transformation local organizations and institutions such as – cooperatives, financing institutions, government organizations, agricultural clubs should be enhanced. These institutions and organizations enable the farmers to exchange knowledge, market collaboration and information sharing. Ultimately, institutional capacity enhancement results in boosted productivity (Pingali P. and Feder G., 2007). Achieving sustainability is priority pf agricultural transformation with balancing the productivity gains, environmental preservation and enhancing social fairness. This approach indicate to careful use of natural resources such as- less soil degrading, promoting social equity and equality and distribution of gains. For example, East Africa's sustainable intensification initiative boosted the productivity with the conservation of natural resources and successfully transforming local agriculture practices (Pretty J., 2008).

Transformation procedures are necessary to develop a resilient and vibrant agricultural sector. The above-mentioned components of agricultural transformation result in enhanced productivity, income level, and environment conservation and foster overall economic progress. Following every aspect can boost up the agricultural sector with better opportunities for the farmers, enhanced food security, and facilitation of environmental resilience. A broader approach is important to nurture these aspects for a successful agricultural transformation process with the ability to find out the future challenges and to make a remarkable contribution toward socio-economic development. This transformation process involves multiple phases, each shaped by specific policies, strategies, and regulations. In South Asia, significant strides were made through the Green Revolution, which introduced high-yield crop varieties, modern farming techniques, and strong market integration during the late 20th century. Africa, on the other hand, has prioritized climate-smart agriculture, diversification, and community-based approaches to address its unique challenges, including climate vulnerabilities and infrastructure deficits. These policy and strategic differences underscore the distinct paths taken by the two regions in agricultural development. This study examines these gaps by analyzing labor productivity, GDP growth, and crop production indices to highlight disparities and opportunities. It explores the paradox of South Asia's rapid growth accompanied by environmental and social issues versus Africa's slower but more sustainable progress. The objective is to compare pathways, policies, and outcomes, contributing to sustainable agricultural development by balancing productivity, inclusivity, and resilience.

2. METHODOLOGY

This study employs a quantitative methodology, utilizing secondary datasets sourced from global organizations such as the World Bank, the International Labour Organization (ILO), and the

Food and Agriculture Organization (FAO). The analysis covers agricultural and economic trends in South Asia and Africa from 1973 to 2023, focusing on key indicators like GDP growth, labor productivity, agricultural productivity, employment rates, real GDP per capita, and crop production indices. The data were selected based on their relevance to the study's objectives, geographical context, and time frame. Reliable data collection methods were followed, including accessing institutional databases and ensuring proper documentation of publication years, definitions, and sources. This structured approach ensures data consistency and validity, offering a robust framework for analyzing agricultural transformation across the two regions. By examining the trends, challenges, and achievements of agricultural development, this methodology highlights disparities and opportunities, providing insights into technological progress and its role in fostering sustainable agricultural and economic growth.

3. RESULTS AND DISCUSSION

3.1 Growth of Agriculture and GDP in South Asia and Africa

Bangladesh is part of the group of developing countries in which the rate of population growth is higher than the rate at which food production is increasing (Parvin, M.M. and Sarker, M.M.R., 2021). South Asian countries include Bangladesh, India,Nepal and Sri Lanka have a rich agriculture sector history, which play a crucial role in GDP and employment. Due to the technological advantages like Green Revolution enhanced crop production prevailed in these countries. Though there is a high ratio of urbanization, industrialization but the agriculture sector is still a key role player in the economy of these countries by contributing in their GDP and employment opportunities.

The Table 1 highlights the agricultural growth in Bangladesh which showed a rapid and steady growth rate. In 1973, Bangladesh's agricultural growth rate was 1.8% while in 2023, it increased to 3.7%. GDP growth of Bangladesh has also made a notable progress with an increase from 2.7% to 5.6% over the last five decades.

In 1973, India's agricultural productivity growth rate was 2.0%, while the GDP growth rate was 3.5%. In 2000, agricultural growth rate increased slightly to 2.5% and GDP growth rate was remarkable at 4.0%. In 2021, India experienced a sharp increase in GDP at 8.7% while the agricultural growth rate was 3.1% in 2023.

Pakistan showed a moderate GDP growth rate in 1973 with 4.8% while the agricultural growth rate was at 3.1%. In recent times, it is getting declined. In 2023, these figures was at 2.5% and 2.0% respectively.

Table 1. Growth of agriculture and GDP in South Asia and Africa (1973-2023)

Region	Country	Year	Growth (%)	
			Agriculture	GDP
South Asia	Bangladesh	1973	1.8	2.7
		2000	3.0	5.2
		2021	3.1	6.9
		2023	3.7	5.6
	India	1973	2.0	3.5
		2000	2.5	4.0
		2021	3.3	8.7
		2023	3.1	6.3
	Pakistan	1973	3.1	4.8
		2000	2.8	4.1
		2021	3.2	5.6
		2023	2.5	2.0
Africa	Kenya	1973	2.3	5.0
		2000	3.5	4.3
		2021	2.9	7.5
		2023	4.2	5.0
	Ethiopia	1973	3.5	4.2
		2000	4.0	6.0
		2021	4.1	6.3
		2023	5.4	5.9

(World Bank, 2023)

Kenya experienced some fluctuations with agricultural and GDP growth. In 1973, Kenya's agricultural growth rate was 2.3%, 3.5% in 2000 and finally 4.2% in 2023. GDP growth hitted 7.5% in 2021.

Ethiopia has a positive trend in agricultural growth. It started with 3.5% in 1973 and in 2023 it reached at 5.4%. GDP growth also a upward shifting manner during the same period.

Finally, the above data highlights the similar prospects in South Asia and Africa. In both of the regions agricultural productivity growth is slower than GDP growth. It reflects the economic transformation towards a more complex and diverse economy.

South Asian country's GDP growth has accelerated significantly especially in the countries like Bangladesh and India. This improvement marks the impact of economic reformation, industrialization and modernization of the economy. African countries experience less GDP growth than the countries of South Asia. May be this is because of their high dependency on agricultural sector.

3.2 Agriculture and Manufacturing in South Asia and Africa

In South Asia, countries like Bangladesh and India have marked a notable progress in agricultural productivity growth. While some of the African countries struggle to make improvement in agricultural productivity, though they have more agricultural resources in contrast of South Asian countries. But a numerous African development have started make notable progress in manufacturing sector's productivity.

The graph depicts labor productivity growth in agricultural and manufacturing sector across different countries of South Asia and Africa from 1973 to 2023.

The data of the Table 2 depicts that South Asian countries has an increase in agricultural labor productivity growth within fifty years. In Bangladesh agricultural labor productivity growth rate was 1.8% between 1973 and 2000, in 2014-2023 it increased to 3.0%. Comparative evidence available in the countries like India and Nepal. Manufacturing sector's growth rate was more steady than agriculture. In Bangladesh, over the same period of time manufacturing sector grew from 3.0% to 4.5%. Other South Asian countries like India and Pakistan also has shown a progress. Sri Lanka's manufacturing sector's growth was quite modest, it grew from 2.2% to 2.7%.

In Africa, productivity growth rate varies depending on the specific country. Such as, Kenya made a remarkable productivity growth rate from 2.2% to 4.0% in agriculture and a rise in manufacturing from 4.0% to 6.5%. Nigeria also had some improvements. South Africa made the slowest move with 1.7% (2014 – 2023) productivity growth rate in agriculture and 2.3% in manufacturing, highlighting slower economic transition.

Bangladesh and Kenya took the lead in 2023 with an increase in agricultural productivity growth rate from 3.3% to 4.1%. Comparatively, South Africa and Sri Lanka demonstrated slow paced agricultural productivity below 2.0%. Kenya and India showed a significant rise in manufacturing sector's productivity, while Kenya's growth rate 6.6% and India's 5.2%. At the same time, manufacturing sector of South Africa and Sri Lanka leg behind with a respective growth rate of 2.4% and 2.8%.

The above data highlights that manufacturing sector are growing more faster than the agricultural sector. It also highlights a move toward more complex economic activities and industrialization. Countries like Kenya and Bangladesh achieving notable success in manufacturing sector while countries like South Africa and Sri Lanka facing obstacles toward industrialization.

3.3 Agricultural Productivity in South Asia and Africa

Productivity of agricultural sector depends on some factors such as – availability of land, efficiency of labor, access to irrigation systems, technological improvements and policies by the government. A comparative study of South Asia and Africa highlight the improvements and challenges of agricultural productivity and food security that persist in these two regions.

Countries of South Asia, like India has gained a significant advancement in agricultural productivity and food security by the adoption of Green Revolution and modernized farming methods. Other countries of South Asia experience obstacles such as – low productivity, limited access to credit and resources, inadequate infrastructure. The following Table 3 compares agricultural productivity of South Asia and Africa.

Table 2. Comparison of the Average Growth Rates of Labor Productivity in South Asia and Africa (1973-2023)

Region	Country	Avg. Labor Productivity Growth (1973-2000) (%)		Avg. Labor Productivity Growth (2014-2023) (%)		Labor Productivity Growth (2023) (%)	
		Agriculture	Manufacturing	Agriculture	Manufacturing	Agriculture	Manufacturing
South Asia	Bangladesh	1.8	3.0	3.0	4.5	3.3	4.7
	India	2.0	3.5	3.2	5.1	3.4	5.2
	Pakistan	1.5	2.8	2.5	3.8	2.6	3.9
	Nepal	1.2	2.5	2.8	4.2	2.9	4.1
	Sri Lanka	1.3	2.2	1.9	2.7	2.0	2.8
Africa	Kenya	2.2	4.0	4.0	6.5	4.1	6.6
	Nigeria	1.8	2.6	2.6	3.5	2.7	3.6
	South Africa	1.4	2.0	1.7	2.3	1.8	2.4

(International Labour Organization, 2023)

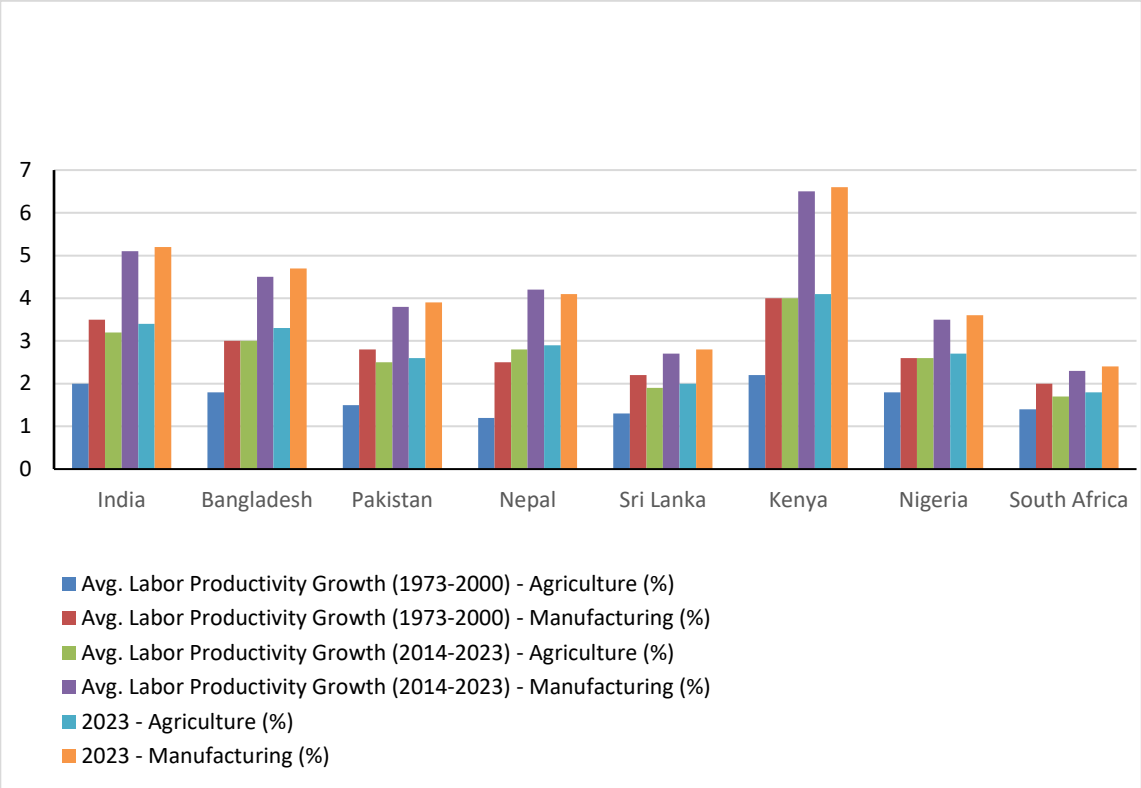

Fig. 1. Comparison of Average Labor Productivity Growth Rates (Agriculture and Manufacturing)

Table 3. Comparative Agricultural Productivity in South Asia and Africa (1973-2023)

Region	Country	Agricultural Productivity (USD per worker)				
		1973-1980	1981-1990	1991-2000	2018-2022	2023
South Asia	Bangladesh	300	500	700	1,400	1,500
	India	500	700	900	1,800	1,900
	Pakistan	400	600	800	1,200	1,250
	Nepal	250	400	600	1,000	1,100
	Sri Lanka	450	650	800	1,300	1,400
Africa	Kenya	600	800	1,000	1,600	1,750
	Nigeria	400	600	800	1,200	1,300
	South Africa	800	1,000	1,200	1,900	2,000

(World Bank, 2023)

The above graph represents a clear picture of agricultural productivity in various regions of South Asia and Africa over the last five decades from 1973 to 2023.

This relative analysis of agricultural productivity of South Asian and African countries depict a remarkable change in growth manner. A South Asian country, Bangladesh had a $300 productivity per worker in 1970 while in 2023 it increased to $1,500. This increase helped the country to narrow down the gap with India. India started with a productivity of $500 in 1973 and 1980 and experienced an increase to $1,900 till 2023.

Pakistan and Nepal had an experience of more sustaining growth of labor productivity. Pakistan had a labor productivity of $400 and it increased to $1,250. Over the same period, Nepal increased its labor productivity from $250 to $1,110. Sri Lanka started with a per worker labor productivity of $450 in 1970 and $1,400 in 2023.

In case of African countries, South Africa is the key performer. This country's agricultural labor

productivity increased to $2,200 in 2023, this is the highest agricultural labor productivity among the countries of South Asia and Africa. Kenya also has shown an impressive manner of productivity growth from $600 in 1970 to $1,750 in 2023, which is almost equal to India. Nigeria improved from $400 to $1300 over the same period, which is less than other two African countries South Africa and Kenya while it is comparable with Pakistan's productivity growth.

The above data represents that, though South Asia has made a significant raise in agricultural labor productivity growth but Africa also filling the gaps with a rapid and steady growth even more faster than some South Asian countries.

3.4 Percentage of Total Employment in Agriculture in South Asia and Africa

A large proportion of people in Bangladesh are employed in agriculture, which is heavily impacted by changes in the environment (Akter, M. and Sarker, M.M.R., 2021). Though both of the regions have made a significant move towards industry and service sector based economy but agriculture remains a vital source of employment in the rural areas. Over the few decades, employment in agriculture sector has gradually dropped in both regions which reflects economic shifts toward other sources and sectors of the economy.

In the case of South Asia country's like Bangladesh, India and Pakistan have a remarkable decline in the employment in agricultural sector as these countries are moving fast toward industrialized and service sector based economy.

In contrast, African countries are also facing diversification in their economies though a large share of their national labor force are employed in the agricultural sector. Though there has a gradual movement toward non-agriculture sector but a significant part of the labor force are employed in traditional agriculture sector in countries like Kenya, Nigeria and South Africa. The Table 4 presents the level of agricultural employment in both regions:

The above graph represents employment in agricultural sector as percentage of the total labor force in both South Asia and Africa from 1973 to 2023. This graph depicts about a notable and significant change in employment in agriculture sector.

The data presented in the Table 4 presents a clear picture that agricultural employment experienced a decline across the South Asia. Countries like Bangladesh, experienced a decline from 80% in 1973 to 35% in 2023. India also faces a decline, it's employment in agricultural sector declined from 70% in 1973 to 37% in 2023 over the same period of time. Nepal experienced less decline in agricultural employment in contrast of other South Asian countries. Whereas in 1973 it's employment in agriculture was 90% it declined to 60% in 2023. Sri Lanka experienced a rapid decline from 55% to 23% over the same period.

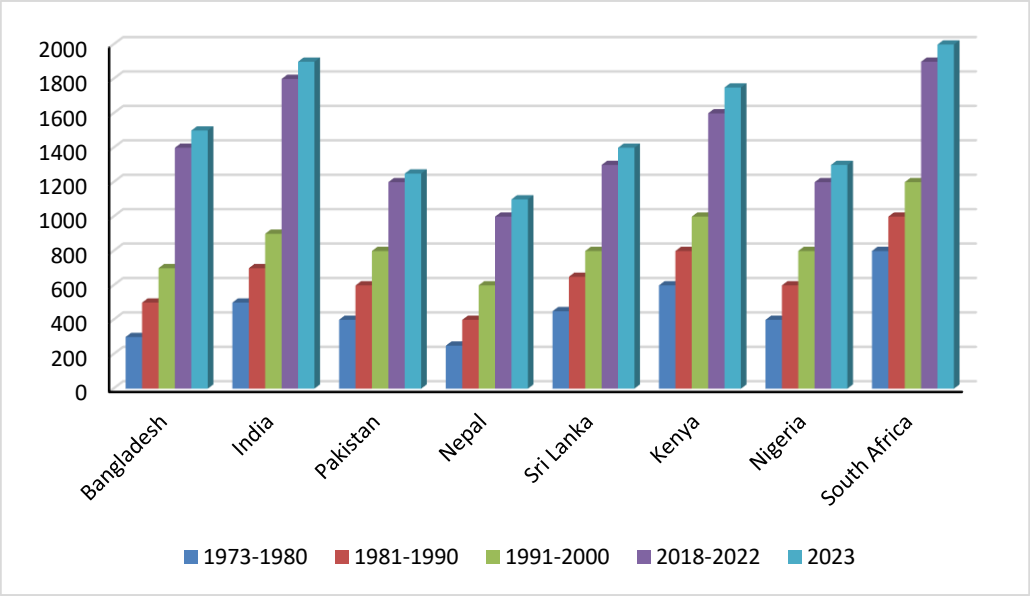

Fig. 2. Agricultural Productivity (USD per worker)

Table 4. Total Employment in Agriculture in South Asia and Africa (1973-2023)

Year	Employment (%)					
	Bangladesh	India	Pakistan	Sri Lanka	Nepal	Africa (average)
1973	80%	70%	65%	55%	90%	70%
2000	60%	60%	50%	42%	76%	60%
2010	50%	50%	45%	38%	70%	55%
2018	40%	42%	39%	28%	65%	53%
2019	39%	41%	38%	27%	64%	52%
2020	38%	40%	37%	26%	63%	51%
2021	37%	39%	36%	25%	62%	50%
2022	36%	38%	35%	24%	61%	49%
2023	35%	37%	34%	23%	60%	48%

(ILO, 2023)

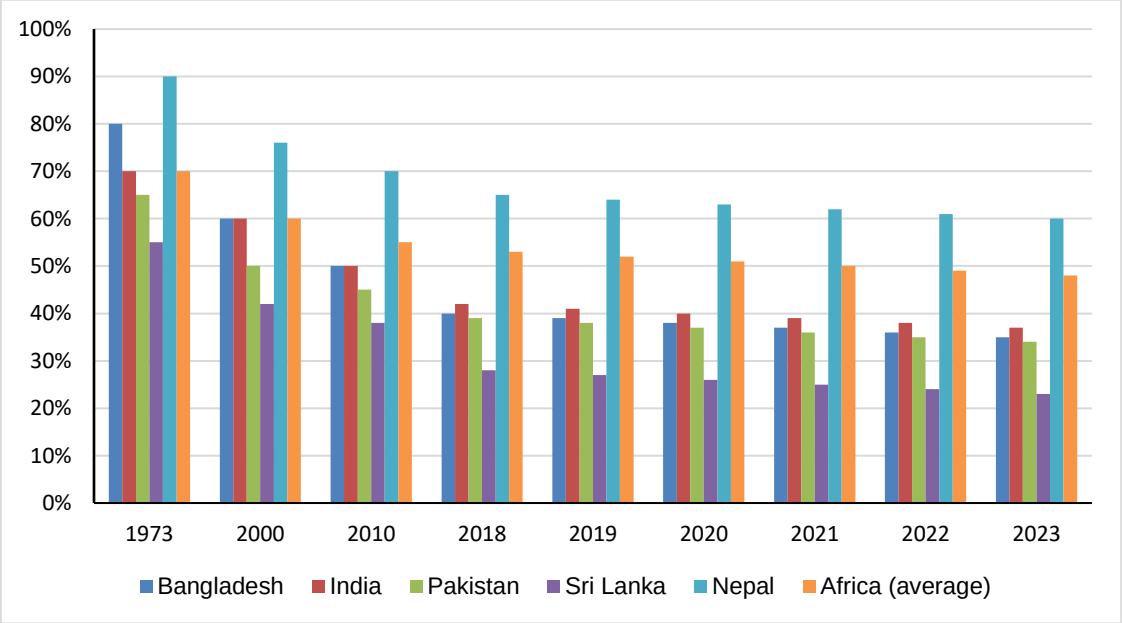

Fig. 3. Percentage of Total Employment in Agriculture (1973-2023).

Overall employment of total workforce in Africa declined from 70% in 1973 to 48% in 2023.

The mentioned changes represent the economic transition in both South Asia and Africa. Both of the regions are moving towards a diversified and complex economy. Agricultural sector continues to employ a larger portion of it's workforce in Africa in contrast of South Asia. As the decline of agricultural employment in Africa is slower than South Asia it indicates that economic transition and diversification is occurring at a slower and different pace. While transforming towards a more diversified and developed economy both of the regions faces challenges associated with broader economic development. Workers with very low or no skill levels are being compelled to take up informal work as a growing number of them lose their positions in the formal and organized sectors (Sarker, M.M.R., 2017).

3.5 Real GDP Per Capita for South Asian and African Countries

In South Asia, countries like Bangladesh, India and Pakistan, Real GDP Per Capita has shown a varied trend over the period of time. Countries of South Asia such as – Bangladesh and India has recently experienced a sustainable economic due to the growth of their industrial and service sectors. These sectors have significantly contributed in increasing real GDP Per Capita. On the other hand, African countries such as – Nigeria and South Africa shows varied patterns of real GDP Per Capita, which represents the

diverse and varied economic activities of this region.

Comparison of Real GDP Per Capita between South Asia and Africa provides valuable insights about the economic activities of these regions. Some of the South Asian countries rapidly filling up the gap with developed economy at the same time some of the African countries struggles with challenges such as – higher rate of poverty, economic instability. The Table 5 presents Real GDP Per Capita of the countries of South Asia and Africa with different levels of economic improvement and progress across these two regions.

The graph presents Real GDP Per Capita of South Asian and African countries from 1973 to 2023 with key trends in economic development and inconsistencies between the two regions.

Over the last five decades almost all of the South Asian countries experience a remarkable growth in Real GDP Per Capita. Bangladesh experienced an impressive growth. In 1973 its Real GDP Per Capita was $408 while in 2023 it raised to $2,015. India faced a rapid growth from $491 to $2,190. Sri Lanka also saw a rapid rise in Real GDP Per Capita growth from $615 in 1973 to $3,450 in 2023. Sri Lanka's Real GDP Per Capita reached its peak in 2020 with $3,862.

Table 5. Real GDP Per Capita in South Asian and African Countries (1973-2023)

Country	1973	2000	2010	2020	2023
South Asia					
Bangladesh	408	539	896	1,970	2,015
India	491	917	1,425	2,120	2,190
Pakistan	673	869	1,171	1,284	1,300
Sri Lanka	695	1,683	2,706	3,682	3,450
Nepal	262	374	685	1,086	1,100
Bhutan	372	945	2,202	3,414	3,530
Maldives	1,123	3,827	7,280	9,349	9,500
Africa					
Nigeria	898	1,206	2,226	2,041	2,100
South Africa	3,274	5,294	6,511	5,331	5,410
Kenya	489	711	1,133	1,802	1,880

(ILO, 2023)

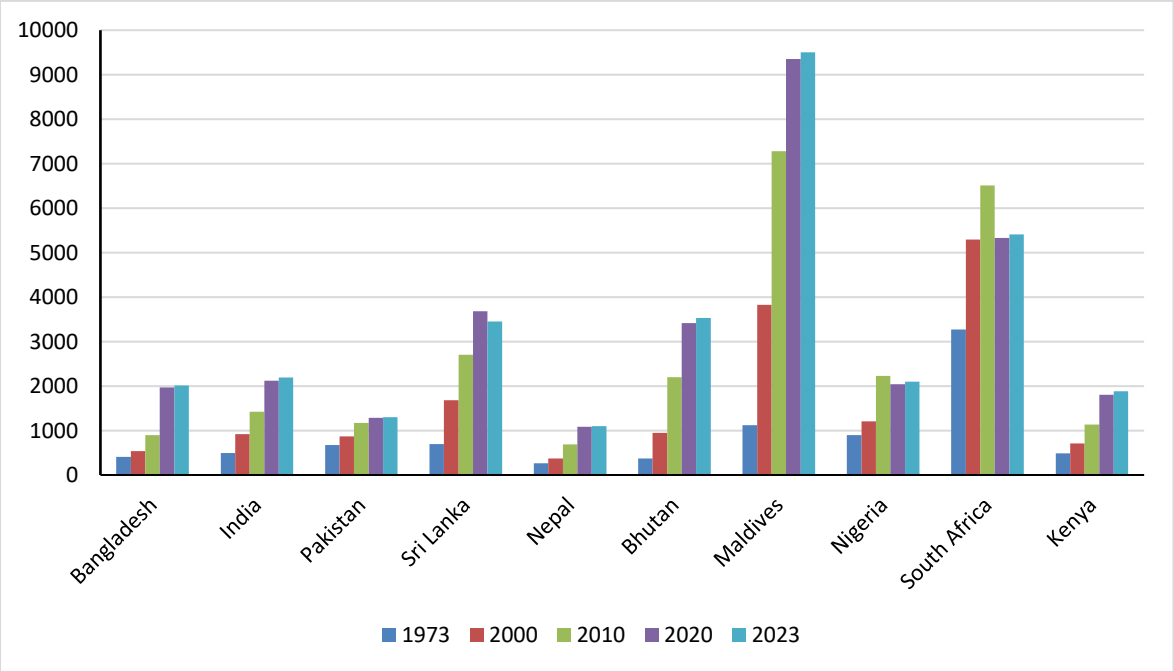

Fig. 4. Comparative Real GDP Per Capita for South Asian and African Countries (1973-2023)

GDP Per Capita of Nepal grew from $262 in 1973 to $1,100 in 2023. At the same time, Bhutan experienced more steady increase from $898 in 1973 to $3,530 in 2023. Maldives is the highest Real GDP Per Capita holder among the countries across South Asia. It's Real GDP Per Capita increase from $1,123 in 1973 to $9,500 in 2023.

Similarly, the countries of Africa region represents more deverse growth. Real GDP Per Capita of Nigeria was $898 in 1973 and in 2023 it experienced a steady increasing manner to $2,100. On the other hand, South Africa stated with highest Real GDP Per Capita of $3,274 in 1973 and it reached it's peak in 2010 and due to economic fluctuations in 2023 it declined to $5,410. Moreover, Kenya showed a steady growth. It started with a Real GDP Per Capita of $489 in 1973 and in 2023 in increased to $1,880.

The data reveals the comparing factors among the countries of these two regions. South Asian countries including Bangladesh and Maldives experienced a substantial and rapid growth with their Real GDP Per Capita, while the countries of Africa showed a mixed manner of Real GDP Per Capita growth often affected by the fluctuations, instability and other related external factors.

3.6 Comparative Crop Production Index (CPI) of South Asian Countries

Comparative Crop Production Index (CPI) offers essential perception about the agricultural productivity of South Asian Countries including – Bangladesh, India, Pakistan, Nepal, Sri Lanka, Bhutan and Maldives. This index compares between current year crop production in contrast of a base year, which presents a clearer landscape of agricultural trends. CPI works as tool to address the changes in level of production indicating growth, stability or reduced level of output. Moreover, CPI is crucial to understand food security as it indicates the enhancing or reducing trends about the availability of food across these countries.

The following table presents the CPI of the South Asian countries with an overview of the agricultural progress in this region.

Table 6. CPI Index of South Asian Countries (1973-2023)

Country	1973	2000	2010	2020	2023
Bangladesh	35	70	90	116	118
India	45	84	102	124	126
Pakistan	40	82	95	109	111
Sri Lanka	38	76	88	105	107
Nepal	41	81	94	112	114
Bhutan	30	68	85	108	110
Maldives	32	65	72	86	87

(Food and Agriculture Organization [FAO], 2023)

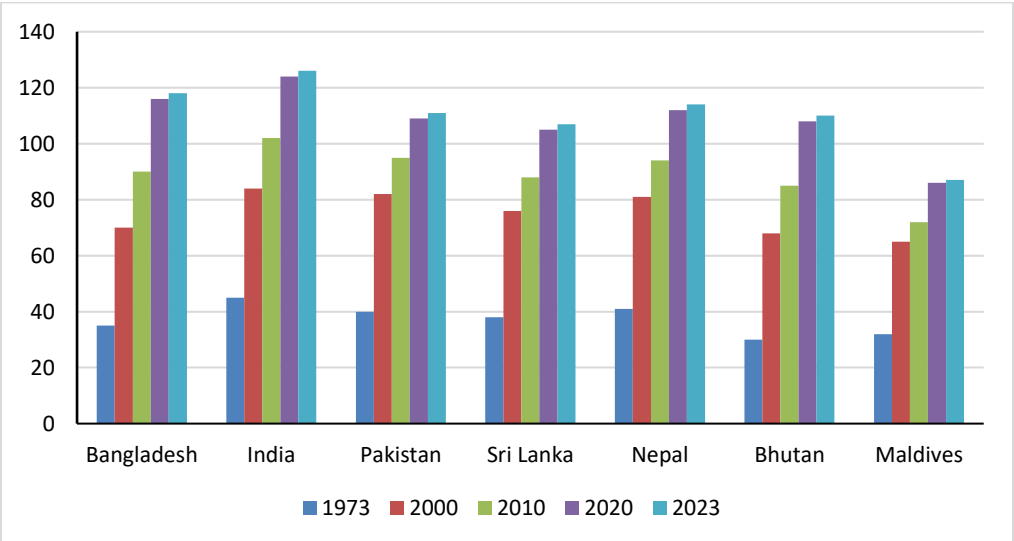

Fig. 5. Comparative Crop Production Index (CPI) of South Asian Countries

The above graph illustrates the CPI index of South Asian countries from the year 1973 to 2023. This graph represents a significant developing trend in agricultural production across the region. Every country's CPI follows an increasing manner signifying developments in agriculture over the decades.

Among the countries of South Asia, Bangladesh has showed a notable growth, specifically from the year of 2000. In 1973, the country's CPI was 35 while in 2023 it increased to118. On the other hand, neighboring country of Bangladesh, India maintained the highest CPI index while it started at 45 in 1973 and in 2023 it reported 126.

Pakistan's CPI index also has a progress. In 1973, the country's CPI index was started with 40 and in 2023 it is 111. Sri Lanka and Nepal both country has shown a steady but slow progress of CPI index. In the case of Sri Lanka, in 1973 Sri Lanka's CPI index was 38 and in 2023 it increased to 107. Nepal's CPI index in 1973 was 41 and in 2023 it increased to 114.

In contrast of other South Asian countries Bhutan and the Maldives has a smaller agricultural sector with geographical challenges. Bhutan's CPI index in 1973 was 30 and in 2023 it was 110, which reflects a slower growth of CPI in Bhutan. Similarly, the Maldives has the lowest CPI in South Asia. In 1973, it was 32 and in 2023 it increased only to 87, which reflects about the constraints of agricultural productivity in the Maldives.

The CPI index represents the overall development in agricultural sector in South Asia, while the countries showed a diversified growth rates.

4. CONCLUSION

Agricultural transformation is essential for economic development as it connects traditional agricultural methods with contemporary, sustainable practices. The importance of agriculture in South Asia and Africa with respect to GDP growth, poverty reduction, and food security is underscored in this study. The Green Revolution, technological advancements, and supportive policies have enabled South Asia, which is led by countries such as India and Bangladesh, to accomplish substantial agricultural growth. However, Africa's progress has been inconsistent. Some nations, such as Kenya and Nigeria, have demonstrated substantial progress; however, others encounter obstacles, including inadequate technology access and underdeveloped markets. The four-stage framework of agricultural transformation provides a straightforward route from subsistence farming to advanced, technology-driven agriculture. It is imperative to maintain development and confront challenges such as climate change by continuing to invest in sustainable practices, infrastructure, and education. Agricultural transformation can be facilitated by effective strategies and collaboration, which can lead to long-term economic diversification and global food security.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Mellor, J. W. 2017. *Agricultural development and economic transformation: Promoting growth with poverty reduction*. Springer.

Kitole, F. A., Mkuna, E., & Sesabo, J. K. 2024. Digitalization and agricultural transformation in developing countries: Empirical evidence from Tanzania agriculture sector. *Smart Agricultural Technology, 7,* 100379.

Christiaensen, L., & Martin, W. 2018. Agriculture, structural transformation, and poverty reduction: Eight new insights. *World Development, 109,* 413-416.

Akramov, K. T. 2011. International food prices, agricultural transformation, and food security in Central Asia. *Development in Practice, 21*(4-5), 741-754.

Sarker, M.M.R. & Fagun, A.N., 2021. COVID-19, Food security, food prices and urban-rural interrelationship for sustainable food and nutritional security: A study on Dhaka City. *International Journal of Agricultural Economics*, *6*(1), pp.47-58.

Timmer, C. P. 1988. The agricultural transformation. In H. Chenery & T. N. Srinivasan (Eds.), *Handbook of*

development economics (Vol. 1, pp. 275-331). Elsevier.

Byerlee, D., de Janvry, A., & Sadoulet, E. 2009. Agriculture for development: Toward a new paradigm. *Annual Review of Resource Economics, 1*(1), 15-31. https://doi.org/10.1146/annurev.resource.050708.144335

Evenson, R. E., & Gollin, D. 2003. Assessing the impact of the Green Revolution, 1960 to 2000. *Science, 300*(5620), 758-762. https://doi: 10.1126/science.1078710

Lipton, M. 2005. Can small farmers survive, prosper, or be the key channel to cut mass poverty? FAO e-conference on agricultural investment.

Parvin, M.M. and Sarker, M.M.R., 2021. Economic analysis of tomato production in Cumilla and Rangpur Districts of Bangladesh. *International Journal of Agricultural Economics*, *6*(4), pp.193-197.

Akter, M. & Sarker, M.M.R., 2021. Impacts of climate factors influencing rice production in Bangladesh. *International Journal of Environment and Climate Change*, *11*(1), pp.43-52.

Reardon, T., Timmer, C. P., Barrett, C. B., & Berdegué, J. 2003. The rise of supermarkets in Africa, Asia, and Latin America. *American Journal of Agricultural Economics, 85*(5), 1140-1146. https://doi:10.1111/j.0092-5853.2003.00520.x

FAO. 2013. *Climate-smart agriculture: Sourcebook*. Food and Agriculture Organization of the United Nations.

Anderson, J. R., & Feder, G. 2004. Agricultural extension: Good intentions and hard realities. *The World Bank Research Observer, 19*(1), 41-60. https//doi: 10.1093/wbro/lkh013

Pingali, P., & Feder, G. 2007. Agricultural mechanization: Adoption patterns and economic impact. In R. Evenson & P. Pingali (Eds.), *Handbook of agricultural economics* (Vol. 3, pp. 2779-2805). Elsevier.

Pretty, J. 2008. Agricultural sustainability: Concepts, principles and evidence. *Philosophical Transactions of the Royal Society B, 363*(1491), 447-465. https://doi.org/10.1098/rstb.2007.2163

International Labour Organization. 2023. *ILOSTAT*. ILO. https://ilostat.ilo.org/

World Bank. 2023. *Agricultural productivity indicators for South Asia and Africa (1973-2023)*. World Development Indicators. Retrieved from https://data.worldbank.org/

FAO. 2023. *Sustainable agriculture: Building climate-resilient and productive systems*. Food and Agriculture Organization.

FAO. 2023. *Water management in agriculture: Improving efficiency and sustainability*. Food and Agriculture Organization.

ILO. 2023. *Youth employment in agriculture: Opportunities and challenges in Bangladesh*. International Labour Organization.

Sarker, M.M.R., 2017. Migration Flows in South Asia. *Regional Cooperation in South Asia: Socio-economic, Spatial, Ecological and Institutional Aspects*,47-6

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