

# GDP growth: Role of human capital-augmented labour and agri productivity

Tahmina Sultana and Md Moniruzzaman | Wednesday, 30 January 2019



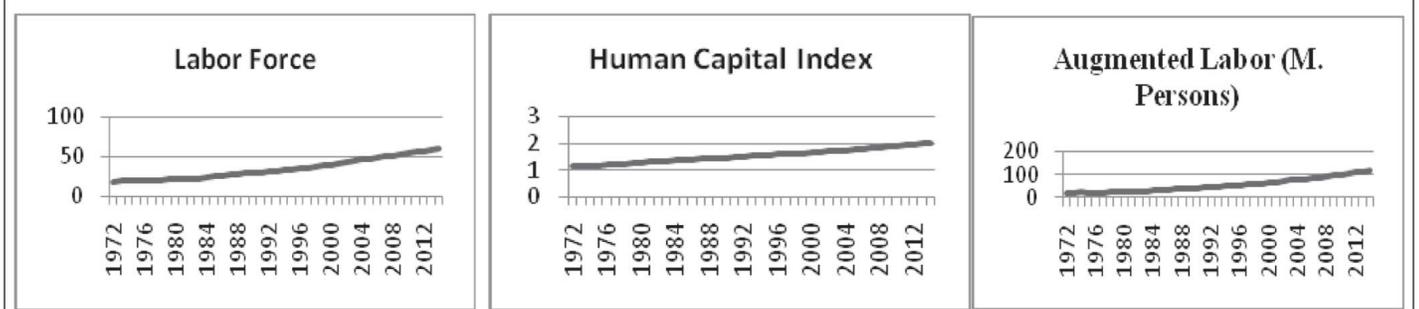
Bangladesh is a large deltaic country where agriculture remains a very important sector of its economy. Currently the share of agriculture in gross domestic product (GDP) is only 13 per cent whereas it was 60 per cent in 1972 (just after the independence) and the highest share was 67 per cent in 1975, according to World Bank data.

Over the years, the share of agriculture in GDP has significantly declined but the performance of this sector remains an irreplaceable driving force for economic growth of the country. This sector has an impact on major macroeconomic objectives like employment generation, human resources development, poverty alleviation and food security. However, due to the deltaic characteristics of the country -- accrual and erosion -- it is observed that the size of arable land as well as total land does not remain fixed over time. The size of agricultural land is being lost every year which is a rising concern for food security of the burgeoning population.

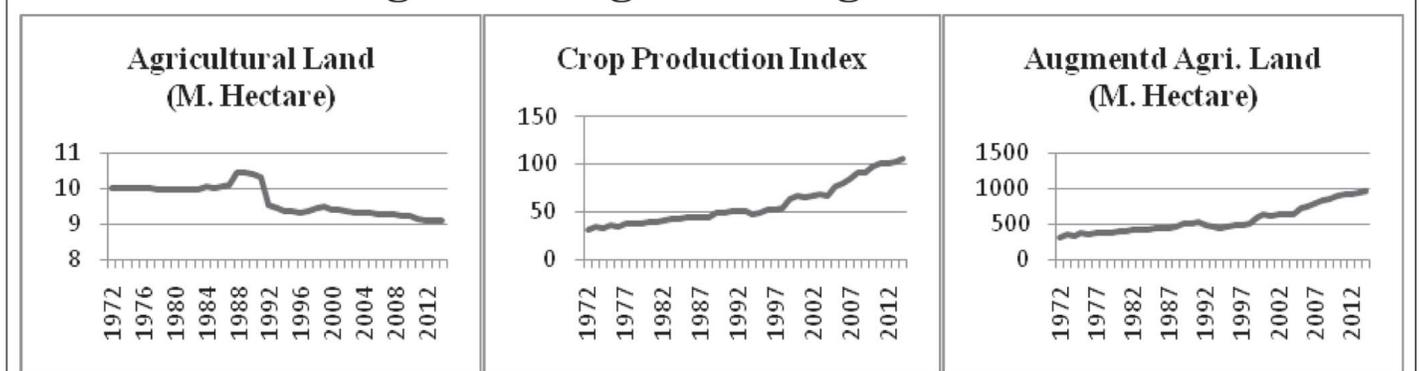
The Bangladesh Bureau of Statistics (BBS) data shows that total land and arable land of Bangladesh has increased in some years due to accretion process. This increase in accreted land in coastal and river areas offers huge potential but faces a number of challenges for converting into productive agricultural land. The changing but scarce characteristics of agricultural land are not only limiting the potential productivity of labour and capital but also act as a dragging factor to potential GDP.

The size of per capita agricultural land is declining not only through erosion of land but also by the pressure of huge population and conversion of agricultural land into non-agricultural land. However, the Global Economy data shows that agricultural productivity has been on rising trend over the years. Therefore, an attempt has been undertaken to explore the contribution of augmented agricultural land and augmented labour in growth of GDP of Bangladesh. Here, crop production index shows agricultural production for each year (prepared by FAO) and human capital index is based on years of schooling and returns to education (Penn World Table 9.0). Agricultural land is augmented by crop production index and labour is augmented by human capital index.

**Figure 1: Human Capital Augmented Labour**



**Figure 2: Augmented Agricultural Land**



Real GDP is chosen as dependent variable while capital stock, human capital augmented labour and production index augmented agricultural land are taken as independent variables as followed by the existing

literatures on growth model. The variable augmented labour (Figure 1) is the product of labour and human capital index, whereas augmented agricultural land (Figure 2) is the product of agricultural land and crop production index.

One of the pioneers of Endogenous Growth model, Robert Lucas (1988) has developed an endogenous production function with capital stock and labour where labour is augmented by the proportion of total labour spent working and the stock of 'human capital'. Lucas emphasises human capital and suggests that investment in human capital has more spillover effects than the investment in physical capital; and human capital is termed as engine of economic growth.

However, for checking the importance of augmented land and human capital, some implications are must to be followed so that along the balanced growth path, the growth of GDP and capital remains equal. In order to maintain positive growth of per capita GDP, the following conditions are to be satisfied:

i. The larger the share of capital stocks, the larger the pushing effect and the smaller the effect of dragging factors.

ii. The larger the share of human capital augmented labour, the larger the pushing effect on GDP growth and the smaller the effect of dragging factor.

iii. The larger the negative impact of population growth, the larger the share of agricultural land. However, this could be nullified by higher growth of human capital and agricultural productivity.

iv. If the absolute value of the growth of crop production index is greater than the growth of falling land and population growth, there will be no dragging effect on per capita GDP growth.

Based on econometric analysis, results show that the estimated coefficient of capital stock is 0.44 and the same for human capital augmented labour is 0.54 (at 1.0 per cent level of significance) and 0.16 for augmented agricultural land (not significant at any level of significance). The coefficients of capital and labour jointly exhibit a production function with constant returns to scale. The ECT coefficient is -0.197 which is significant at 1.0 per cent level and indicating high speed of convergence from disequilibrium.

But when the contribution of crop production index has been discounted, we have got estimated coefficient of capital stock 0.54 and the same for human capital augmented labour 0.35 and for agricultural land -0.97. It is found that the agricultural productivity has huge impact on the production system which reduces the share of agricultural land in GDP from 0.13 to -0.97. On the other hand, it is found that estimated coefficients are 0.51 for capital stock, 0.25 for labour and -0.26 (insignificant) for augmented agricultural land when the model is discounted by human capital index. It signifies that human capital index is a very powerful determinant which brings down the contribution of labour in GDP from 0.53 to 0.24.

Therefore, the analysis driven findings revealed that estimated coefficients exhibit constant returns to scale production function. The growth of human capital and agricultural productivity appeared as the most contributory factors to outweigh negative effect of the growth caused by falling agricultural land and population growth and to continue positive growth of per capita GDP. The share of augmented labour is higher than the share of capital.

From the study findings, the recommended policy is to provide more focus on creating human capital through spending on education, skills, health and nutrition. Moreover, stress should be given on increasing the utilisation rate and productivity of agricultural land for ensuring food security for around 160 million (16 crore) people of Bangladesh. Therefore, necessary steps should be taken to protect agricultural land from its shifting to non-agricultural utilisation. Formulation of land zoning policy and land reclamation policy may be instrumental for effective use and protection of declining agricultural land and adverse environmental impacts.

*Tahmina Sultana is working as deputy director - research at Bangladesh Institute of Governance and Management (BIGM) and Dr. Md. Moniruzzaman is associate professor at Bangladesh Institute of Governance and Management (BIGM).*

[tahmina.sultana@bigm.edu.bd](mailto:tahmina.sultana@bigm.edu.bd), [md.moniruzzaman@bigm.edu.bd](mailto:md.moniruzzaman@bigm.edu.bd)

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### **Acting Editor : Shahiduzzaman Khan**

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Telephone : PABX : 9553550 (Hunting), 9513814, 7172017 and 7172012 Fax : 880-2-9567049

Email : [editor@thefinancialexpress-bd.com](mailto:editor@thefinancialexpress-bd.com), [fexpress68@gmail.com](mailto:fexpress68@gmail.com)