**Impact on Economic Growth of Agriculture in India Vis-À-Vis A Few Countries of Asia**

**By**

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Abstract:

India is recognized all over the world as an agriculture dependent country. In recent times emphasis has been placed not only on the agricultural crops but also on horticultural crops. The current commercialization takes hold of the progressive peasantry and greatly benefits the farmer. In the present day, commercialization of agriculture plays a vital role behind the economic growth. It is revealed that for first quarter of 2020, agriculture was the only sector to have reported positive growth. The Gross value added (GVA) by agriculture has enhanced by 3.4 per cent in the first quarter of 2020, compared to 2019. Thus the agriculture sector has added Rs 14,815 crore in the first three months of 2020 in absolute monetary terms. It is obvious that there are few drawbacks involved with this process as peasants are over using their lands in order to increase the commercialization of crops which leads to lack of soil fertility and environmental pollution. However the economic aspects of farming and the impact on economic growth cannot be ruled out.

Major objective of the chapter is to analyze the influence or the impact of agriculture on GDP of India and few countries of Asia such as Afghanistan, Bangladesh, Bhutan, China, Japan and Nepal. The data used for the study have drawn from World Bank and other statistical reports. The study covers the period of 1990 to 2019. Ordinary least squares multiple regression models have used to analyze the relation between GDP growth and contribution of agriculture of the selected countries.

Key Words: Agriculture, commercialization, GDP growth, Economic growth, Gross value added (GVA), regression analysis.

**Introduction**

# In developing economies agriculture is a very essential and important sector. Agriculture plays a vital role in the Indian economy. Over 70 per cent of the rural households depend on agriculture. Agriculture is an important sector of Indian economy as it contributes about 17% to the total GDP and provides employment to over 60% of the population. Indian agriculture has registered impressive growth over last few decades. The food grain production has increased from 51 million tonnes (MT) in 1950-51 to 250MT during 2011-12 highest ever since independence.( Kekane Maruti Arjun, 2013).The contribution of agriculture sector in Indian economy is much world's average (6. 4 per cent) the industry and service sector's contribution is lower than the world’s average 30 percent for the industry and 63 percent for the service sector (Ministry of Statistics and Programme Implementation,04 Jan 2021).The resilience of the farming community in the face of adversities made agriculture the only sector to have clocked a positive growth of 3.4% at constant price 2020-‘21 when other sectors slid. The share of agriculture in GDP increase 13.9 percent 2020-21 from 17.8 percent in 2019-20( [Shagun Kapil](https://www.downtoearth.org.in/author/shagun-kapil-131365), 2021).

India is ranked under the world largest producers 80% of agricultural produce items including many cash crops such as coffee and cotton 2010(FAOSTAT, 2014 data). India is currently the world's second largest producer of several dry fruits agriculture based textile, raw materials , tuber crops, pharmacies ,eggs, fishes, sugar cane and numerous vegetables(FAOSTAT, 2014 data). women's participation in economic activity throughout Asia and the Pacific region and the relative share of male and female labour force participation in agriculture that in South Asian countries such as India, Bangladesh, Bhutan , Nepal etc, a particularly high percentage( more than 60% and up to 98%) of employed in agriculture sector(<http://www.fao.org/3/af348e/af348e00.htm#Contents>).It is now widely acknowledged by most stakeholders that the role of agriculture and the rural economy is fundamental for securing sustainable gains in the fight against poverty (FAO,2008).A productivity induced expansion can pull actors with increase economic activity and impact cities in rural areas(Anriquez and Stamoulis, 2007).The research outcomes of Davis et al.(2007) show that in spite of revenue diversification by rural households, households in the lowest expenditure categories still drawn from a larger of their total earnings from agriculture sector when compared to household in higher income group. This suggests the need to accord continued attention and increased resource allocation to the agriculture sector over the long term period(FAO,2008).The importance of agricultural sustainable development is particularly high in south Asia and southeast Asia. Agriculture plays an important position in the economic and social development of south and southeast Asian countries, which has exclusively contributed to providing employment, improving food security, and reducing poverty (Anik et al2017)(Briones,2017)(Kim, J etal,2018).In the Millennium Development Goals by World Bank, the global society has an ambition to reduce extreme poverty, hunger, and malnutrition in developing countries. This has led to the realization that agricultural growth is not only important for overall growth but also most effective in reducing rural and urban poverty. The main focus in food-producing countries is to promote sustainable agriculture – so as to optimize food production, boost the incomes of farmers and maintain vibrant rural economies. (Sustainable agriculture and Food Security in Asia and the pacific, The United Nations Economic and Social Commission for Asia and the Pacific UNESCAP. 2009).The world's demand for food is expected to double within the next 50 years, while the natural resources that sustain agriculture will become scarce, degraded, and vulnerable to the effects of climate change. In many poor countries, agriculture accounts for at least 40 percent of GDP and 80 percent of employment. At the same time, about 70 percent of the world's poor living in rural areas mostly depend on agriculture for their livelihoods. Agriculture constitutes the main source of employment of the majority of the world’s poor. The share of agriculture in total employment in developing countries constitutes 53% of the total workforce in 2004(GerdienMeijerink & PimRoza2007).Asia houses the world’s underprivileged population where agriculture is large both in terms of aggregate income andtotal labor force. In its major sub-regions (South, Southeast and East Asia) 55% of the world’s total population lived with 73% of the world’s agricultural population in 2012. Hence, agriculture continues to play a crucial role in development, especially in these regions of Asia where the agrarian economy is common.( Lorna Econg 2014).There is renewed interest in agriculture motivated by the emerging countries of China and India as they focus on smallholder agriculture in agricultural commercialization as a strategy for reducing the growing gaps between rural and urban incomes (Pingali, 2010).The World Bank (2008) report states that in agriculture-based economies, agriculture can be the primary growth engine, whereas in transforming countries, agriculture is less important economic activity but is still a major instrument to reduce rural poverty. Agricultural economists have long investigated the role of agriculture in the economic development of a nation. Early analysts such as Lewis (1954) advocated agriculture as the basis for industrial and economic growth as it has an abundance of resources and has the ability to transfer surpluses to the industrial sector. Schultz (1953) propounded that agriculture secured subsistence for the people in the society and without it, there will be no overall economic growth. This proposition is still supported by contemporary studies viewing agriculture as the vibrant economic sector. In most developing countries, agriculture is the main sector that provides employment to large segments of the population thereby bringing sustained economic growth to the countries (Anthony, 2010).Johnston and Mellor (1961) support the agro fundamentalists’ view of the importance of agricultural contribution to economic progress especially in the early process of growth. To them, agriculture does not simply supply food and labor but is important for production and consumption linkages. (Lorna Econg , 2014).Adelman (1984) gave the theory of agricultural demand led industrialization (ADLI). He advocated a development strategy driven by agriculture. Increased agricultural productivity is the initiator of industrialization. He laid emphasis on small-to-medium-size farmers who are more likely to use domestically produced intermediate goods as opposed to large-scale producers who might import machinery and other inputs, which would weaken the linkages between agriculture and other sectors (Lorna Econg , 2014).Timmer (2002) analyzed the relationship between economic and agricultural growth for 65 developing countries from 1960-85. The analysis expands upon the panel data approach to estimate endogenous growth models. His findings suggested that a 1% increase in agricultural growth results to a 0.2% increase in the non-agricultural growth. Similarly, Self and Grabowksi (2007) established a positive relationship between different measures of agricultural productivity and average growth of real GDP per capita over 1960 – 1995 for a cross-section of countries. (Lorna Econg , 2014).In Japan, according to the farmers, their farm sector has been destabilized or weakened by a dependence or reliance on tariffs and ineffective government subsidies, which do not reward farms for innovation or productivity (Hiroko Tabuchi, New York Times, November 11, 2010).Agricultural farming in Bhutan is extremely vulnerable to impacts of climate change. The agricultural practice is totally dependent on vagaries of monsoonal rain and short growing period. The rugged mountainous topography and a fragile mountainous ecosystem make it more vulnerable to effects of climatic swings. In 1996, there was 80-90% loss in rice production due to blast disease. Turcicum damaged 50% of maize production in 2007, with bigger ruckus in 2008 when maize crops were flattened by severe windstorm.

The chapter seeks to investigate and analyse whether agriculture is a vibrant sector in the economic development or GDP growth of the agriculture-based country India vis-à-vis a few countries of Asia such as China, Bangladesh, Nepal, Bhutan, Japan and Afghanistan.

**Data base and Methodology**

To bring about the concerned objectives of our study, secondary data was collected from World Bank data base of seven different Asian countries such as India, Afghanistan, Bangladesh, Bhutan, China, Japan and Nepal. Important statistical techniques have used to analyze and interpret the data. The various tools such as compound annual growth rate, regression analysis have been used.

*Regression:*

To examine the factor relationship of dependent and explanatory (independent) variables, regression analysis is used wherever it is necessary. Regression analysis is the most important way to estimate the exact relationship between dependent variable and explanatory (independent) variables. Now, an equation of the linear regression line can be written as,

Y= β0 + β1X1 + β2X2+……. + βnXn + e; here Y is the dependent variable and X1, X2  are the explanatory variables. β0 is the constant or intercept. β1,β2 are regression coefficients. The adjusted R2 and F of the estimated regression equation of this model are such that the relevant regression model is fitted to the data set.

*Durbin Watson Test:*

It is a measure of autocorrelation or serial correlation in residuals from regression analysis. Autocorrelation is the similarity of a time series data over successive time intervals. It can lead to underestimate of the standard error. It can show the predictors are significant when actually they are not.

The value of test statistic is estimated by the following method:



Where et are residuals from ordinary least squares (OLS) regression the DW test reports test statistic with a value which live between (0 to 4), If the values of DW are,

1. exactly 2 ,then there is no autocorrelation.
2. 0 to less than 2, then there is positive autocorrelation.
3. more than 2 but less than 4, then there is negative autocorrelation.

But a thumb rule is that, the values of test statistic in the range of 1.5 to 2.5 are relatively normal. Values outside the range could be cause for concern.

**An Empirical Exercise of impact on economic growth of Agriculture:**

Here we consider Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables. Thus in our analysis we can write the model equation as,

PCGDPGRT =β0 + β1 AGLVAGRT+ β2 MFVAGRT+β3 SRVVAGRT+ β4 GRSCF + e

According to the collected data for the study period 1990 to 2019(Except Japan & Afghanistan), the above equation is estimated by Ordinary Least Squad (OLS) method. The estimated results of the selected countries are presented below.

INDIA:

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) to the extent of 83 per cent this means that the model has a very high predictive ability. The DW value is 1.8.Thus it is free from autocorrelation problem. It is also observed that coefficient of the variables are significant at 1 per cent except gross capital formation , which is significant at 5 percent level of significance. The whole model's significance level is at 1 per cent level of significance in the case of India for the study period (Table-1).

BANGLADESH:

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) to the extent of 74 per cent this means that the model has a very high predictive ability. It is also observed that coefficient of the variables are significant at 1 per cent level of significance. The DW value is 2.1.Thus it indicates the model is free from autocorrelation problem. The whole model's significance level is at 1 per cent level of significance in the case of Bangladesh for the study period (Table-1).

CHINA:

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) to the extent of 78 per cent this means that the model has a very high predictive ability. The DW value is 1.7.Hence the model is free from autocorrelation problem. It is also observed that coefficient of the variables are significant at 1 per cent level of significance. The whole model's significance level is at 1 per cent level of significance in the case of China for the study period (Table-1).

BHUTAN:

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) to the extent of 46 per cent. It is also observed that coefficient of the variable annual growth rate of total manufacturing value added (MFVAGRT) is significant at 1 per cent level of significant. The variable, annual growth rate of total services value added (SRVVAGRT) is significant at 5 percent level of significance. Here the variable annual growth rate of total agricultural value added (AGLVAGRT), is not significant .The DW value is 1.9. So that it lies in the normal range ( i.e, 1.5 to 2.5).Hence the model is free from autocorrelation problem. The whole model's significance level is at 1 per cent level of significance in the case of Bhutan for the study period (Table-1).

NEPAL :

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) to the extent of 84 per cent this means that the model has a very high predictive ability. It is also observed that coefficient of the variables are significant at 1 per cent level of significance except the variable annual growth rate of total manufacturing value added (MFVAGRT) , which is not significant in the model. The DW value is 1.8 . Thus it shows the model is free from autocorrelation problem. The whole model's significance level is at 1 per cent level of significance in the case of Nepal for the study period (Table-1).

Table - 1. Results of Regression Analysis for the Nations India, Bangladesh, China, Bhutan and Nepal for the Study Period 1990 to 2019.

|  |  |  |  |
| --- | --- | --- | --- |
| REGRESSION EQUATIONS | AdjR2 | F -Value | DW -Value |
| INDIA | PCGDPGRT=0.24AGLVAGRT\*+0.20MFVAGRT\*+0.58SRVVAGRT\*+0.08GRSCF\*\*-4.3 (6.1) (5.4) (5.9) (2.6) | 83% | 36.7\* | 1.8 |
| BANGLADESH | PCGDPGRT=0.18AGLVAGRT\*+0.26MFVAGRT\*+0.47SRVVAGRT\*+0.12GRSCF\*-4.2 (5.1) (7.5) (3.1) (3.3) | 74% | 128.7\* | 2.1 |
| CHINA | PCGDPGRT=0.17AGLVAGRT\*+0.28INVAGRT\*+0.59SRVVAGRT\*+0.08GRSCF\*-4.2 (3.5) (14.5) (17.2) (6.3) | 78% | 533.2\* | 1.6 |
| BHUTAN | PCGDPGRT=0.06AGLVAGRT+0.38MFVAGRT\*+0.20SRVVAGRT\*\*+0.01GRSCF+0.8 (0.28) (4.8) (2.2) (0.31) | 46% | 7.32\* | 1.9 |
| NEPAL | PCGDPGRT=0.43AGLVAGRT\*+0.006MFVAGRT+0.56SRVVAGRT\*+0.13GRSCF\*-2.9 (6.4) (0.23) (5.2) (4.8) | 84% | 37.9\* | 1.8 |
|  | \* Indicates significant at 1% level , \*\* Indicates significant at 5% level .The values of parentheses are ‘t’ Values.Sources: Author’s calculation by using open source data From World Bank. |  |  |  |  |

JAPAN

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and gross capital formation (GRSCF), Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of gross capital formation (GRSCF), annual growth rate of total agricultural value added (AGLVAGRT), Annual growth rate of total manufacturing value added (MFVAGRT), and annual growth rate of total services value added (SRVVAGRT) to the extent of 75 per cent this means that the model has a very high predictive ability. The DW value is 1.9.Hence it can be aid that the model is free from autocorrelation problem. It is observed that coefficient of the variable total agricultural value added (AGLVAGRT), is not significant but positive. On the other hand it is also observed that coefficient of the variables, annual growth rate of total manufacturing value added, annual growth rate of total services value added are significant at 1 per cent level of significance but coefficient of the variable, gross capital formation is significant at 5 percent level of significance. The whole model's significance level is at 1 per cent level of significance in the case of Japan for the study period 1995-2018. In the case of Japan, the study period has been taken 1995 to 2018 due to lack of availability of data. (Table-2).

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| Table-2.Results of Regression Analysis for the Nation JAPAN for the study period 1995 to 2018 |
| Regression Equation | AdjR2 | F | DW |
| PCGDPGRT=0.005AGLVAGRT+0.26MFVAGRT\*+0.77SRVVAGRT\*+0.09GRSCF\*\*+1.96 (0.3) (9.8) (7.05) (2.11) | 75% | 101.9\* | 1.9 |
|   |
| \* Indicates significant at 1% level , \*\* Indicates significant at 5% level .The values of parentheses are ‘t’ Values. Sources: Author’s calculation by using open source data From World Bank. |  |  |  |

AFGANISTHAN

The Regression equation concerning Annual Growth Rate of Per Capita Gross Domestic Product (PCGDPGRT) as regressand and Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) as explanatory variables or regressors shows that the variation in annual growth rate of per capita gross domestic Product is significantly explained by the value of Annual Growth Rate of Total Agricultural Value Added (AGLVAGRT), Annual Growth Rate of Total Manufacturing Value Added (MFVAGRT), and Annual Growth Rate of Total Services Value Added (SRVVAGRT) to the extent of 87 per cent this means that the model has a very high predictive ability. The DW value is 2.2. Thus according to the thumb rules the model is free from autocorrelation problem. It is also observed that coefficient of the variables, annual growth rate of total agricultural value added (AGLVAGRT), and annual growth rate of total services value added (SRVVAGRT) are significant at 1 per cent level of significance but annual growth rate of total manufacturing value added (MFVAGRT) is not significant. The whole model's significance level is at 1 per cent level of significance in the case of India for the study period. In the case of Afghanistan, the study period has been taken 2003 to 2019 due to lack of availability of data. Here we did not take the value of gross capital formation due to unavailability of the data (Table-3).

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| Table-3.Results of Regression Analysis for the Nation AFGANISTHAN for the study period 2003 to 2019 |
| Regression Equation | AdjR2 | F | DW |
| PCGDPGRT=0.26AGLVAGRT\*+0.06MFVAGRT+0.54SRVVAGRT\*-2.5 (7.4) (0.65) (6.6)  | 87% | 36.7\* | 2.2 |
|   |
| \* Indicates significant at 1% level. The values of parentheses are ‘t’ Values. Sources: Author’s calculation by using open source data From World Bank. |  |  |  |

In summary the analysis shows that in India, Bangladesh, China, Afghanistan as well as Nepal agriculture has a positive and significant effect on economic growth while in the case of Japan and Bhutan the economic growth is not significantly explained by the agricultural sector. Sustainable agriculture in Bhutan is an important factor for socio economic development as well as economic growth. In addition to climate related hazards, challenges to productive and agriculture in Bhutan including water scarcity , land holding, changing land use, negative human wildlife interactions, inadequate irrigation and poor infrastructural development(N Chhogyel , 2018 ).In the year of 2017, the Bhutan Government developed the most important project ‘Enhancing Sustainability and Climate Resilience of Forest and Agricultural Landscape and Community Livelihoods in Bhutan’. The major objectives of the project are to make stronger biological corridors, build flexibility for adaption to climate change and support sustainable agriculture in Bhutan by 2023(N Chhogyel , 2018 ).In the economy Japan high level transaction costs hamper efforts to consolidate farmland and raise efficiencies. Moreover, a sprawling and bureaucratic distribution system dissipates farmers’ earnings or their total revenue from the farm. [Hiroko Tabuchi, New York Times, November 11, 2010]

**Conclusion:**

The empirical outcomes show that, most of all of our selected countries are the evidence to support the agro-fundamentalists who believed and viewed agriculture as the engine of growth.While we are looking at the service sector at the moment, we have to acknowledge that agriculture is one of our most valuable sectors for economic development.

In this chapter we have seen that almost all of our selected countries except Japan and Bhutan are associated with agricultural development. Bhutan has a number of barriers to agricultural production, such as natural or ecological, water scarcity, fragmented landholding, changing land use, negative human-wildlife interactions, inadequate irrigation and poor infrastructural development. If such obstacles can be overcome, then we must see a direct impact on agricultural development and with it economic development. Citizens in these two countries are still largely dependent on agriculture. In Japan According to the farmers, their farm sector has been destabilized or weakened by a dependence or reliance on tariffs and ineffective government subsidies, which do not reward farms for innovation or productivity (Hiroko Tabuchi, New York Times, November 11, 2010). It can be said that ,in Japan high level transaction costs also hamper efforts to consolidate farmland and raise efficiencies. Moreover, a sprawling and bureaucratic distribution system dissipates farmers’ total earnings or their total revenue from the farm. [Hiroko Tabuchi, New York Times, November 11, 2010]

 Therefore, it is not entirely correct to say that economic development depends only on the service sector and the manufacturing sector, but it can also be said that the agricultural sector in an economy plays a leading role in economic development in tandem with the service sector and the manufacturing sector.

Thus it can be said that if economic development is to be done properly or appropriately in the future, economic development can be possible not only in the service sector or manufacturing sector but also in agriculture.

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