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A Study of Agriculture Value Added Percentage of Gross Domestic Product for Selected Asian Countries

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Abstract

Agriculture sector is considered most important sector our of primary sectors in any country. The basic needs of human being are to eat, salter and water. For hunger not just human being but all animal on planet is depend on agriculture sector so it is important to know that the growth of agriculture sector in the country. In this study Asian countries have been selected based on area on the earth. The selection of samples is considered as Russian which considered as highest area coverage on Asia after that China, India, Kazakhstan, Saudi Arabia, Indonesia and Iran selected for analysis purpose. The time period from 2006 to 2021 considered for the study. the major findings of the study were Russia, Kazakhstan and Saudi Arabia saw on an average constant trend of value added towards agriculture of GDP. Chine indicated decreasing trend whereas Iran in saw increasing trend of agriculture value added towards GDP. India is highest contributor of agriculture value added of GDP out of selected countries and Indonesia is on second position.

Keywords: Agriculture Sector, Gross Domestic Product (GDP), Asian Countries

Introduction

One of the most effective strategies for reducing extreme poverty, fostering shared prosperity, and feeding the estimated 9.7 billion people by 2050 is agricultural development. Compared to other sectors, the agriculture sector's growth is two to four times more successful in increasing the incomes of the poorest people. Research from 2016 revealed that agriculture was the primary source of income for 65% of impoverished working individuals. Agriculture is also essential to economic growth; in 2018, it contributed 4% of the world's GDP, and in the least developed nations, it may even make up more than 25% of GDP. Many rising nations won't advance without a material rise in domestic output since many developing agricultural producing nations depend on imports and food security. It is clear that during the past several years, agriculture's contribution to the growth of the global economy has made significant strides. On an average, agriculture takes up 11% of the world's land, while livestock grazing accounts for 26%. Food, fuel, fiber, and raw materials are the major products of agriculture. Here, the study is made on agriculture and forestry value added percentage of GDP (Gross Domestic Product) in selected Asian countries.

Literature review

(Fan & Chan-kang, 2005) have analyzed firm size, productivity and poverty in Asian agriculture. Asia's farming is based on small farms. The average length of farms in the region shrank due to the fragmentation of land holdings, while the proportion of small-scale holdings rose sharply. For food security and the reduction of poverty, these small-scale farmers are crucial. It is controversial if and how these small farms can continue to operate in the face of

globalization. In particular, the axiom "small is beautiful," which is grounded in the actual finding that small farms exhibit greater land productivity than large farms, is under attack. It has been demonstrated that there is a favorable correlation among farm size and worker productivity.

(Coelli & Rao, 2005) have worked on Total Factor productivity growth in agriculture: a malmquist index analysis of 93 countries, 1980-2000. In this study, researchers look at 93 industrialised and developing nations that make up a significant share of the world's population and agricultural production to determine levels and trends in agricultural productivity and output. Our analysis, which spans the years 1980 to 2000, uses data from the Food and Agriculture Organization of the United Nations. The study employs data envelopment analysis (DEA) to develop Malmquist productivity indices when trustworthy input pricing data is not available. The research looks at changes in agricultural production throughout time. Agriculture productivity issues related to catch-up, convergence, or in certain cases, potential divergence, are evaluated within a global context. In addition, the research calculates the shadow prices and value shares that are inherent in the Malmquist productivity indices based on DEA and assesses the veracity of their levels and changes over the study period.

(Janvry & Sadoulet, 2009) have studied on agricultural growth and poverty reduction: additional evidence. A key tool for reducing poverty is agricultural expansion, which has long been acknowledged but there are currently few and often dubious measures of this link. Based on current data, the authors give more proof at the sectorial and household levels. Agricultural labour productivity and yield increase have been linked to reduced rural poverty, although the strength of this relationship varies significantly between geographical settings, according to the results. The 40 percent of the population who live in poverty see income growth that is on average three times bigger when GDP growth comes from agriculture than when it comes from the rest of the economy. Rural regions contributed more than half of the observed aggregate drop in poverty when the decline in poverty is broken down into its urban, rural, and population shift components. Last but not least, the authors demonstrate how Vietnam's strong agricultural boom has provided rural households with means of escaping poverty. Despite the fact that the effectiveness of agricultural expansion in alleviating poverty is widely documented, research on the effectiveness of public investment in promoting agricultural growth is still lacking and context-dependent.

(Alena, 2010) has studied on productivity and growth the effects of research and development in African agriculture. This article evaluates and analyses total factor productivity increase in African agriculture between 1970 and 2004 under concurrent and sequential technological advances. Using a fixed-effects regression model and a polynomial distributed lag structure for agricultural R&D spending; the drivers of productivity increase are investigated. Agricultural production in Africa increased at a greater rate of 1.8 percent per year than is indicated by conventional estimates, which show an average productivity growth rate of only 0.3 percent annually. Productivity increase was mostly driven by technological advancement rather than changes in efficiency. Agriculture in Africa has been significantly impacted by trade liberalization, weather, and agricultural R&D. R&D has demonstrated to be a socially advantageous investment in African agriculture, with a rate of return of 33% annually. While substantial productivity growth following the mid-1980s was caused by a rapid rise in R&D spending of roughly 2 percent per year in the 1970s, slower productivity growth in the 2000s was caused by a stall in R&D spending in the 1980s and early 1990s. Results indicated that improving weather conditions and policy changes both had a role in the recovery of agricultural production after the mid-1980s. This finding is consistent with the current economic recovery in Africa, which is demonstrated by higher agricultural GDP growth rates.

(Golline, 2010) has analyzed agricultural productivity and economic growth. Despite being a sizable industry, agriculture is not always required to be the engine of economic expansion. In actuality, compared to the rest of the economy, the productivity of agriculture is quite low in the majority of emerging nations. It's possible that growth won't always be improved by expanding a low-productivity industry. The problem of reverse causality is another problem. Affluent nations or those with favorable institutional circumstances that benefit the agriculture sector may be the cause of economies that see increases in total production. There is therefore a tonne of evidence supporting correlations between gains in agricultural production and economic growth but little conclusive evidence for a causal relationship, even after 50 years of study on agricultural development. This study examines the theoretical justifications and empirical support for the idea that raising agricultural production spurs economic expansion in emerging nations. The development of agriculture is crucial for economic success in nations with big populations living in the interior and restricted access to foreign markets. Depending on how easy and expensive it is to import food, other nations will determine the significance of agriculture-led growth.

(Headey & Alauddin, 2010) have worked on explaining agriculture productivity growth: an international perspective. This paper gives estimates of multi-output, multi-input total factor productivity (TFP) growth rates in agriculture for 88 countries between 1970 and 2001, using both the less prevalent data envelopment technique and stochastic frontier analysis (SFA) (DEA). We find that the results from SFA are more credible than those from DEA, and we utilize them to examine global patterns and the factors that influence the increase of TFP in emerging nations. The main result is that key determinants of TFP growth include policy and institutional factors, such as public agricultural expenditure and pro-agricultural price policy measures. Distance to the next OECD nation is the most significant geographic correlate of TFP increase.

(Dethier & Alexandra, 2012) have worked on Agriculture and development: a brief review of the literature. This Research examines the economic literature's opinions on these issues. It covers a variety of topics, including the role that agriculture plays in the development process, the interactions between agriculture and other economic sectors, the factors that led to the Green Revolution and laid the groundwork for agricultural growth, the need for farmers to diversify their sources of income, strategies for rural development, and the problems with international trade policy and food security that have contributed to the recent spike in agricultural commodity volatility.

(Binswnger, 2013) have analyzed The stunted structural transformation of the Indian economy: agriculture, manufacturing and the rural non-farm sector. Since the late 1980s, India's economy has been growing rapidly, but not the country's agricultural sector. While rural-urban migration is still sluggish, the population and labour force in rural areas are both growing. The gap between urban and rural consumption, income, and poverty has not been widening, despite increased labour productivity differences between agriculture and non-agriculture, restricted rural-urban mobility, and slow agricultural expansion. The rapidly expanding rural non-farm sector, which now creates the most jobs in India, has become significantly influenced by urban-rural spillovers. Farm households are expanding into the sector to improve income, making rural non-farm self-employment particularly dynamic. Because of the labour shortage in rural regions, farm sizes will continue to shrink, agriculture will expand to feminize, and part-time farming will overtake other farm models.

(Arendonk, 2015) has worked on The development of the share of agriculture in GDP and employment: a case study of china, Indonesia, the Netherlands and the united states. Agriculture's role in the economy appears to be more significant in emerging nations than in

industrialized ones. The development of agriculture's contribution to GDP and overall employment in both emerging and developed nations is the main emphasis of this study. The case studies will be China, the Netherlands, Indonesia, and the United States. The study initially discusses some broad beliefs on the evolution of agriculture before outlining the theoretical approach and data taken from the National Input and Output Tables. The information spans from 1995 until 2010. A number of explanatory elements are taken into consideration for the shares' development throughout time. Results are contrasted across nations and across time.

(Khatum, 2016) has studied on Relationship between real GDP and Labour and capital by applying the cobb-Douglas production function: a comparative analysis among selected Asian countries. In Bangladesh, India, China, Malaysia, and Thailand, the study uses the Cobb-Douglas production function to examine the link between real GDP (the dependent variable) and labour and capital (the independent variables) and to draw comparisons between Bangladesh and the chosen nations. The research makes use of time-series data from 1990 to 2014. The model is estimated with Ordinary Least Square (OLS). Reliable parameter estimates have been obtained by applying the Newey-West test to test for autocorrelation. In all of the examined nations, the data indicate that there is a strong positive and substantial association between labour and capital and real GDP. At the 1% and 5% levels of statistical significance, the results are significant. The analysis also demonstrates that all of the chosen nations' manufacturing processes have rising returns to scale. Real GDP is calculated to rise by 301 percent for every 100 percent increase in labour and by 40 percent for every 100 percent increase in capital. China and Bangladesh are the two countries with the biggest labour and capital contributions. Due to their emphasis on investing in human capital and the significance countries place on the education, health, and training of their labour force, Malaysia (15%) and Thailand (10%) have the lowest capital contributions. The study comes to the conclusion that it is crucial to invest in these nations' large labour pools, particularly their female labour pools in the case of Bangladesh and India, as well as in the efficient use of capital by skilled labour and management, in order to maintain these nations' rising growth rates.

(Saengchai & Sriyakul, 2019) have studied on analyzing the role of government agriculture expenditure, extension service and agriculture credit on real agriculture GDP in ASEAN Countries. The study's goal was to examine how government agricultural spending (GAE), extension services (AES), and agricultural credit (AGC) affected the Real Agricultural GDP (RAG) of ASEAN nations. By gathering panel data for the last 30 years, the short- and long-term effects of GAE, AES, and AGC on the RAG of ASEAN nations were examined for this purpose. The panel ARDL technique was utilized to evaluate these associations using panel data spanning 30 years. This study is based on secondary data that was taken from the various country's databases. In the current data, the AES had a short-term, considerable impact on the RAG. Because it shows the function of AES, GAE, and AGC on RAG, the study will be useful for researchers and decision-makers.

(Liu, Wang, & Yang, 2020) have worked on Agricultural productivity growth and its determinants in south and southeast Asian countries. In this study Researcher first apply stochastic frontier analysis (SFA) to examine the development of agricultural total factor productivity (TFP) and its three components—technical change (TC), technical efficiency change (TEC), and scale change (SC)—in 15 countries in south and south-east Asia from 2002 to 2016. Next, dynamic panel data models are used to identify the factors that influence the rise of the agricultural TFP. The findings show that agricultural production fell across the board in south and south-east Asian nations over the study period, raising doubts about the sustainability of future agricultural expansion. Though its contribution has diminished recently, technological advancement was the main driver of TFP growth. On the other hand, diminishing size and improvements in technological efficiency led to a gradual decline in productivity. Different

productivity performance levels were seen among nations, mostly due to technology development. In comparison to south Asia, south-east Asia's agricultural expansion was more consistent and long-lasting.

(Huu & Quang, 2021) have worked on the role of agricultural financing and development on sustainability: evidence from ASEAN countries. this study investigate how the ASEAN region's rural development, agricultural growth, and financial support for agriculture all contribute to the region's long-term sustainability. World Development Indicators (WDI) and Global Sustainable Development Reports are the primary sources for the pertinent data, which spans an 11-year period (2009 to 2020). (GSDR). According to the findings of the fixed-effect model (FEM) method, agriculture financing, agricultural advancement, and rural development have a large and favourable impact on the long-term sustainability of ASEAN countries. The results show that sustainable growth is driven by agricultural financing, agricultural innovation, and rural development, to be more precise. For policymakers who are in charge of regulating these industries, these findings have a number of ramifications. The necessary regulatory bodies should design policies that may offer effective incentives for the growth of agriculture, rural areas, and sustainable systems.

(Prasad, 2022) has analyzed agriculture and economic development. Although there have been numerous improvements and advancements in agriculture throughout the Lewisian two-sector model era up until the present, the sector's sluggishness has endured. Different policy approaches for agriculture have been tested in low-income nations. A succession of improvements in value addition through various forms of processing and through connecting supply chains to specialized markets best sum up the current connection connecting agriculture to the rest of the economy. Nevertheless, the inadequacies in low-income agriculture's systemic structure rarely make up for the sporadic gains in value addition. For instance, there is evidence of nations where more than 34% of the populace is underweight, despite the fact that agriculture accounts for 30% of GDP. Significant environmental and climatic issues also affect agriculture. While utilizing 40% of the land and 85% of the freshwater withdrawals from the developing world, this sector is responsible for up to 30% of glasshouse gas emissions. The answers to these problems may be found in a variety of locations, including effective technology, wise policies, open institutions, and, most importantly, effective markets.

Research Gap

Research gap of the study is indicated gap between past studies and current study. for the identification of research gap researcher reviewed various literature like (Alena, 2010) has studied on productivity and growth the effects of research and development in African agriculture, (Arendonk, 2015) has worked on The development of the share of agriculture in GDP and employment: a case study of china, Indonesia, the Netherlands and the united states, (Liu, Wang, & Yang, 2020) have worked on Agricultural productivity growth and its determinants in south and southeast Asian countries (Huu & Quang, 2021) have worked on the role of agricultural financing and development on sustainability: evidence from ASEAN countries but no single study has been identify for the agriculture, forestry and fishing value added as percentage of GDP (Gross domestic product) so, there is a research gap for doing further research.

Methods

the following research methodology has been followed by researcher for carried out research on agriculture value added as percentage of gross domestic product.

The objective of this study are to analyze value added of agriculture as percentage of GDP in selected countries and to compare performance of value added of agriculture among selected countries.

Hypotheses for the study

H_0 = There is no significant difference among value added of agriculture, forestry and fishing percentage of GDP for the study period.

Period of the study

The period of the study indicated time framework the study. for the study time period is considered as 2006 to 2021.

Scope of the study

The scope of the study has been divided for the study in two parts first one is considered as functional scope and second one is geographical scope.

Functional Scope

Functional scope of the study has considered as area of agriculture value added as percentage of gross domestic product.

Geographical Scope

The geographical scope is considered as selected countries like Russia, China, India, Kazakhstan, Saudi Arabia, Indonesia and Iran.

Selection of Samples

For the selection of samples non probability sampling technique has been used. In non-probability sampling technique judgmental type of sampling is considered for below samples. For the selection of samples area occupancy by country is considered and as per larger area it has been given rank chronologically.

Rank	Country	Capital	Area KM^2
1.	Russia	Moscow	17,098,242
2.	China (PRC)	Beijing	9,596,961
3.	India	New Delhi	3,287,263
4.	Kazakhstan	Nur-Sultan	2,724,900
5.	Saudi Arabia	Riyadh	2,149,690
6.	Indonesia	Jakarta	1,904,569
7.	Iran	Tehran	1,648,195

Source: https://visaguide.world/asia/

Data Collection:

Data analysis is considered as most important aspect in research work. for this study data has been collected from world bank website. The secondary source of data has been used in this research work. the reliability of data is depend on the source of data.

Data Analysis and Interpretation

Agriculture value added percentage of GDP (In Percentage)

Years	Russia	China	India	Kazakhstan	Saudi Arabia	Indonesia	Iran,
2006	3.86	10.63	16.81	5.50	2.95	12.97	7.12
2007	3.78	10.25	16.75	5.66	2.77	13.72	7.19

2008	3.75	10.17	16.79	5.32	2.32	14.48	6.12
2009	4.08	9.64	16.74	6.15	2.85	15.29	6.92
2010	3.34	9.33	17.03	4.51	2.64	13.93	6.50
2011	3.15	9.18	17.19	4.99	2.17	13.51	4.64
2012	2.93	9.11	16.85	4.29	2.08	13.37	6.80
2013	2.99	8.94	17.15	4.50	2.16	13.36	8.77
2014	3.36	8.64	16.79	4.33	2.23	13.34	9.38
2015	3.87	8.39	16.17	4.71	2.62	13.49	10.09
2016	3.84	8.06	16.36	4.56	2.69	13.48	9.78
2017	3.55	7.46	16.56	4.52	2.53	13.16	9.83
2018	3.39	7.04	16.03	4.40	2.14	12.81	11.22
2019	3.53	7.14	16.73	4.47	2.20	12.71	13.87
2020	4.00	7.70	18.23	5.39	2.54	13.70	12.78
2021	3.80	7.26	16.77	5.11	2.31	13.28	

Source: World Bank

The above table indicated percentage of value added in concern with GDP for agriculture, forestry and fishing with selected nations. In the year 2006 the percentage of agriculture forestry and fishing of GDP is indicated 3.86% which is constant for the year of 2008. In the year 2009 it was increased up to 4.08% but in the year 2010 it decreased to 3.34% furthermore the ratio was decreased for three consecutive years like 2011, 2012 and 2013. For that time period the percentage was 3.15%, 2.93% and 2.99% which saw decreasing trend. In the year 2014 the ratio was increased up to 3.36% further in the year 2015 it also increased by 0.51%. for the year 2016 to 2019 the ratio indicated as 3.84%, 3.55% , 3.39% and 3.53% respectively. In the year 2020 the ratio indicated highest contribution towards GDP as 4% which is higher for selected study period but in the year 2021 the ratio decreased by 0.20% and remains at 3.80%. In case of China it is indicated in the year 2006 is the percentage of agriculture forestry and fisheries of GDP is 10.63%. for the year 2007 and 2008 percentage is 10.25% and 10.7% respectively. For the year 2009, 2010, 2011, 2012 the percentage of GDP was indicated 9.64% 9.33% 9.8% and 9.11% respectively for that time period it was also indicated decreasing trend. further in the year 2013 the percentage of GDP in relation with agriculture forestry and fishing was 8.94% and for the year 2014 to 2016 the percentage was indicated 8.64%, 8.39% and 8.06% which is saw drastic decreasing trend as compared to 2006. For the year 2017 agriculture percentage of GDP was 7.46% and it was decreased in the year 2018 by 0.42% and remains at 7.04%. for the year 2019 2020 and 2021 the percentage of agriculture in concern with GDP was 7.4% 7.70% and 7.26% respectively it is source drastic decreasing brand during the study period it also means that year by year agriculture portion of GDP was decreased. In case of India the value added of agriculture in GDP was indicated as for the year 2006 to 2009 the percentage of GDP like 16.81%, 16.75% , 16.79% and 16.74 respectively. Which was indicated minor fluctuating trend during the study period. In the year 2010 the ratio was increased by 0.27% and stood at 17.03%. 17.19% value added of GDP has been recorded in the year 2011. For the years 2012 to 2019 value added of GDP was indicated as 16.85%, 17.15%, 16.79%, 16.36%, 16.56%, 16.03% and 16.73% which saw constant trend during the study period. There were minor changes in contribution toward GDP of agriculture. In the year 2020 the highest value added has been identified as 18.23% of GDP which was also higher out of selected countries and maybe that's why Indian is considered as agriculture based country. The fourth largest country Kazakhstan indicated value added of GDP for the time period 2006 to 2008 the percentage of value added indicated 5.5% 5.6% and 5.32% respectively full stop in the year

2009 the highest percentage of value added his been identified is 6.15% of GDP. For the year 2010 to 2019 value added of agriculture in GDP indicated is 4.51% 4599% 429% 4.5% 433% 4.71% 4.56% 4.52% 4.4% and 4.407% which saw minor constant trend during that time period. India 2020 agricultural value added of GDP is indicated 5.39% and in the year 2021 the percentage indicated 5.11% respectively. In the case of Saudi Arabia agriculture value added of GDP in percentage indicated as in the year 2006 to 2021 as 2.95% 2.77% 2.32% 2.85% 2.64% 2. 17% 2.08% 2.6% 2.23% 24 62% 2.69% 53% 2 14% 2.2% 24% and 2.31% respectively. It also means that the trend of value added in agriculture, forestry and fishing more or less same during the study period. In the concern of Indonesia value added in GDP indicated as for the year 2006 12.97%, for the year 2007 Percentage of GDP 13.72%, for the year 2008 percentage of GDP 14.48% and for the year 2009 percentage of GDP was 15.2%. in the year 2009 the highest value added has been identified by the data for Indonesia. For time period of 2010 to 2017 the percentage of value added of GDP in agriculture indicated is 13.93% 13.51% 13.37% 13.36% 13.34% 13.49% 13.48% and 13% respectively after that for the year 2018 to 2021 the agriculture value added of GDP has been identified as a decreasing Trend like 12.81% 12.71% 13.7% and 13.28% respectively. in the case of Iran agriculture value added to GDP in percentage indicated as for the 2006 and 2007 the percentage was 7.12% and 7.19% respectively. After that in the year 2008 to 2010 it is so decreased up to 6.12% 6.92% and 6.5% respectively. In the year 2011 the value added percentage has identified as 4.64% which was lowest during the time framework. For the year 2012 to 2015 the percentage saw increasing trend like 6.8%, 8.77%, 9.38%, and 10.09% respectively but in the year 2016 and 2017 the percentage further decreased up to 9.78%, and 9.83% respectively. The growth in agriculture value added has been identified in the year 2019 and 2020 as the percentage increase 13.87% and 12.78% respectively. Overall some selected countries indicated constant performance in agriculture value added two words GDP whose countries named as Russia India Kazakhstan Saudi Arabia Indonesia but China and Iraq indicated fluctuating trade during the study period.

Hypothesis Testing

Groups	*Count*	*Sum*	*Average*	*Variance*
Russia	16	57.22	3.57625	0.124972
China	16	138.94	8.68375	1.355358
India	16	268.95	16.80938	0.24178
Kazakhstan	16	78.41	4.900625	0.313926
Saudi Arabia	16	39.2	2.45	0.079493
Indonesia	16	216.6	13.5375	0.40154
Iran,	15	131.01	8.734	6.720426

Source: Calculated from MS Excel

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	2691.374	6	448.5623	353.8363	8.3E-67	2.186993
Within Groups	131.842	104	1.267712			
Total	2823.216	110				

Above table indicated one-way Anova for testing hypothesis. Hypothesis has been tested at 5% level of significance. The p-value of result indicated as 8.3E-67 which is less than 0.05 and another result also indicated calculated value is more than table value so null hypothesis has been rejected by one way Anova test which means there is significant difference in significant difference among value added of agriculture, forestry and fishing percentage of GDP for the study period.

Conclusion

The trend of agriculture value added towards GDP in Russia indicated as minor fluctuating trend and more over constant trend during the study period. In the year 2020 highest contribution has made towards Agriculture as 4% of GDP. In case of Chine it seems as decreasing trend as in the year 2006 the value added of agriculture was 10.63% which decreased in study period and stood at 7.26% in the year 2021. It also indicated more economic development leads to decrease in contribution of agriculture sector. Out of selected nations the highest contribution has been identified in India. Agriculture value added towards GDP was on an average 17-18% in India. In the year 2020 the highest valued added was realized as 18.23%. Kazakhstan saw minor fluctuating trend towards value added in GDP of Agriculture. In the beginning of study period 5.5% value added seems and it was increased in the year 2009 as 6.15% but in the year 2012 it was decreased up to 4.29% afterh correction at last in the year 2020 it was further increase in the year 2020 as 5.39%.

The lowest contributor out of selected countries was Saudi Arabia which indicated on an average 2% value added towards GDP. Indonesia considered as second highest contributor of value added towards GDP out of selected countries. On an average 13% value added has been identified by the study during the study period. Iran indicated increasing trend during the study period of value added of agriculture towards GDP. In the beginning of the study period 2006 the 7.12% performance saw but, in the year, it was increased up to 10.09% in the year 2015 after consecutive two years it was decreased but for the year 2018 to 2020 it further increased up to 12.78% which saw good increment toward GDP for Agriculture sector.

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