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Impact of Public Expenditure on Agricultural Output in Karnataka: An Analysis

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Abstract
The Indian economy still relies heavily on agriculture, which is also a core component of its socio-economic progress. A little over 54.6 per cent of the workforce (as of the 2011 census) derives some level of support from agriculture sector, which contributes around 21.1 per cent of GDP. Due of its extensive backward and forward connections, agriculture's success greatly influences the development of other sectors as well as the economy as a whole. It is not only a source of livelihood and food security for a sizeable portion of India's people. Public expenditure plays a pivotal role in increasing economic size as well as agriculture sector output in Karnataka state. The study regresses public expenditure and agriculture output on gross state domestic product to find out the impact of public expenditure and agriculture output on economic size of Karnataka. The OLS empirical results found that public expenditure and agriculture output have a significant positive impact on economic size of Karnataka at one percent level of statistical significance. The regression outcomes find that, the public expenditure of Agriculture and Allied Activities have positive effects on agriculture output in Karnataka at one percent level of statistically significance. Therefore, study suggests that the state of Karnataka should prioritize increased public expenditure in agriculture and allied activities, with a particular focus on capital expenditure rather than revenue expenditure.

Keywords: Public Expenditure, Agriculture Output and Impact.

1. Introduction

The Indian economy still relies heavily on agriculture, which is also a core component of its socio-economic progress. A little over 54.6 per cent of the workforce (as of the 2011 census) derives some level of support from agriculture sector, which contributes around 21.1 per cent of GDP. Due of its extensive backward and forward connections, agriculture's success greatly influences the development of other sectors as well as the economy as a whole. It is not only a source of livelihood and food security for a sizeable portion of India's people, but it also holds special importance for the underprivileged, weak, and vulnerable groups. Despite its importance, Indian agriculture faces a number of challenges, including low productivity, low investment, heavy reliance on the monsoon, fragmentation of land holdings, and ancient methods of cultivation. Among other things, falling public expenditure over the time has become a significant binding constraint on agriculture's performance and continues to be as cause and concern. Because of these factors, the agriculture sector needs adequate policy in order to raise living standards and increase welfare in general. While India's economy as a whole is expanding, agriculture's economic contribution to GDP is progressively dropping. However, agriculture is the

India's largest economic sector by population and is crucial to the country's entire socio-economic structure. According to the National Agriculture Policy of 2000, agriculture is expected to grow by more than 4Percent annually. Therefore, in order to attain the anticipated rate of growth, public spending in agriculture must be sped up. More importantly, agriculture public investment has the greatest impact, it must be properly timed, planned, and delivered. Many studies have been made on impact of public expenditure on agriculture output. The agriculture sector contribution to economy is not too much to consider for building sustainable development, but play the role of employment, export potential and financial impact on the economy. In this context, the present study aims to study the analyses of trends and patterns of agricultural expenditure on agriculture sector and also investigate the impact of public expenditure on agriculture output in Karnataka over the period from 2001-02 to 2021-22.

2. Hypothesis

- H_0: Public Expenditure has no significant effect on agriculture output in Karnataka.
- H_1: Public Expenditure has a significant effect on agriculture output in Karnataka.

3. Review of Literature

Atayi A and et al. (2020) conducted an empirical analysis on the impact of government spending on agricultural output in Nigeria from 1981 to 2018. They found a positive correlation between capital and recurring expenditure on agriculture by the federal government and agricultural output. This implies that increased government spending in these areas can lead to higher agricultural productivity. Based on these results, they suggest that the federal government of Nigeria should prioritize maintaining the quality and stability of its agricultural expenditure in order to achieve substantial improvements in productivity.

Dkhar and et al. (2018) a study examining the effects of government expenditure on agriculture and related activities on the economic growth (GSDP) in Meghalaya from 1984-85 to 2013-14 reveals noteworthy findings. The analysis indicates a notable positive influence of agricultural expenditure specifically focused on crop husbandry on the growth of GSDP. However, contrasting results are observed regarding the impact of public spending on forestry, dairy, and irrigation, which are found to have a negative effect on GSDP growth.

Abbas Ali and et al. (2016) the main objective of this study was to analyze the impact of Government expenditure on the agricultural sector and economic growth in Pakistan from 1983 to 2011. Time series data from the Pakistan Statistical Year Books and Economic Survey of Pakistan (2015) were collected for the analysis. The research employed various analytical tools, including the Augmented Dickey-Fuller (ADF) unit root test, Johansen Co-integration test, and Ordinary Least Squares (OLS) technique. The empirical results of the regression analysis demonstrated a significant influence of agricultural outputs and Government expenditure on economic growth in the country. However, it was noted that the agricultural sector in Pakistan still faces several challenges, such as inadequate funding, underdeveloped agriculture marketing, poor infrastructure, and irrigation shortages.

Ebere and et al. (2014) analyse the impact of government expenditure on agriculture on Nigeria's economic growth over a span of 33 years, using time series data sourced from the Central Bank of Nigeria. The researchers employed the Ordinary Least Square (OLS) technique to analyze the secondary data. In the analysis, GDP served as a proxy for economic growth, while agricultural output and government expenditure on agriculture served as indicators of government spending in the agricultural

sector. They found that there is a positive relationship among agricultural output, government expenditure, and GDP. The study recommends that the country prioritize the development of its agricultural sector by increasing government spending.

4. Methodology

The study is based on Secondary data, collected from the Reserve Bank of India and Economic Survey of India. This paper also used, appropriate statistical tools for data analysis such as percentage, Annual Growth Rate. The study used ordinary least square method for impact assessment of public expenditure on agricultural output by using data from 2001-02 to 2021-22.

5. Results and Discussion

5.1 Trends and Patterns of Public Expenditure on Agriculture and Allied Activities in Karnataka State

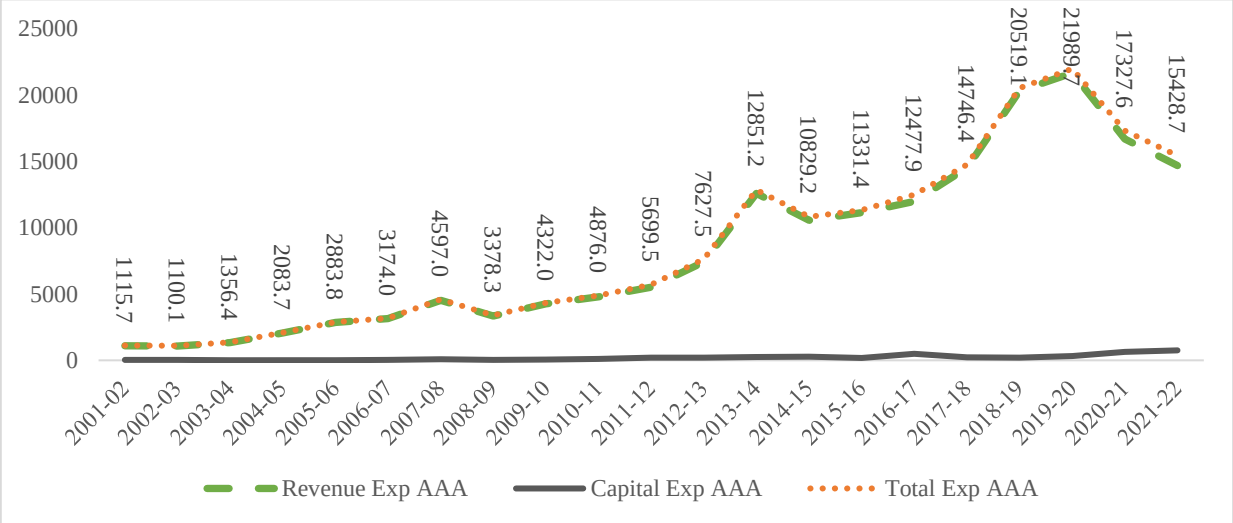
The Fig 1 shows the revenue expenditure on agriculture and allied activities in Karnataka has shown fluctuations over the years. It increased from 1088.1 lakh rupees in 2001-02 to a peak of 21668.6 lakh rupees in 2019-20. However, it decreased in the subsequent years, reaching 14677.1 lakh rupees in 2021-22. The capital expenditure on agriculture and allied activities has also exhibited fluctuations. It remained relatively stable in the early years but increased significantly from 2011-12 onwards. It reached a peak of 751.6 lakh rupees in 2021-22. The total expenditure on agriculture and allied activities is the sum of revenue and capital expenditures. Similar to the revenue expenditure, the total expenditure increased over the years, with the highest value recorded in 2019-20 at 21989.7 lakh rupees. However, it decreased in 2020-21 and further in 2021-22. Overall, the trends in public expenditure on agriculture and allied activities in Karnataka indicate an increase in investment from the early years until 2019-20. However, there has been a decrease in expenditure in recent years. It is essential to consider the specific reasons and policies that may have influenced these trends for a more comprehensive analysis.

The data provided in Fig. 2 shows the share of revenue expenditure on agriculture and allied activities in Karnataka has remained relatively high throughout the years. It ranged from 95.1 percent in 2021-22 to 99.5 percent in 2003-04, with an average share of around 97-99 percent. This indicates that the majority of the expenditure was allocated to revenue-related activities such as salaries, subsidies, maintenance, etc. The share of capital expenditure on agriculture and allied activities in Karnataka has shown some fluctuations. It ranged from 0.5 percent in 2003-04 to 4.9 percent in 2021-22. In general, the share of capital expenditure remained relatively low, indicating a smaller allocation of funds for long-term investments in infrastructure, machinery, and other capital-intensive activities. Overall, the data suggests that the focus of expenditure in Karnataka's agriculture and allied activities has primarily been on revenue-related aspects rather than capital-intensive investments. However, there has been a slight increase in the share of capital expenditure in recent years, indicating a potential shift towards allocating more resources for long-term development and infrastructure.

The Fig.3 shows the share of total expenditure on Agriculture and allied activities of the total government expenditure in Karnataka has shown fluctuations over the years. The share ranged from a low of 5.8 percent in 2002-03 to a high of 14.4 percent in 2013-14. From 2001-02 to 2007-08, there was a gradual increase in the share of total expenditure on Agriculture and allied activities, indicating a higher allocation of resources towards the agricultural sector. The share increased from 6.0 percent in 2001-02 to 12.3 percent in 2007-08. After 2007-08, the share remained relatively stable, fluctuating

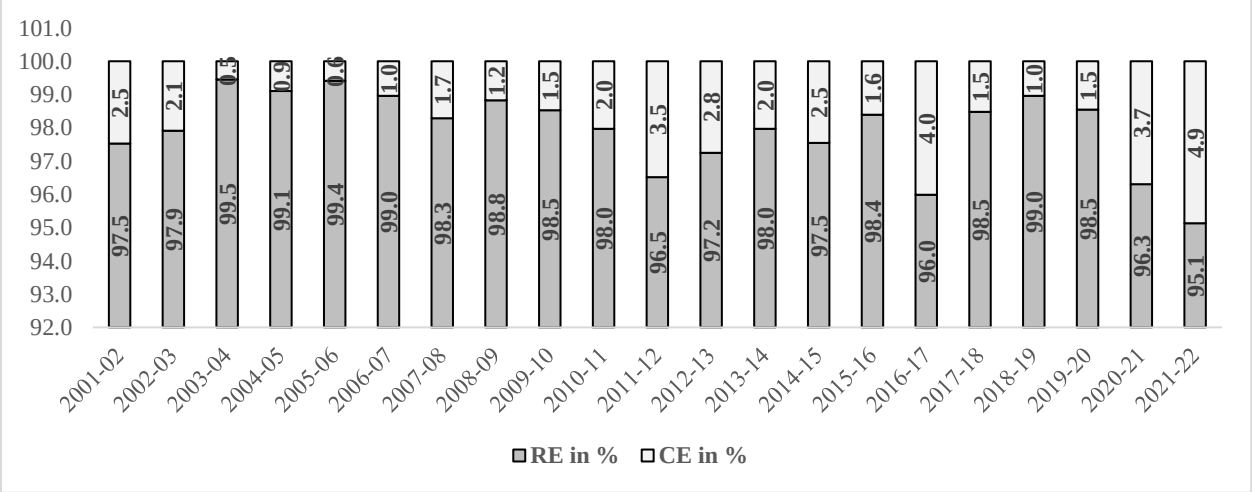
between 8-10 percent until 2017-18. However, there has been a slight decrease in the share in recent years, with 7.9 percent in 2021-22 being the lowest share observed since 2001-02. The years 2013-14, 2018-19, and 2019-20 recorded relatively higher shares of total expenditure on Agriculture and allied activities, with 14.4 percent, 12.5 percent, and 12.6 percent respectively. These years may have witnessed special focus or increased investment in the agricultural sector. In summary, the share of total expenditure on Agriculture and allied activities of the total government expenditure in Karnataka has shown fluctuations over the years. It is concluded that the fluctuations in the share of expenditure reflects changing priorities and budget allocations in the agricultural sector

Fig.1 Total Public Expenditure on Agriculture and Allied Activities in Karnataka



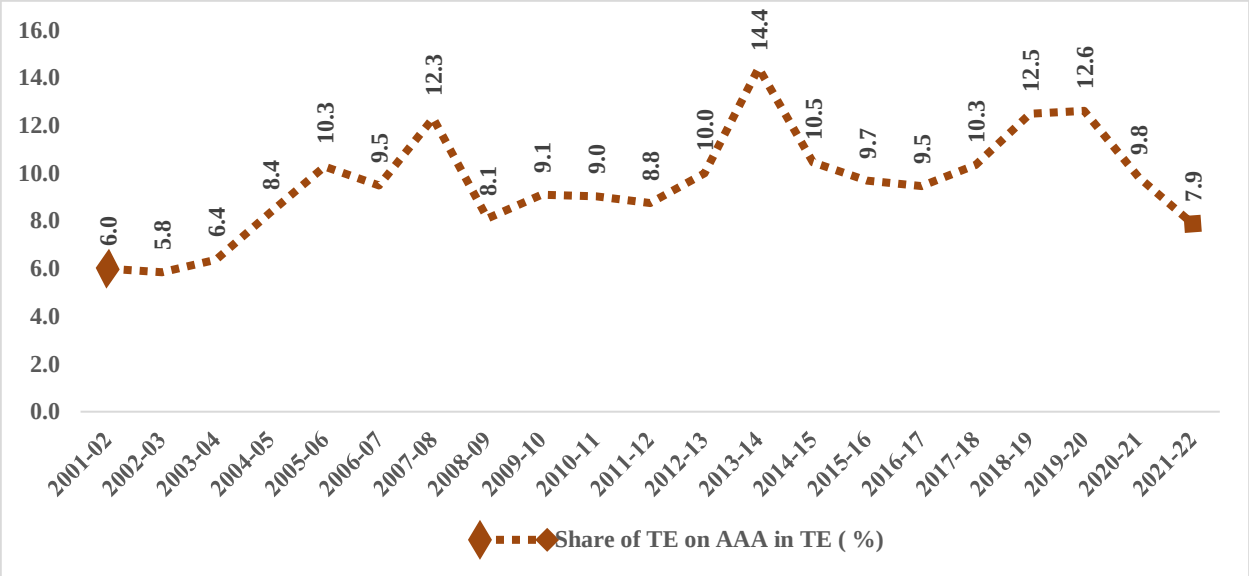
Note: Revenue Exp AAA Revenue -Expenditure on Agriculture & Allied Activities; Capital Exp AAA -Capital Expenditure on Agriculture & Allied Activities; Total Exp AAA- Total expenditure on Agriculture & Allied Activities.
Source: RBI, GOI

Fig.2 Share of Revenue and Capital Expenditure on Agriculture and Allied Activities in Karnataka



Note: RE-Revenue Expenditure; CE-Capital Expenditure.
Source: RBI, GOI

Fig.3 Share of Public Expenditure on Agriculture and Allied Activities in Total Public Expenditure of Karnataka



Note: TE on AAA in TE-Total Expenditure on Agriculture and Allied Activities in Total Expenditure.
Source: RBI, GOI

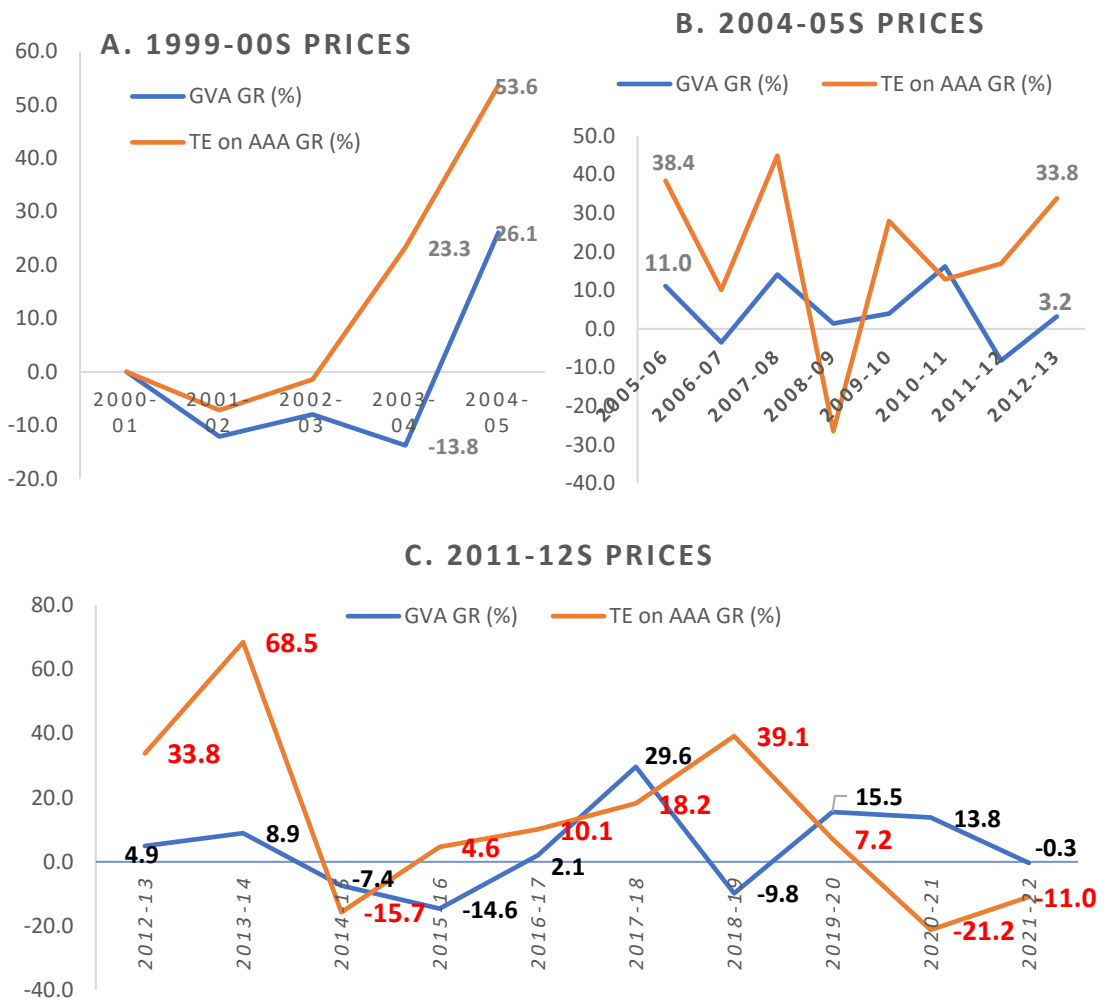
5.2 Relationship between Public Expenditure on Agriculture and Allied Activities and Output

In 2001-02, both public expenditure on Agriculture and allied activities and the GVA from the agriculture sector experienced negative growth rates. Public expenditure decreased negatively by 7.2 percent, while the GVA from agriculture decreased negatively by 12.1 percent. In 2002-03 year, both public expenditure and the GVA from agriculture experienced negative growth rates, although at a lower magnitude compared to the previous year. The public expenditure decreased negatively by 1.4 percent, while the GVA from agriculture decreased negatively by 8.0 percent. In 2003-04 year witnessed a significant positive growth rate in public expenditure on Agriculture and allied activities (23.3 percent). However, the GVA from agriculture experienced a sharp decline with a negative growth rate of 13.8 percent. This suggests a potential negative relationship between public expenditure and agriculture output, but the impact on agriculture output is relatively lower. In the year 2004-05, both public expenditure and the GVA from agriculture was high positive growth rates. Public expenditure grew by 53.6 percent, while the GVA from agriculture grew by 26.1 percent. This suggests a potential positive relationship between public expenditure and agriculture output, as higher expenditure coincided with increased agricultural output (Fig.4. A).

In 2005-06, 2007-08, 2009-10, and 2012-13, both public expenditure on Agriculture and allied activities and the GVA from the agriculture sector experienced positive growth rates. This suggests a potential positive relationship between public expenditure and agriculture output, as higher expenditure coincided with increased agricultural output. In 2008-09 and 2011-12, there appears to be a negative relationship between public expenditure and agriculture output. Despite positive growth rates in public expenditure, the GVA from agriculture experienced negative growth rates. In 2006-07 and 2010-11, The growth rates in public expenditure and the GVA from agriculture do not exhibit a consistent pattern or correlation (Fig.4. B).

In 2012-13, 2013-14, and 2016-17, both public expenditure on Agriculture and allied activities and the GVA from the agriculture sector experienced positive growth rates. This suggests a potential positive relationship between public expenditure and agriculture output, as higher expenditure coincided with increased agricultural output during these periods. In 2014-15, 2015-16, 2020-21, and 2021-22, there appears to be a negative relationship between public expenditure and agriculture output. Despite positive growth rates in public expenditure during some of these periods, the GVA from agriculture experienced negative growth rates. In 2017-18 and 2019-20, there is a positive growth rate in both public expenditure and the GVA from agriculture, indicating a potential positive relationship. However, the magnitude of the growth rates differs, suggesting that the impact of expenditure on agriculture output varied during these years (Fig.4. C).

Fig. 4. Association between Total Public Expenditure on Agriculture and Allied Activities and Agriculture Sector Output in Karnataka



Source: RBI GOI

5.3 Imapct of Public Expenditure and Agriculture Output on Economic Size of Karnataka

The study regresses the public expenditure and agriculture output on gross state domestic product to find out the impact of public expenditure and agriculture output on economic size of Karnataka. The OLS empirical results found that public expenditure and agriculture output have a significant positive effect on economic size of Karnataka at one percent level of statistical significance. Indicating that economic size grew by 0.82 percent for every one percent increase in agriculture output size in Karnataka and also, economic size grew by 0.55 percent for every one percent increase in public expenditure on AAA in Karnataka (Table 1).

Table 1. Impact of public Expenditure and Agriculture output on Economic Growth in Karnataka

Dependent Variable: GSDP				
Method: Least Squares				
Included observations: 2001-02 to 2021-22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.556118	0.193503	8.041813	0.0000
AO	0.821633	0.253866	3.236482	0.0043
TEAAA	0.557006	0.109295	5.096343	0.0001
R-squared	0.971873	Mean dependent var		3.661147
Adjusted R-squared	0.968912	S.D. dependent var		0.909956
S.E. of regression	0.160442	Akaike info criterion		-0.695646
Sum squared resid	0.489090	Schwarz criterion		-0.546868
Log likelihood	10.65211	Hannan-Quinn criter.		-0.660598
F-statistic	328.2497	Durbin-Watson stat		1.451130
Prob(F-statistic)	0.000000			

Note: ***GSDP*-Gross State Domestic Product; AO-Agriculture Output, TEAAA-Total Public Expenditure on Agriculture and Allied Activities**

5.4 Imapct of Public Expenditure on Agriculture Output Size of Karnataka

According, study regresses public expenditure of AAA on Agriculture gross state domestic product. The regression outcomes find that, public expenditure of AAA has positive effects on agriculture output size in Karnataka at one percent level of statistically significance. Suggesting that Agriculture output size grew by 0.40 percent for every one percent increase in public expenditure on AAA in Karnataka. Hence, the study rejected the null hypothesis i.e. “Public Expenditure has no significant effect on agriculture output in Karnataka”. It concludes that, public expenditure has positive impact on agriculture output in Karnataka (Table 2).

Table 2. Impact of public Expenditure on Agriculture Output in Karnataka

Dependent Variable: Agriculture Output				
Method: Least Squares				
Included observations: 2001-02 to 2021-22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	0.712290	0.060676	11.73923	0.0000
TEAAA	0.407725	0.030912	13.18996	0.0000
R-squared	0.896894	Mean dependent var		1.406966
Adjusted R-squared	0.891739	S.D. dependent var		0.429498
S.E. of regression	0.141318	Akaike info criterion		-0.989097
Sum squared resid	0.399417	Schwarz criterion		-0.889912
Log likelihood	12.88007	Hannan-Quinn criter.		-0.965732
F-statistic	173.9751	Durbin-Watson stat		1.020216
Prob(F-statistic)	0.000000			

Note: AGSDP-Agriculture Gross State Domestic Product; TEAAA-Total Public Expenditure on Agriculture and Allied Activities

6. Conclusion and policy suggestions

Public expenditure plays very important positive role in increase in economic size as well as agriculture sector output in Karnataka state. The study regresses public expenditure and agriculture output on gross state domestic product to find out the impact of public expenditure and agriculture output on economic size of Karnataka. The OLS empirical results found that public expenditure and agriculture output have a significant positive effect on economic size of Karnataka at one percent level of statistical significance. The regression outcomes find that, public expenditure of Agriculture and Allied Activities has positive effects on agriculture output size in Karnataka at one percent level of statistically significance. Therefore, study suggests that the state of Karnataka should prioritize increased public expenditure in agriculture and allied activities, with a particular focus on capital expenditure rather than revenue expenditure.

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