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Impact Of Public Expenditure On Agricultural Productivity And Economic Growth In Himachal Pradesh

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Abstract: Public expenditure policy is crucial for promoting inclusive growth, impacting economic growth, reducing poverty and income distribution in both short and long-term terms. Social spending provides a minimum income level and increases access to public services. In the short run, public spending on cash transfers reduces income inequality and poverty. In the long run, these transfers can be growth-enhancing and improve distributional outcomes. Spending on education and healthcare services improves quality of life and social mobility, potentially leading to greater equality in social outcomes. Public expenditure also contributes towards economic growth and social development through multiple channels for example investments in agricultural and industrial infrastructure creates backward and forward links and leads to employment opportunities. This paper is to analysed the impact of public expenditure on agricultural productivity and economic growth of Himachal Pradesh. This study includes the impact of public expenditure on crop husbandry, soil and water conservation, animal husbandry, fisheries, forestry and wild life food storage and warehousing, co-operation and gross domestic product (GDP) as indicator of agricultural productivity. ADF Unit Root Test, Correlation and Regression techniques have been applied. Public expenditure on food storage and warehousing had a positive and significant impact on economic growth. This results in insufficient increases in sectoral production which makes it difficult to predict future values of gross state domestic product and economic growth of Himachal Pradesh due to poor resource allocation.

Index Terms **-** Public Expenditure, Production, Productivity, Correlation, Regression

I. INTRODUCTION

Agriculture is the main occupation of the people of Himachal Pradesh and has an important place in the economy of the State. Himachal Pradesh is the only State in the country whose 89.96 per cent population (Census 2011) lives in rural areas. Therefore, dependency on Agriculture is ominent as it provides direct employment to about 62 per cent of total workers of the State. [1] Public expenditure refers to the expenditure of public authorities, including central, state, and local governments, to meet the collective social needs of the people. It can increase aggregate demand, allocating resources, controlling inflation, and influencing the size and composition of national income. Public authorities also use public expenditure to raise aggregate demand and manage the economy.[2] In Himachal Pradesh, the number of marginal and small farmers is growing as land holdings are subdivided. According to the agricultural census of 2000-01, small and marginal farmers own 86.4 percent of total land holdings. The average size of a holding is 1.1 hectares. Though governmental spending and investment cannot modify the extent of land holdings, they have helped to sustain the production of the key cereal crops (wheat, maize, and rice) by providing irrigation, strengthening extension services, and giving biotechnologically improved seeds. Agricultural development in Himachal Pradesh relies heavily on government funding due to external factors, high risks and disagreements with agricultural sector that discourage private investment in agriculture.[3] The agricultural development had to rely heavily on government finance since the inception of first Five Year plan (FYP) period. However, there has been declining share to agriculture from the public finance.4Public expenditure on agriculture leads to increased agricultural output

and food security, especially in agrarian economies like India. This expenditure is crucial for promoting economic development and alleviating poverty. Government expenditure can directly or indirectly affect farm income, with investments in research and development improving cultivation methods and alternative pesticide use. Other government spending, such as access to formal credit, transportation facilities, and animal healthcare, also significantly impacts agricultural output. [5]

II. Review of literature:

Gangal and Gupta (2013) [6] study examined the impact of government spending on India's economic growth from 1998 to 2012, using data from total public expenditure (TPE) and GDP per capita. The results confirmed a long-term equilibrium relationship between public expenditure and economic growth, with a positive Granger Causality Test and a unidirectional relationship from TPE to GDP. The study suggests increasing public expenditure to accelerate economic growth.

Kumar and Jain (2013) [7] study examine the growth and instability in productivity in Indian agriculture from 1990-91 to 2007-08 using secondary data from the Central Statistical Organization, Ministry of Agriculture's Directorate of Economics and Statistics, and Department of Animal Husbandry, Dairying, and Fisheries. The cross-sectional time-series method of regression was used. The study found instabilities in productivity growth due to low rainfall and less irrigation facilities, resulting in less use of modern inputs.

Singh, Pal and Jha (2015) [8] have analyzed the trends in Growth of Public Expenditure and Investment for state agriculture and from 1991-92 to 2003-2004 and 2003-2004 to 2010-11. This study attempted to discuss in detail the issue of whether agricultural public expenditure was strategically prioritized across sectors and regions. Secondary data was used to estimate Compound annual growth rate and long run and causal relationship between capital-labour ratio and labour productivity using autoregressive distributed lag (ARDL) bounds testing approach. The study highlights the positive correlation between public investment and agricultural capital, suggesting prioritizing infrastructure and research in backward eastern India states due to weak infrastructure and high subsistence farmer concentration.

Kaur and Misra (2017) [9] have investigated the causal relationship between government spending and economic growth in Rajasthan. To examine the six variations of the Wagner law of public expenditure annual time-series data from 1970-71 to 2013-2014 were used. The ARDL Model and Toda-Yamamoto method were used to examine the long-run equilibrium connection for six Wagner Law variants. Results showed no long-run relationship between government spending and economic growth but it is observed that public expenditure was the causal factor for the state's net state domestic product growth.

Seshaiah, S.V., Reddy, and Sarma, I.R.S. (2018) [10] study examines the impact of Indian government spending on GDP growth from 1980-1981 to 2015-2016. It uses simple regression analysis, FDI growth rate, and two dummy variables. The results show no multicollinearity or autocorrelation problems among the explanatory variables. The study suggests that expenditure management should focus on programmed design and alternative alternatives. It also emphasizes the need for fiscal reform at the state level to fix guarantee ceilings, considering factors like default likelihood, development likelihood, guarantee type, and service cost. Fiscal correction and consolidation are also recommended.

Akber, N., & Palta Singh, K. R. (2021) [11] study examines national trends in agricultural investment in India, focusing on structural breaks between 1960 and 2017. It compares the performance of agricultural investment and output growth in various sub-periods. Data was gathered from various sources and transformed into a constant series using the wholesale price index. The Bai-Perron test was used to identify structural breaks. The analysis found that low capital formation in Indian agriculture, particularly public investment, was responsible for the recent slowdown in both investment series. The study's main drawback is the lack of state-level private investment time-series data. To achieve poverty eradication, public investment and connecting farmers with the food processing industry are crucial.

Shah (2021) [12] have examined the effects of Agricultural Subsidies along with its distribution in India from 1980-81 to 2016-17.The data and relevant information was collected from a variety of official records and secondary sources, including the Ministry of Agriculture and Farmer's Welfare, Ministry of Finance, Ministry of Petroleum and Natural Gas, Economic Survey of India, Ministry of Consumer Affairs, Food and Public Distribution, GOI and The Organisation for Economic Co-operation and Development (OECD), France. The study reveals an increasing trend in food and agricultural input subsidies in India over the past two and a half decades, with food subsidies increasing from $87 million in 1980-81 to $18714 million in 2015-16. These subsidies have caused adverse effects like soil degradation, nutrient imbalance, environmental harm, and

groundwater depletion. It is suggested that direct cash transfer of fertilizer subsidy to farmers, and food subsidy should be raised on investment categories and made transparent, targeted, and short-term in nature.

Vatta, Singhand Priscilla (2021) [13] study examines the impact of government spending on agricultural growth in Punjab from 1990-1991 to 2019-20. It uses secondary data from the Reserve Bank of India Publications and the Directorate of Economics and Statistics. The Augmented Dickey-Fuller (ADF) test and the Causality test were employed to determine the stationarity of the variables and the causal relationship between agricultural GSDP and public expenditure Determinants included crop husbandry, animal husbandry, dairy development, fisheries, forestry and wildlife, and agricultural research and education. The results show that crop husbandry, dairy development, and agricultural research and education significantly impact agricultural growth, while soil and water conservation and wildlife have no effect. The study recommends reprioritizing public spending in agriculture to boost future growth.

III. Objective of the study

1. To evaluate the relationship between Public Expenditure and Agricultural Output.
2. To investigate relationship between public expenditure and GSDP.

IV. Data Sources and Methodological Approach:

The study based on secondary data which is collected from various government publications like Reserve Bank of India Publications, Directorate of Economics and Statistics and Finance Accounts of Government of Himachal Pradesh from 1993-94 to 2022-23. Annual time series data on GSDP are used as a proxy for economic growth and have been obtained from Economics and Statistics Department of the Himachal Pradesh and Data.gov.in & Census 2011, Govt. of India. ADF Unit Root Test, Correlation and Regression techniques have been applied.

Stationarity and unit roots tests

In this study, we apply the ADF test, as the purpose of the Augmented Dickey-Fuller (ADF) test is to acquire the white noise errors. To check the presence of unit root test, we based our next procedure on the following regression.

$$\Delta Y_t = a_0 + a_1 Y_{t-1} + \sum_{j=1}^{n} a_{2i} \Delta y_{t-1+} \mu_t \ldots\ldots\ldots\ldots\ldots 1$$

This regression is based on t-ratio. Where Δ is the first difference operator of the series y and n is lag, is constant, $a_1$and $a_2$are parameters and 'μ' isa white noise error residual. According to the ADF test we usually use null and alternative hypothesis:

H_0: $a_1 = a_2 = 0$ (Series contains a unit root, non-stationary)

H_1: $a_1 = a_2 = 0$ (Series is stationary)

If we would not reject the null hypothesis, then we conclude that series have a unit root and are non-stationary. Wherefore, if the null hypothesis is rejected for the above regression, then it can be concluded that series does not have a unit root and is stationary (mean and variance is constant). [14]

Model specification

To avoid multicollinearity, the econometric model was specified after examining the correlation among independent variables. The model is then specified

as : LnGSDP = C + β1LnCROP + LnSOIL β2 + LnANIMAL β3 + LnFISH β4+ Ln FOREST β5+ LnSTORAGE β6 + u …(2)

Where

LnGSDP = logarithm of Gross State Domestic Product,

Ln CROP = logarithm of public Expenditure on Crop Husbandry,

LnSOIL= logarithm of public expenditure on Soil and Water Conservation,

LnANIMAL = logarithm of Public Expenditure on Animal Husbandry,

LnFISH = logarithm of Public Expenditure on Fisheries,

Ln FOREST = logarithm of Public Expenditure on Forestry and Wild Life,

LnSTORAGE = logarithm of Public Expenditure on Food Storage and Warehousing and

LnCO-PRATION= logarithm of Public Expenditure on Co-operation.

V Results and Discussion

Trends in Public Expenditure on Agriculture and Allied Sector in Himachal Pradesh:

The agriculture and allied sectors in Himachal Pradesh are crucial for the state's economy and rural livelihoods. It provides employment to a significant portion of the population and contributes substantially to its GDP. The state government has launched the different type of programmes and schemes to achieve 4 percent growth per annum in agriculture and allied sector. The state has great potential for the production of off-season vegetables, ginger, potato, tea and maize. Keeping in view the potential of agriculture and allied sector of the State, the Department of Agriculture implemented various programmes. In Himachal Pradesh, allied agricultural subsectors such as crop husbandry, soil and water conservation, animal husbandry, fisheries, forestry and wildlife, food storage and warehousing, and cooperation are integral to the state's agricultural development strategy. Crop husbandry focuses on optimizing the cultivation of diverse crops, enhancing productivity through improved practices and high-yielding varieties. Soil and water conservation initiatives are vital for maintaining soil health and ensuring sustainable water management, particularly in the hilly terrain. Animal husbandry complements crop production by providing additional income and nutrition through livestock rearing. The fisheries sector, although less prominent, offers opportunities for diversification and income generation, while forestry and wildlife conservation contribute to ecological balance and resource sustainability. Furthermore, the establishment of food storage and warehousing facilities is essential for reducing post-harvest losses and ensuring food security. The cooperative movement in the state fosters collaboration among farmers, enhancing their bargaining power and access to resources, ultimately promoting a more resilient agricultural economy. [15]

In Table 1.3 we depicted the Trends in Public Expenditure on Agriculture and Allied Sector in Himachal Pradesh including Crop Husbandry Soil and Water Conservation Animal Husbandry Fisheries Forestry and Wildlife Food Storage and Warehousing and Co-operation from 1993-94 to 2022-23. The data reveals a fluctuating pattern in public expenditure on crop husbandry. While there was increase in 1994-95 followed by decline in 1995-96. The lowest point was reached in 2003-04 which was followed by a significant recovery in 2004-05 which was highest growth rate overall and decline in 2006-07. However, there was a significant increase in 2018-19, and afterwards fluctuating trend till 2022-23. The highest growth was recorded in1996-97 and lowest was in 2003-2004. Afterwards, increasing until 2010-2011, followed by decline in 2014-2015. These initiatives are critical for enhancing soil fertility and ensuring efficient water usage for irrigation purposes. The decline in 2022-2023 could be attributed to climate change and the need to safeguard agricultural resources. The allocation to animal husbandry reveals a fluctuating trend 1998-99 followed by increase in 1999-00 until 2002-2003. The highest was recorded 1996-97 and lowest in 2003-04. Thereafter, the trend was upward until 2010-11. Afterward, it displayed a fluctuating pattern until 2022-23. Increasing trend may be because state government is focused on improving veterinary services, promoting high-yield breeds, and supporting dairy farming through various initiatives. The public expenditure on fisheries has shown fluctuating pattern from throughout the years from 1993-94 to 2022-2023. The highest allocation was recorded in 2004-05 and lowest in 1999-00. Initially it shows upward trend till 1996-97. The lowest allocation was recorded in 2003-04, while the highest was in 2004-05. Subsequently, the allocation has exhibited a fluctuating trend over the years until 2022-2023.The data on food storage and warehousing shows mixed trend overall years. The highest allocation to co-operation was recorded in 2004-05, followed by a slight decline in 2005-06. The lowest allocation was recorded in 2006-07. Subsequently, the allocation fluctuated until 2010-11. Thereafter, it increased until 2013-14, followed by a decline until 2016-17. Since then, the allocation has exhibited an alternating pattern of increase and decrease until 2022-2023. While there were minor fluctuations, the overall spending has consistently increased, lowest was recorded in 1999-00 and the highest allocation was recorded in 2001-02, followed by a slight decline in 2002-03. Keep on increasing till 2016-17 and after that shows fluctuating trend till 2022-2023.

Table 1.1

Trends in Public Expenditure on Agriculture and Allied Sector in Himachal Pradesh

Years	Crop Husbandry	Soil and Water Conservation	Animal Husbandry	Fisheries	Forestry and Wild Life	Food Storage and Warehousing	Co-operation
1993-94	82151	12930.3	24685	7331	90629	20979	35649
1994-95	88252	18486.3	28323	8056	99031	20408	40235
1995-96	37869	73.3	7683	9911	111388	21788	42119
1996-97	90198	18519.3	36526	11228	125821.1	23724	47302
1997-98	40150	20494.3	10111	10471	75034.7	9445	44911
1998-99	37648	24812.1	11383	11512	48000	8423	46251
1999-00	54580	20640	23590	2550	83410	8410	1770
2000-01	92940	27140	54160	5660	212830	3080	16730
2001-02	87440	31330	56440	5910	205510	4930	12050
2002-03	98950	42060	59710	5110	330640	4040	13270
2003-04	27640	26210	14680	1370	57540	800	3810
2004-05	83850	38060	63900	6050	140020	5100	11900
2005-06	108450	33810	73830	6720	172840	5610	11330
2006-07	96580	36300	78790	5770	198670	-54320	25840
2007-08	123240	51270	100730	7640	225100	76430	16720
2008-09	135880	66930	117150	9120	293700	143390	16450
2009-10	185440	94370	142850	12040	586520	118990	18610
2010-11	235920	109620	191120	11570	346830	84590	29920
2011-12	268510	91950	187810	18070	358730	110400	29410
2012-13	258890	83040	217860	22700	363810	159160	34970
2013-14	278680	61090	228320	20420	423370	262030	25730
2014-15	374300	60700	274800	15480	434030	195200	32200
2015-16	406820	71880	261680	14150	409600	177660	33690
2016-17	508300	93850	330300	29470	480080	170940	48270
2017-18	466375	95428	324926	20115	410258	230641	31844
2018-19	653602	101257	370720	26718	451223	343312	48046
2019-20	610183	95875	359795	29111	483023	323947	32264
2020-21	801566	97537	375052	37877	595974	267432	38431
2021-22	784960	161940	395230	27560	626810	350920	35620
2022-23	928810	129060	465410	37550	723150	379500	47190

in lakh

Source: Computation from Reserve Bank of India Publication and Finance Accounts of Government of Himachal Pradesh (1993-94 to 2022-23).

Trends in Public Expenditure

In figure 1.3 illustrates the public expenditure trends across various agricultural and allied sectors in Himachal Pradesh from 1993-94 to 2022-23. It's evident that there has been a significant increase in public expenditure over the years indicating a growing emphasis on these sectors. The highest allocation of public expenditure is directed towards Crop Husbandry indicating a major focus on crop production and improvement. Followed by Forestry and Wild Life and Animal Husbandry reflecting the importance of forest conservation and wildlife protection and highlighting the government's efforts to boost livestock production and dairy development. Furthermore, least spent on Co-operation and Fisheries.

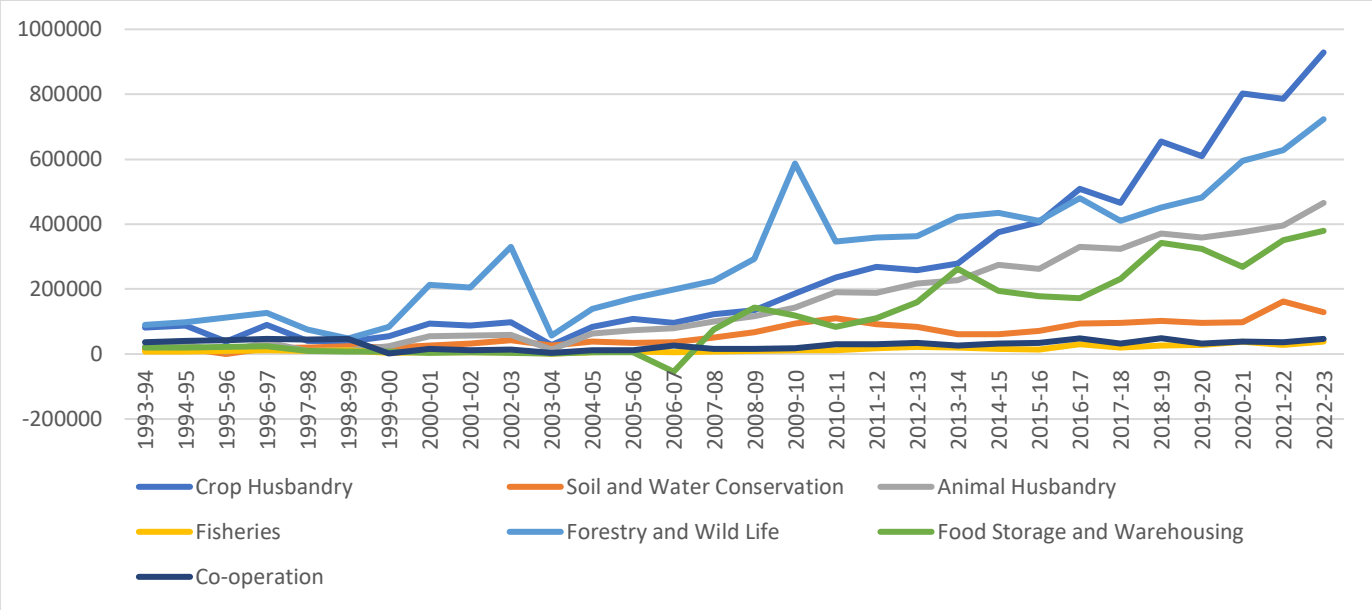

Figure 1.3 Trends in Public Expenditure on Crop Husbandry Soil and Water Conservation Animal Husbandry Fisheries, Forestry and Wildlife Food Storage and Warehousing and Co-operation

Results on the Impact of Agricultural Expenditure on Economic Growth

Unit Root Tests

Stationarity is an important property of time-series variables as non-stationarity of a time series may lead to spurious regressions. The Augmented Dickey-Fuller (ADF) test as shown in Table 1.2 was employed to examine the stationarity of the time series

Table 1.2
Unit Root Tests of the Variables

	Level			**First Difference**		
Variable	**ADF test statistic**	**Prob**	**Decision**	**ADF test statistic**	**Prob**	**Decision**
LnGSDP	-1.647	0.748	Not Stationary	-5.904	0.0002***	Stationary
LnCROP	1.980	1.000	Not Stationary	-14.535	0.0000***	Stationary
LnSOIL	-3.208	0.102	Not Stationary	-5.977	0.0002***	Stationary
LnANIMAL	-1.727	0.712	Not Stationary	-8.927	0.0000***	Stationary
LnFISH	-2.568	0.296	Not Stationary	-5.752	0.0004***	Stationary

LnFOREST	-3.881	0.026	Not Stationary	-7.535	0.0000***	Stationary
LnSTORAGE	-2.616	0.276	Not Stationary	-5.209	0.0016***	Stationary
LnCO-PRATION	-2.504	0.323	Not Stationary	-8.696	0.0000***	Stationary

Source: **Computation from Reserve Bank of India Publication and Finance Accounts of Government of Himachal Pradesh (1993-94 to 2022-23).**

Note: *, **, * indicate the level of significance at 1%, 5% and 10% respectively., GSDP =Gross State Domestic Product, CROP = Public Expenditure on Crop Husbandry, SOIL= public expenditure on Soil and Water Conservation, ANIMAL = Public Expenditure on Animal Husbandry, FISH = Public Expenditure on Fisheries, FOREST = Public Expenditure on Forestry and Wild Life, STORAGE = Food Storage and Warehousing and CO-PRATION= Co-operation.**

variables. The results reveal that the absolute values of the ADF test statistic for all variables at level are lesser than the absolute critical values. Hence, the null hypothesis of non-stationarity cannot be rejected, indicating that the variables are not stationary. After taking first difference, the absolute value of ADF test statistics of all the variables are greater than the absolute critical values; hence, the null hypothesis is rejected which confirms that the variables are integrated of order one. Therefore, we reject our null hypothesis and conclude that both the series are stationary at significant level at first difference, and all the series are stationary which means absence of unit root. [16]

Correlation

To avoid the risk of multicollinearity, a correlation matrix was computed in table 1.3 to assess the correlations between the variables which are Public Expenditure on Crop Husbandry, Soil and Water Conservation, Animal Husbandry, Fisheries, Forestry and Wild Life, Food Storage and Warehousing and Co-operation.

Table 1.3

Bivariate Correlation Matrix of Independent Variables

Variables	Crop Husbandry	Soil and Water Conservation	Animal Husbandry	Fisheries	Forestry and Wild Life	Food Storage and Warehousing	Co-operation
Crop Husbandry	1						
Soil and Water Conservation	-.150	1					
Animal Husbandry	.517**	.278	1				
Fisheries	.650**	.184	.765**	1			
Forestry and Wild Life	.124	-.073	-.097	-.022	1		
Food Storage and Warehousing	.498	.116	.437	.630	-0.042	1	
Co-operation	.519	-0.37	.439	.474**	.069	.189	1

Source: Computation from Reserve Bank of India Publication and Finance Accounts of Government of Himachal Pradesh (1993-94 to 2022-23).

The result shows that Crop Husbandry was negatively low correlation relationship to Soil and Water Conservation. Crop Husbandry shows a moderate positive relationship with Animal Husbandry, Food Storage and Warehousing and Cooperation. It indicates a

Table 1.4

Variance Inflation Factors (VIF) of the variables

Variables	Tolerance	VIF
Crop Husbandry	.466	2.148
Soil and Water Conservation	.765	1.307
Animal Husbandry	.348	2.874
Fisheries	.272	3.670
Forestry and Wild Life	.941	1.063
Food Storage and Warehousing	.528	1.895
Co-operation	.654	1.530

Source: Computation from Reserve Bank of India Publication and Finance Accounts of Government of Himachal Pradesh (1993-94 to 2022-23).

weak positive relationship with Forestry and Wildlife. However, Soil and Water Conservation indicates moderate positive relationship with Animal Husbandry, a weak positive relationship with Fisheries, Food Storage and Warehousing, and Cooperation, and a weak negative relationship with Forestry and Wildlife. Animal Husbandry reveals that there is a high correlation with Fisheries, necessitating the use of VIF scores and tolerance to assess potential multicollinearity. It also shows a weak negative relationship with Forestry and Wildlife, and a moderate correlation with Food Storage and Warehousing, as well as Cooperation. Fisheries has a weak negative relationship with Forestry and Wild Life and positive moderate relationship with Food Storage and Warehousing and Co-operation. Forestry and Wild Life has low negative relationship

with Food Storage and Warehousing and low positive relationship with Co-operation. Food Storage and Warehousing has low positive relationship with Co-operation.[17] The variance inflation factor (VIF) identifies the correlation between independent variables and the strength of that correlation. Generally, a VIF value below 5 is considered acceptable. This indicates that the independent variables are not highly correlated with each other. However, if a VIF value exceeding 10 indicates strong multicollinearity which can negatively impact the regression model. The table 1.4 indicates that VIF score is lower than 5 of Crop Husbandry, Soil and Water Conservation, Animal Husbandry, Fisheries, Forestry and Wild Life, Food Storage and Warehousing and Co-operation as it suggests that the condition where independent variables are highly correlated is not significant issue. Hence, regression model can be implemented on these independent variables.[18]

Regression Analysis of Agricultural Expenditure on Gross State Domestic Product

The relationship between public expenditure on agriculture and allied sector and the gross state domestic product is depicted in table 1.5. The value of the Durbin Watson statistics is 1.65. It indicates the presence of no autocorrelation since the value falls

Table 1.5
Regression Results of GSDP and Public Expenditure (Agri. & Allied Sector)

Variable	Coefficient	Std. Error	t-Stat	Prob.
LnCROP	0.208	0.222	0.936	0.361**
LnSOIL	-0.067	0.178	-0.380	0.708*
LnANIMAL	0.045	0.222	0.203	0.841*
LnFISH	0.216	0.2486	0.869	0.396**
LnFOREST	0.125	0.154	0.814	0.426**
LnSTORAGE	0.401	0.106	3.783	0.001***
LnCO	0.336	0.210	1.600	0.126**
R-squared	0.793	**Durbin-Watson stat**	1.657	
Adjusted R-squared	0.712	**F-stat**	9.859	

Source: Computation from Reserve Bank of India Publication and Finance Accounts of Government of Himachal Pradesh (1993-94 to 2022-23).

Note: *, **, * indicate the level of significance at 1%, 5% and 10% respectively., R^2= R-squared and DW= Durbin-Watson stat, GSDP =Gross State Domestic Product, CROP = Public Expenditure on Crop Husbandry, SOIL= public expenditure on Soil and Water Conservation, ANIMAL = Public Expenditure on Animal Husbandry, FISH = Public Expenditure on Fisheries, FOREST = Public Expenditure on Forestry and Wild Life, STORAGE = Food Storage and Warehousing and CO= Co-operation.**

between 1.5 and 2.5 judging from the rule of thumb. Also based on the variance inflation factor (VIF), variables are not multi-collinearity. The R-squared is (0.793) and Adjusted R-squared is (0.712) imply that the overall fit of the model is very satisfactory. In addition, the estimation is not spurious since R2<DW. The F statistic which is 9.85 suggests that the overall regression model is statistically significant. The table 1.5 also indicates that 1% increase in Crop Husbandry will cause real GDP growth to increase by 0.208%. with p-value of 0.361, we can interpret that Crop Husbandry has a positive but statistically insignificant relationship with real Gross State Domestic Product (GSDP). Public expenditure on Soil and Water Conservation has negative and statistically insignificant impact on economic growth as 1% Soil and Water Conservation will cause real GSDP to decline by 0.067 with p-value 0.708. [19] It indicates that Public Expenditure on Animal Husbandry as positive but insignificant relationship with real Gross State Domestic Product (GSDP) which means if it increases 1 % it can cause real GDP to grow by 0.045%. Public Expenditure on Fisheries has positive impact on economic growth as real GDP will increase by 0.216 % and also have statistically insignificant. Public Expenditure on Forestry and Wild Life has positive and insignificant. Impact on real GDP. Real GDP will grow by 0.125 % if it increases by 1 %. Food Storage and Warehousing and Co-operation

both has positive and statistically significant impact on economic growth as p-value is less than significant level which means if both increase by 1%, Real GDP will grow by 0.401% and 0.336% respectively. It was clear that public expenditure on crop husbandry, animal husbandry, fisheries, forestry and wildlife and cooperation have positive and insignificant GDP, while expenditure on soil and water conservation has negative and insignificant GDP. This may be due to the long-term nature of such projects, which can delay the realization of economic benefits. Also, insufficient infrastructure and poor implementation of conservation measures can increase costs without generating a corresponding economic return, leading to a negative perception of their effectiveness. Moreover, benefits of these projects are often indirect, such as improved soil fertility, water retention, and reduced erosion. These benefits may not be immediately reflected in economic indicators. However, food storage and warehousing demonstrate a positive and significant contribution to GSDP. [20]

Diagnostic tests

To ensure the robustness of the model, diagnostic tests such as the Breusch-Godfrey LM test for serial correlation and the Breusch-Pagan-Godfrey test for heteroskedasticity were employed.

i) Normality Test:

H0: Residuals are normally distributed; H1: Residuals are not normally distributed

Jarque-Bera= 0.178; p = 0.914.

Here, the Null Hypothesis (H0) cannot be rejected indicating that the residuals are normally distributed.

ii) Breusch-Godfrey Serial Correlation LM Test:

H0: Residuals are not serially correlated; H1: Residuals are serially correlated

Obs*R-squared = 1.250; p = 0.535.

In this case, the Null Hypothesis (H0) cannot be rejected and hence the residuals are not serially correlated.

iii) White Heteroskedasticity Test:

H0: Residuals are not heteroscedastic; H1: Residuals are heteroscedastic

Obs*R-squared=5.655; p = 0.9178.

These tests revealed that the model is free from serial correlation and heteroskedasticity, ensuring that the estimated coefficients are unbiased and normality assumption is satisfied.

VI. Conclusion

This chapter examines the impact of agricultural expenditure on Himachal Pradesh economic growth. The data reveals a fluctuating pattern in public expenditure on Crop Husbandry, Animal Husbandry, Food Storage and Warehousing and Co-operation but upward trending over the years. Soil and Water Conservation showing falling in recent year. Fisheries and Forestry and Wild Life showing initially they were increasing but in recent they almost constant compare to other sub sectors. It was found that public expenditure on crop husbandry, animal husbandry, and fisheries forestry wildlife, and cooperation had a positive and insignificant impact on the Gross State Domestic Product. However, public expenditure on soil and water conservation had a negative and insignificant impact. Public expenditure on food storage and warehousing had a positive and significant impact on economic growth. This results in insufficient increases in sectoral production which makes it difficult to predict future values of gross state domestic product and economic growth of Himachal Pradesh due to poor resource allocation**.** The analysis of public expenditure in agriculture on economic growth highlights the importance of public spending in agricultural output. Agriculture is a vital sector providing employment opportunities and development in Himachal Pradesh. The government should prioritize the agricultural sector through strategic budget allocation and effective program implementation to ensure its sustainability and improvement. There is a specific need to prioritize expenditure in key areas, including Crop Husbandry, Soil and Water Conservation, Animal Husbandry, Fisheries, Forestry and Wildlife, Food Storage and Warehousing, and Co-operation and to ensure the efficient and effective utilization of government spending in these sectors. For achieving sustainable agricultural growth requires a focus on two critical areas: rational budget allocation and the development of more effective systems for allocating funds within the agricultural sector. Additionally, investing in research and agricultural development activities is crucial for ensuring sustainable agricultural productivity, performance, and growth. The study recommends a strategic reallocation of public spending to enhance agricultural productivity, focusing on areas that directly impact efficiency and sustainability, while also advocating for robust monitoring and evaluation mechanisms to assess the effectiveness of these spending.

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