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Impact of Agricultural Aid on Agricultural Growth in Nepal

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Bal Kumar Kalakheti^{1*} and Kushum Shakya PhD²

¹ Sukuna Multiple Campus, Sundarharaincha, Morang, Nepal

² Central Department of Economics, Tribhuvan University, Kirtipur, Nepal

* kalakheti.bk@gmail.com

Abstract

Nepal has been receiving agricultural sector foreign aid since 1950/51. Agricultural output growth has remained relatively low despite continuous aid inflows in agricultural inputs. This study examines the trend of foreign aid in agriculture and its impact to agricultural growth in Nepal. The study used a quantitative research design using annual data from 1975 to 2020. Simple linear regression was used to examine the impact of agricultural sector foreign aid on agricultural GDP. Besides, the study used irrigated land, imported chemical fertilizers, agricultural sector credit, government expenditure in agriculture, and the economically active population engaged in agriculture as independent variables. The findings revealed that foreign aid, irrigated land, imported chemical fertilizers, government expenditure in agriculture, and the economically active population and agricultural sector credit had positive and statistically significant effect on agricultural GDP. The results show that both external financial assistance and complementary agricultural inputs play important roles in promoting agricultural production in Nepal. The study concludes that maintaining and expanding agricultural inputs by utilizing foreign aid is essential for achieving higher agricultural growth.

Keywords: foreign aid, agriculture credit, government expenditure, economically active population

Introduction

Foreign aid is an important source of development financing for developing countries. Foreign aid refers to assistance provided by a country or an international organization to another in the form of grants, concessional loans, technical assistance, or aid in kind, with objectives of humanitarian relief, economic development, or strategic interests (Pearce, 1996; Thirlwall, 2006). According to Rodan (1961), foreign aid comprises of capital inflows including long-term loans, grants, soft loans, and technical assistance. The main theme of foreign aid is the provision of external resources for acceleration of economic growth and development in the recipient country.

Foreign aid plays a crucial role in bridging the gap between investment and domestic savings. Rapid population growth, low-income levels, weak revenue-generating capacity, and rising development expenditures force developing nations to rely on external assistance. So, foreign aid has become an integral part of development financing. However, the role of foreign aid in achieving sustained economic growth has become a debate in development economics, with mixed empirical evidence across countries (Burnside & Dollar, 2000; Easterly, 2003). Aid aligned with climate adaptation strategies have stronger effects on productivity growth (Trentinaglia et al., 2023).

Agricultural sector foreign aid constitutes investments in agricultural research, irrigation, rural infrastructure, agricultural education and integrated rural development programs. Although it is difficult to distinguish between agricultural and non-agricultural aid due to sectoral interlinkages, government budgetary classifications allow for the identification of aid allocations to agriculture. Such sector-specific aid is specifically relevant in agrarian economies. Empirical evidence indicates that agricultural aid can enhance productivity when effectively implemented. However, its effectiveness varies with country-specific conditions and investments (Trentinaglia et al., 2023; Bhandari, 2024).

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Nepal is also an aid-dependent agrarian economy. Agriculture dominates the Nepalese economy which provides livelihoods for the majority of the population. Agriculture sector has received high priority in national development strategies since the very first periodic planning. Agricultural Perspective Plan emphasized in commercialization, diversification, productivity enhancement and poverty reduction through enhanced agricultural production in Nepal (NPC, 2002). However, it requires substantial financial resources which are not available from domestic savings alone. Hence, foreign aid has become necessary in Nepal. Development programs such as the Resilient High-Value Agricultural Program illustrated how targeted external financing aims to improve agricultural productivity and commercialization among smallholder farmers (IFAD, 2024). In spite of increasing aid inflows in Nepal, there remains challenges of absorptive capacity, implementation inefficiencies, governance, and the translation of aid into sustained sectoral productivity gains.

Several studies reported a positive impact of foreign aid to GDP. Bhattarai (2009) showed that the long-run elasticity of aid ranged from 0.010 to 0.297 depending policy and political variables. Sharma and Bhattarai (2013) showed that the long-run coefficient of foreign aid ranged from 0.040 to 0.074 across different model specifications. This implies that a one-unit increase in the aid-to-GDP ratio increase economic growth by 0.04 to 0.07 percentage in the long run. Similarly, Poudel et al. (2021) and Yogi et al. (2025) emphasized agriculture as main driver of economic growth and poverty reduction in Nepal. However, empirical evidence on the effectiveness of agriculture-specific aid is limited. Most studies focus on aggregate foreign aid and overall economic growth. However, it is important to examine the direct impact of agriculture sector foreign aid on agricultural sector GDP. This is an important research gap.

Despite a considerable share of foreign aid in agriculture, there is scanty of evidence whether aid has significantly contributed to agricultural growth. Despite of Kalakheti & Shakya (2026). Impact of Agricultural . . .

aid-financed development interventions, agricultural output growth in Nepal has remained relatively low and unstable. This situation raises an important research question whether foreign aid allocated to agriculture has effectively enhanced agricultural sector output in Nepal. So, this study examines the impact of agricultural sector foreign aid and agricultural growth in Nepal. The objectives of the study are to analyze the trends of agricultural sector foreign aid and agricultural sector output and to examine the impact of agricultural foreign aid on agricultural sector output in Nepal.

The study is important from both policy and academic perspectives. From a policy perspective, it provides empirical evidence on the effectiveness of agricultural foreign aid and identifies key factors influencing agricultural growth. From an academic perspective, the study contributes to the literature on sectoral aid effectiveness by focusing on agricultural aid rather than aggregate foreign aid. The findings reveal the role of foreign aid in enhancing sustainable agricultural development in Nepal.

Yogi et al. (2025) analyzed that agriculture sector of Nepal is constrained by low productivity, traditional farming systems, limited access to modern technology, and growing vulnerability to climate change. Mechanization, infrastructure expansion, value-addition, and the empowerment of women and youth are needed to achieve inclusive and sustainable agricultural growth.

Bhandari (2024) found that total aid inflows increased over the recent period. But the share of aid to agriculture decreased to 1.1% in FY 2076/77 BS. Agriculture contributed for 25.12% of GDP in the same year with only marginal improvements in cereal production. The study showed a positive association between aid inflows and agricultural development but emphasized persistent inefficiencies in sectoral utilization. Maruta et al. (2019) showed that agricultural aid is more effective in countries with better institutional quality. Barkat and Alsamara (2019) found a small but positive impact of agricultural aid. McArthur and Sachs (2018) showed that well-targeted

agricultural aid generates long-term productivity gains, structural transformation, and welfare improvements without adverse macroeconomic effects.

Verter (2017) observed that agricultural aid positively influenced output when complemented by fertilizer use, access to credit, and technological improvements. In contrast, Ighodaro and Nwaogwugwu (2013) reported that agricultural foreign aid had no effect on agricultural output in the short as well as long run. Kaya et al. (2013) found positive effects of agricultural aid on output growth in developing economies.

Feeny and Ouattara (2009) reported that agricultural aid had a positive impact on agricultural output, while Feeny (2007) found no significant effect of foreign aid on agricultural growth in Melanesian countries. Dewbre et al. (2007) argued that agricultural aid reduces local commodity prices which offsets production gains and weakens agricultural GDP.

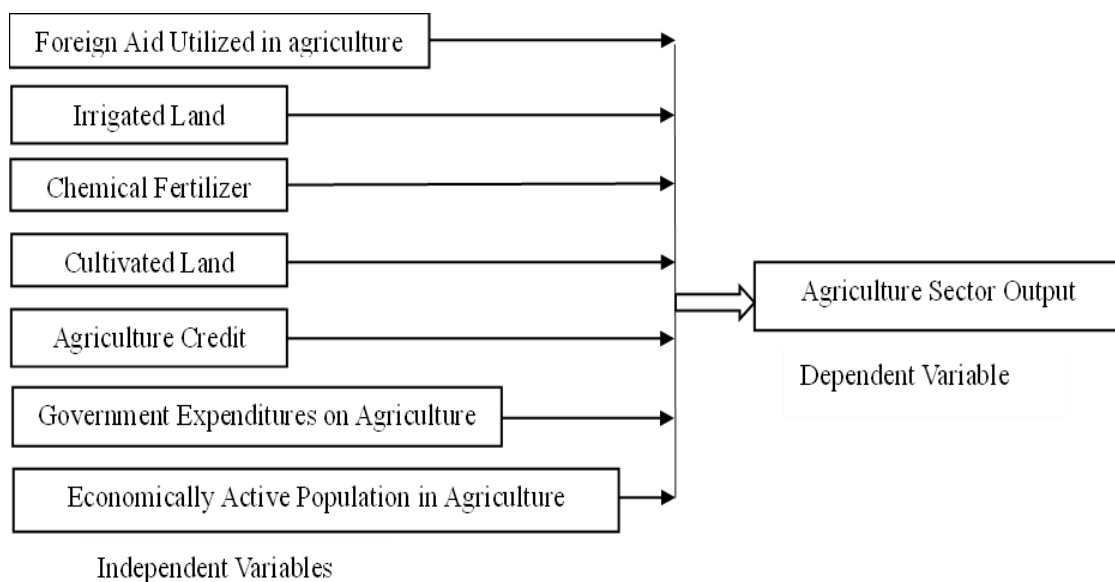
Akpokodje and Omojinite (2008) and Alabi (2014) reported that foreign agricultural aid positively affected agricultural GDP, although its effectiveness differed across bilateral and multilateral sources. Aboagyea and Gunjal (2000) emphasized that aid effectiveness depended on positive economic reforms. Norton et al. (1992) found that the effect of foreign aid on agricultural productivity varied widely across regions, being negative in economies facing large fiscal deficits and high external debt. Kherallah et al (1994) reported that foreign aid has positive impact on agricultural growth across 56 developing countries.

The literature suggests that foreign aid can contribute to agricultural growth, but its effectiveness is highly dependent on institutional quality, policy frameworks, and sector-specific implementation. Despite agriculture absorbing a substantial share of foreign aid in Nepal, empirical evidence on the direct impact of agricultural aid on agricultural output remains limited, which justifies the present study. Nepal has been facing a persistent resource gap, in which domestic savings are insufficient to finance the level of investment required to accelerate economic and agricultural growth. In this Kalakheti & Shakya (2026). Impact of Agricultural . . .

context, foreign aid used in the agriculture sector is conceptualized as an external capital inflow that fills this resource gap, thereby enabling the expansion of productive investment in agriculture. This, in turn, is expected to increase real agricultural sector output in Nepal.

Figure 1

Conceptual Framework



The framework specifies real gross agricultural sector output as the dependent variable. The independent variable is gross agriculture sector foreign aid. The study includes other control variables that effect agricultural output such as irrigated land, quantity of imported chemical fertilizer, cultivated land area, agricultural sector credit, government capital expenditure on agriculture, and the economically active population employed in agriculture. The relationship between agricultural foreign aid and gross agricultural sector GDP is estimated using least square regression method.

Methods and Materials

This study adopted a causal-comparative research design, in which foreign aid in the agricultural sector was taken as the independent variable and real gross agricultural sector output as the dependent variable. The analysis is based on secondary time-series data published by Nepal Rastra Bank (NRB,2022), the Ministry of Finance (MOF, 2022), and the National Statistics Office (NSO, 2022). All raw data were compiled and processed using Microsoft Excel prior to empirical analysis. The data were converted into real form by dividing the nominal data by the GDP deflator. The obtained data were then transformed into logarithmic form. For further analysis, EViews 10 was used to test for unit roots, cointegration, and to perform OLS regression. The time period of the analysis is 1974/75 to 2019/20, as the data on annual additional irrigated land are only available up to 2020. Real gross agricultural sector output (RGASO) was taken as the dependent variable. Gross foreign aid utilized in the agriculture sector (GFAUAS) was taken as the independent variable.

Following previous empirical studies (Kherallah et al., 1994; Dewbre et al., 2007; Kaya et al., 2013; Alabi, 2014; Feeny, 2007; Ighodaro & Nwaogwugwu, 2013; Verter, 2017; Barkat & Alsamara, 2019), the multiple regression model was specified for estimation.

$$RGASO_t = \alpha_0 + \alpha_1 GFAUAS_t + \alpha_2 IRL_t + \alpha_3 ICF_t + \alpha_4 GCL_t + \alpha_5 ASC_t + \alpha_6 GEXPAS_t + \alpha_7 EAPEAS_t + \varepsilon_t$$

Where,

$RGASO_t$: real gross agricultural sector output (Rs. million)

$GFAUAS_t$: gross foreign aid utilized in the agricultural sector (Rs. million)

IRL_t : additional irrigated land (hectares)

ICF_t : imported chemical fertilizer (thousand metric tons)

GCL_t : gross cultivated land under major cereal and cash crops (thousand hectares)

ASC_t : agricultural sector credit (Rs. million)

$GEXPAS_t$: annual government expenditure in the agricultural sector (Rs. million)

$EAPAS_t$: economically active population employed in agriculture (million),
interpolated from census years.

It was hypothesized that an increase in agricultural foreign aid positively influence agricultural output. Irrigated land was expected to have a positive effect as irrigation expands cultivable areas and reduces production risks of rainfall variability. Imported chemical fertilizer was also expected to increase agricultural output by enhancing land productivity. An expansion in cultivated land was expected to increase agricultural output by increasing more land area for cropping. Agricultural credit increases financial access of farmers to invest in inputs, technology, and equipment, which has positive effect. Government expenditure on agriculture increases investments in rural infrastructure, subsidies, extension services, and support programs which positively increases agricultural GDP. Finally, increase in economically active population in agriculture was expected to have a positive effect on agricultural GDP.

Results and Discussion

Results

Unit Root Tests

To avoid spurious results, unit root test has been conducted. For this, Augmented Dickey-Fuller (ADF) unit root test was used developed by Dickey and Fuller (1979, 1981). The test was conducted in both level and first-difference forms, first with an intercept, then with an intercept and trend. The ADF test results based on the log-level data are reported in Table 1.

Table 1

ADF Unit Root Results at Log Level Form

Variables	Intercept		Intercept & Trend	
	- statistics	p-value	- statistics	p-value
LNRASO	0.7583	0.9922	-2.7238	0.2322
LNGFAUAS	-1.8598	0.3477	-2.7026	0.2406
LNIRL	-2.1483	0.3421	-2.8740	0.1215
LNICF	-2.6532	0.1902	-2.7022	0.2407
LNGCL	-2.5863	0.1032	-2.6888	0.1925
LNASC	-0.0122	0.9523	-2.0445	0.1142
LNGEXPAS	-0.8938	0.7812	-2.0821	0.5414
LNEAPEAS	-0.8970	0.7800	-1.9212	0.6266

The unit root test results revealed that all variables exhibited non-stationarity at the level form under. The corresponding p-values showed the presence of unit roots in the log-level series. Consequently, the ADF test was reapplied to the first-differenced series, and the results are presented in Table 2.

Table 2

ADF Unit Root Results at First Difference

Variables	Intercept		Intercept and Trend	
	- statistics	p-value	- statistics	p-value
Δ LNRASO	-7.5557	0.0000	-7.6567	0.0000
Δ LNGFAUAS	-9.1900	0.0000	-9.2465	0.0000
Δ LNIRL	-8.3485	0.0000	-8.7344	0.0000
Δ LNICF	-8.3336	0.0000	-8.2527	0.0000
Δ LNGCL	-10.1043	0.0000	-10.1120	0.0000
Δ LNASC	-6.0664	0.0000	-6.1378	0.0000
Δ LNGEXPAS	-7.4895	0.0000	-7.3955	0.0000
Δ LNEAPEAS	-6.6289	0.0000	-7.6057	0.0000

The findings indicated that all variables became stationary after first differencing under both intercept and intercept-and-trend specifications, confirming the absence of unit roots in the transformed series. Hence, all variables were integrated of order one, $I(1)$. The log first-differenced series were therefore considered suitable for the empirical analysis.

After examining the stationarity of the variables, the study used the Johansen cointegration technique. The test was conducted using the log-level data. Based on the Akaike Information Criterion (AIC), EViews 10 automatically selected a lag length of seven. The results of the test are shown in Table 3.

Table 3

Cointegration test results of the rank test of (trace)

Unrestricted Cointegration Rank Test (Maximum Eigenvalues) Hypothesized	Unrestricted Cointegration Rank Test (Maximum Eigenvalues) Eigenvalue	Unrestricted Cointegration Rank Test (Maximum Eigenvalues) Trace	Unrestricted Cointegration Rank Test (Maximum Eigenvalues) 0.05	Unrestricted Cointegration Rank Test (Maximum Eigenvalues) Prob.

No. of CE(s)		Statistic	Critical Value	
None *	0.8516	255.7406	159.5297	0.0000
At most 1 *	0.7583	171.7921	125.6154	0.0000
At most 2 *	0.5791	109.3168	95.7537	0.0042
At most 3 *	0.4644	71.2413	69.8189	0.0383
At most 4	0.3287	43.7691	47.8561	0.1149
At most 5	0.2967	26.2314	29.7971	0.1219
At most 6	0.2069	10.7435	15.4947	0.2277
At most 7	0.0123	0.5444	3.8415	0.4606

Trace test indicates 4 cointegrating equation(s) at the 0.05 level.

An asterisk (*) denotes rejection of the hypothesis below at the 0.05 level.

The table shows the results of the Johansen cointegration rank test based on the trace statistics. The null hypothesis of no cointegration is rejected as p-value is less than 0.05. Likewise, the null hypotheses of at most one, two, and three cointegrating vectors are also rejected because their respective p-value is less than 0.05. However, the null hypothesis of at most four cointegrating relations cannot be rejected, as the p-value is 0.1149 which is greater than 0.05. Therefore, the results indicate that there is the existence of atmost four cointegrating equations which implies there is a long-run relationship among the variables. This confirms that the variables move together in the long run.

Ordinary Least Square Regression Results

The empirical examination of the relationship between agricultural sector GDP and the agricultural foreign aid in Nepal (both differenced in 1st order) is presented in Table 4.

Table 4*Regression results RASO as the dependent variable*

Variables	Coefficients	Standard Errors of Coefficients	t-statistics	P-value
Δ LNGFAUAS	0.1645	0.0225	7.3238	(0.0000)
Δ LNIRL	0.1153	0.0140	8.2555	(0.0006)
Δ LNICF	0.1391	0.0139	10.0077	(0.0030)
Δ LNASC	0.1039	0.0133	7.8314	(0.0000)
Δ LNGCL	0.1685	0.1107	1.5225	(0.1162)
Δ LNGEXPAS	0.1279	0.0161	7.9558	(0.0001)
Δ LNEAPEAS	0.5650	0.1565	3.6093	(0.0009)
Constant	8.6339	0.8238	10.4809	(0.0000)
$R^2 = 0.89$		DW = 1.98		
Adjusted $R^2 = 0.88$		F = 1506.93		
		Probability of F statistics = 0.0000		

The results indicate that GFAUAS, IRL, ICF, ASC, GEXPAS and EAPEAS are statistically significant at the 1 percent level. The GCL is significant at the 15 percent level. The adjusted coefficient of determination is 0.88, which means that 88 percent of the variation in agricultural sector output is explained by the independent variables. The F-statistic is also significant at the 1 percent level, which reflects the overall goodness of fit. The Durbin–Watson statistic is 1.98 which suggests the absence of serious autocorrelation.

Table 5*Breusch-Pagan-Godfrey Serial Correlation LM Test*

Lags	Chi2 value	DF	Prob Chi2
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1	7.8953	1	0.4978
2	11.5843	1	0.7136

The p-value of both lags are greater than 0.05 which indicate that the null hypothesis of no serial correlation at both lags cannot be rejected. This confirms the absence of serial correlation in the residuals.

The variance inflation factor (VIF) test was conducted to detect multicollinearity.

Table 6

Multicollinearity test

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
Δ LNIRL	0.0002	405.9251	1.9509
Δ LNICF	0.0002	426.3240	2.3123
Δ LNEXPAS	0.0003	350.0300	3.8934
Δ LNGL	0.0123	16814.1900	4.0232
Δ LNPEAS	0.0246	2098.6870	3.3526
Δ LNASC	0.0005	848.7248	3.7848

The centered VIF values for all explanatory variables are less than 5, which indicates the model does not suffer from multicollinearity.

Discussions

The coefficient of FAUAS is 0.16, which indicates that a 1 percent increase in agriculture sector foreign aid to 0.16 percent increase in real agricultural sector output. This confirms that agriculture foreign aid contributes to increasing real agricultural

output in Nepal. Similarly, the coefficient on IRL is 0.12 which indicates that 1 percent increase in irrigated land increases the real agricultural output by 0.12 percent. This suggests that expansion of irrigation facilities enhances agricultural productivity. The coefficient of ICF is 0.14, which indicated that 1 percent increase in imported chemical fertilizers increases real agricultural output by 0.14 percent. This shows the importance of fertilizers in improving crop yields.

The ASC coefficient is 0.14 which indicates that 1 percent increase in credit provision leads to 0.14 percent increase in agricultural output. This shows the importance of agricultural finance in facilitating access to inputs, equipment and other resources. The coefficient of GCL is 0.17, which indicates that 1 percent increase in cultivated land contributes to a 0.17 percent increase in agricultural output.

GEXPAS has a coefficient of 0.13 which indicates that 1 percent increase in government spending on agriculture raises real agricultural output by 0.13 percent. This demonstrates the positive effect of public investment. The coefficient on EAPEAS is 0.57 which indicates that 1 percent increase in agricultural labor results in 0.57 percent increase in output. This shows that labor is important in the Nepalese agricultural sector.

These findings are consistent with previous studies (Kherallah, Beghin, Peterson & Ruppel, 1994; Dewbre, Thompson & Dewbre, 2007; Kaya, Kaya & Gunter, 2013; Alabi, 2014; Verter, 2017). This indicates that agricultural aid provides foreign exchange for imports and technical assistance in agriculture. This strengthens agricultural productivity, infrastructure, and human capacity. Additionally, the results confirm that irrigated land, chemical fertilizers, agriculture sector credit, cultivated land, government expenditure, and agricultural labor have positive and significant effects on real agricultural output.

Conclusion

Nepal is an agricultural country that faces resource deficits in agriculture. So it need aids in the agriculture. However, the contribution of foreign aid to agricultural
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output is unknown. This study analyzes the effect of agricultural aid on agricultural GDP. The study finds that agriculture foreign aid to the agricultural sector has a positive effect on agricultural output. Specifically, increases in irrigated land, imported chemical fertilizers, agriculture sector credit, gross cultivated land, government expenditure in agriculture, and agricultural labor contribute to higher agricultural output. Therefore, it can be concluded that foreign aid plays a significant role in supporting the domestic economy when it is effectively utilized with essential agricultural inputs.

Conflict of Interest

The author declares no conflict of interest.

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