

**INVESTMENT IN EDUCATION AND ITS IMPACT ON
ECONOMY OF NEPAL
(AN EMPIRICAL ANALYSIS OF EDUCATIONAL SPENDING
TO AGRICULTURE PRODUCTIVITY)**

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ABSTRACT

Using 20 years of time series data, 1994-2014, on key macro-economic variables the present paper attempts to examine the significance of public spending in education in GDP through agriculture technical education. We argue that education plays a crucial role in the adaptation of new agriculture technology and methodologies through the availability of more trained agriculture manpower including extension workers and thereby help increase agriculture productivity. The increase in agriculture productivity eventually helps to increase the GDP of the country. Results from our econometric analyses revealed that variables like students enrollment in agriculture and forestry institute and agriculture output ratio in GDP are not in expected direction though this one is statistically significant. The result thus signifies that the impact of investment in education especially in agriculture and forestry technical education is inconclusive demanding more deeper analysis about the possible mechanism of the nexus between the two . .

Key Words: GDP, Education Sector Spending, Government Spending, Two pillars of the Economy.

General Background of Economy Indicator of Nepal

Nepal's economic growth rate over the last decade has recorded an average of 5.0% (FY2007/08 and 2013/14) and the Real GDP at basic and producers' price is estimated to grow by 5.2 percent and 5.5 percent respectively in fiscal year 2013/14. Likewise, the average growth rates of agriculture and non-agriculture sectors remained at 3.2% and 4.7% respectively in the previous decade. From the sectoral perspective, the contribution of primary, secondary and tertiary sector contribution to nominal GDP are estimated to remain at 33.7%, 14.1% and 52.3%

respectively and data showing the decreasing contribution of the agriculture to GDP at current price stood at 37.4% in FY 2001/02 to 33.1% in current FY 2013/14. Nepalese per capita GDP is estimated to have reached at Rs.69,919 in current fiscal year, which is equivalent to US \$703 (Economic Survey, 2014)

Despite drop in the poverty level to 23.8% from 42.0% between FY 1995/96 and FY 2012/13, wide difference still exist between urban and rural, different geographical regions, and groups. During this period, urban poverty declined from 21.6 % to 15.5%, while rural poverty dropped to 27.4% from 43.3%.The Gini-coefficient of 0.328, an indicator used for measuring income inequality shows that the gap between the rich and poor is still very high. The country has been examined the effective achievement in the education sector. During the academic year, the net enrollment rate for primary level has reached 95.6% and those for basic education and secondary level are 86.3% and 33.2%respectively. Such enrollment rates were 95.3%, 87.55 and 32.4% respectively during the previous FY 2012/13. Similarly, higher level enrollment increased by 10.25% in comparison to last two academic years from 2012/13 to 2013/14. The average life expectancy rate at birth is 69 years.

INTRODUCTION OF THE STUDY

The agriculture sector and education enhancement have the interconnecting relationship. It also contributes the foreign exports of foods, food for the cities, raw materials for the industries, a market industry as backbone of the economy and sustainable development.

Dudley Seers (1963) wrote “The Limitation of the Special Case”, a paper which effectively launched the profession of development studies. He argued that most economic policy-making was derived from the experience of small number of rich countries, which, in global terms, constituted an unrepresentative special case. He identified twenty features of this special case, relating factor of production, sectors of the economy, public finance, foreign trade, households, saving and investment and dynamic influence of it. But these factors only for applied in develop countries and far from the developing countries, it means do not apply for such countries (Siman et al., 2001).

By realizing the concerning factors, which directly effects the development aspects, the development issues thinking concern economists examine for the period of 1960 to 1990 and changed the framework of overall development concepts relating to : a) agriculture as a share of GDP, b) the share of labor force in agriculture, c) the importance of the urban population, d) educational enhancement, e) production of primary commodities as a share of merchandise exports, concerning the main developing countries, regions and as a whole.

Rethinking Public Policy in Agriculture: Lesson from distant and recent history; consolidated by Hanjoon Chang, University of Cambridge; FAO, UN, (2009) stated that like all other economic sectors, agriculture requires better technologies to increase productivity. Of

course, farmers have always innovated technology, including through selecting breeding and making improvement in agriculture.

According to the IFRC, a resilient community will have the ability to assess, manage and monitor its risks, and be able to learn new skills and build on past experiences. It will have the capacity to identify the problems, establish priorities and react in situation of crisis. It will also be engaged in the development of local policy for reducing risks and establishing and maintaining relationship with external actors who are able to provide supports, goods and services when necessary from which they can solve their problems whenever they suffer .

Philip M.Gwage (2013) stated , although the governmental, social, environmental and legal frameworks exists in developing countries, re-enforcement mechanisms are generally weak, resulting in policies which are decorating bookshelves and gathering dust. While generally decision making is not an issue because of the desire of the many developing country government to minimize vulnerability of infrastructure, natural resources, ecosystem and communities, the means required for full and effective implementation of adaptation decisions at national, local government and community level are lacking.

The evolution of Technologies for adaptation, UNEP (2011) concluding meeting included: the developing the national adaptation framework and its relationship to the country's development goals and highlighted the broad and strategic adaptation planning to implement the adaptation activities and steps to develop/ or acquire in specific technology in action plan.

Public Spending and Education Aspects

Education remains the backbone of development of the developing countries like Nepal. The contribution of education sector has been receiving top priority in the planning and budget formulation. The entire programs towards education is directed in bringing positive change in the lifestyles of the majority of communities by enhancing overall production and productivity as well as the education to change capacities to grab the needs of the 21st century needs as for competition, innovation, problem solving and transformation.

The Ministry of Finance (MOF,2014) in its Economic Survey(2014) mentioned that due to the expansion of the government budget and expenditure in the education sector together with expansion of educational activities in the private and non-government sector, output of the sector is estimated to remain 6.0 % with the marginal increase of 0.1 % as compared to previous fiscal year. The contribution of this sector is current years' GDP is expected to remain at 6.0 %.

Educational institutions accelerates knowledge, creation and the development of human capital, social capital learning system and networks in order to enhance the capacity to innovate. Johnson C.A. and Andrew E. OF (2007), Impact of education spending in GDP examined that educational attainment reflects the knowledge and skill, human capital, of the population research shows that for every single year that the average level of schooling of the adult

population is raised there is the corresponding increase of 3.7% in the long term growth. Furthermore, education has also been found to play a crucial role in the adaptation of new agriculture technology and methodologies.

Education and Economic Growth:

The theoretical literature on economic growth and education towards the education spending relates at least three mechanisms through which education may affect economic growth in the sense mentioned by Shrestha(2014) including of: First, education can increase the quality (efficiency) of the labor force that works as a factor of production and shift growth towards a higher equilibrium level of output (Lucas,1988; Mankiw, Romer and Weil,1992). The second opinion on the role of education on economic growth states that the education can increase the innovative capacity of the economy and the new knowledge on new technologies, products, and processes promotes growth (Romer, 1990). The third expression is that the education can facilitate the diffusion and transmission of knowledge needed to understand and process new information and to successfully implement new technologies created by others and promotes economic growth (Nelson and Phelps, 1966; Benhabib and Spiegel, 1944)

The agriculture and education which are the two pillars of the economy and the budget allocation of these pillars and its proper mobilization with the effective policies and programs can only guarantee the sectors development as well as country's development. The expenditure on these sectors is one of the most key instruments of the government for solving the poverty, unemployment, which are the major problems of the economy.

The sectors preference towards the budget expenditure as a percentage of GDP, measures its importance of the government. As compared to developed countries share of the budget on education is extremely low in developing countries and high in developed countries. Among all types of expenditure on education and its interlink in production, most important aspect is what percentage of expenditure comprise the research and development through which both sector can link together and utilize the capabilities to develop or produce in education, automatically diverts to productive sectors based industries and enterprises in connecting to agriculture.

METHOD

The main focus of this study was to examine the significance of the public spending in education and through the education its impacts in agriculture based programs of Nepal especially in relation to education to total output, Gross Fixed capital investment and real Gross Domestic Product (GDP) of the country of Nepal by using the economic models.

Data collection strategy

In order to fulfill the study objectives and test the study hypothesis the secondary data were included. For this, the following data/ information will be required:

Real Gross Domestic Product, Gross Fixed Capital Investment of the country and its proportion in the education and Real contribution of the agriculture in the economy of Nepal will be taken into the study to test the variables of the education into the total contribution of the economy.

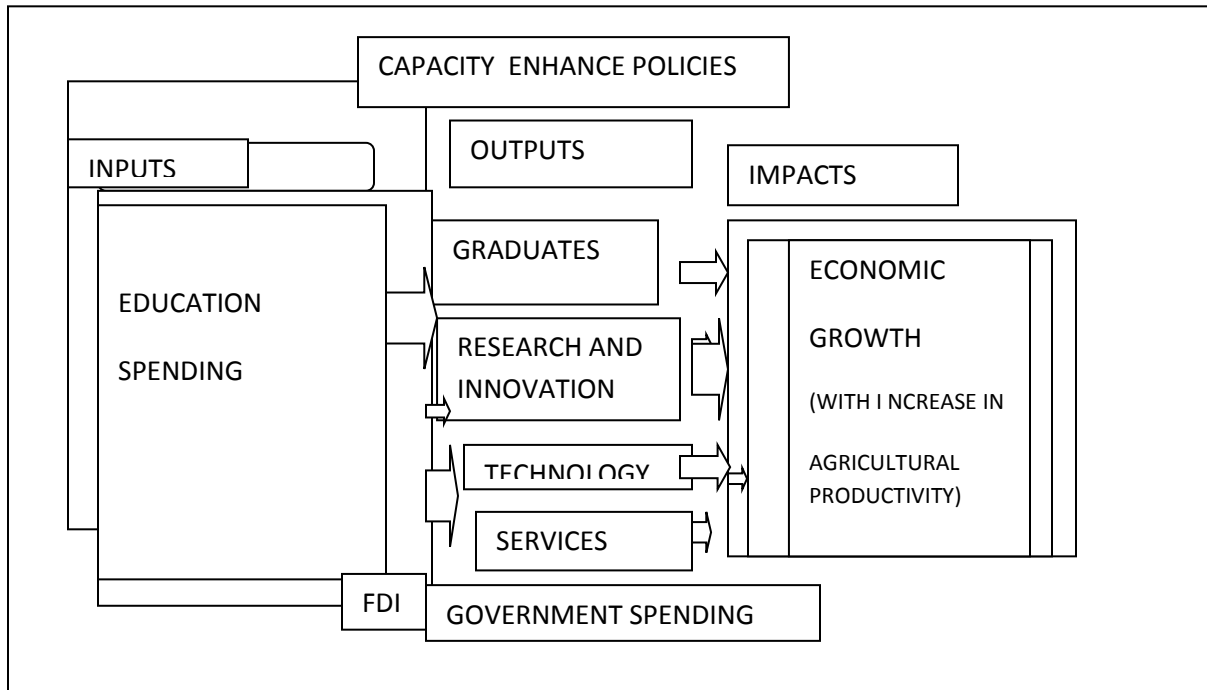
The data has been categorized in terms of enrollment in higher level of education which is generally applied in the education system of Nepal in which agriculture and forest faculty enrollment was also included to specify education and in relation to agriculture output.

Revenue contribution made by the agriculture sector to the GDP was examined by using secondary data.

All the required data relating to the variables were collected through the secondary sources. Secondary data were collected from the published report of Ministry of Education (MOE), Ministry of Finance (MOF), National Planning Commission (NPC), Central Bureau of Statistics (CBS), Nepal Rastra Bank (NRB), World Bank, and published journals of different research organizations.

Research Framework:

The effective empirical measurement aspect, the following conceptual frame work has been concluded:



Adapted From: Bloom et. al. 2006 ; 16: Higher Education and Economic Development of Africa and further modify by the authors.

The Model:

The basic model of the growth accounting method developed by Solow- a neoclassical economist with the modification of Cobb-Douglas production function model starts with the neoclassical production function as given below was used in the study:

$$Y_t = F(A_t, K_t, L_t) \dots \dots \dots (1)$$

In Solow’s model, A_t is used to capture the general efficiency with which inputs are used and reflects the effects of such things as policies and institutions (Perkins et,al; 2001) or what Chou (2003) refers to as “ the total stock of useful ideas” it is general refers to as Total Factor Productivity (TFP). Determining the value of TFP for developed and developing countries has produced the range of values and which model has applied by Hall and Jones (1999)

$$Y_t = F(A_t, K_t, E_t, L_t) \dots \dots \dots (2)$$

Where,

Y_t = Output level or Real GDP in year t.

A_t = Level of Technology in year t.

E_t = Level of Education in the year t.

K_t = Level of Capital in year t

L_t = Level of labor in year t.

The education and labor inputs are disaggregated into quality and quantity and quality components approximately those used in the Denison study..... . Meulemeester and Rochat (1995) found a causal relationship between GDP per capita and higher education in four countries analysis and concluded that quantitative and qualitative components of education impact testing methods have high effort and suggested to use it in the analysis.

The data was time series and therefore could be analyzed by using some autoregressive techniques. However, this was not appropriate in this growth accounting approach as it would render the weights un-interpretable. Instead, a time index or trend variable which acts as a proxy for a variable that was affected the dependent variable and was not directly observable but was highly correlated with time could be used. It was allowed separation of components affected on GDP growth from any underlying annual trend due to un-observed focus. Thus, the equation (2) was expanded to include the disaggregated capital and labor variables and to exclude the technology variable which has previously been defined as the residual and the equation (3) modified in the following which required equation for the study and test the significance as contribution of the education in the agriculture earnings and growth in an economy.

$$Y_t = F (DEe_t, HEE_t, AGFE_t, AgOR_t, GFCFI_t, T_t) \dots \dots \dots (3)$$

Where,

Y_t = Output level of real GDP per capita in the year t.

DEe_t = Development Expenditure in education in the year t

HEE_t = Higher level student number of Enrollment of the year t

$AGFE_t$ = Higher level student number of Enrollment in agriculture and forest of the year t

$AgOR_t$ = Agriculture output ratio in GDP in the year t

$GFCFI_t$ = Gross fixed capital formation for investment in the year t

T_t = Time trends year i, e 1994

The above equation (3) can be regressed as:

$$Y_t = B_0 + B_1DEe_t + B_2HEE_t + B_3AGFE_t + B_4AgOR_t + B_5GFCFI_t + E_t \dots \dots \dots (4)$$

Since the focus of the study is to determine or test the significance of the partial elasticity's for economic growth contribution with respect to relevant educational factor inputs the log-linear functional form is appropriate which is also applied by Gerking and Boyes (1980) for a similar application as the following:

$$\ln Y_t = B_0 + B_1 \ln DEe_t + B_2 \ln HEE_t + B_3 \ln AGFE_t + B_4 \ln AgOR_t + B_5 \ln GFCFI_t + \epsilon_t \dots \dots \dots (5)$$

RESULT & DISCUSSION

Table 1 shows the relationship between expenditure on education; higher level education enrollments and agriculture output ratio and GDP of twenty years (i.e.1994-2014 A.D) in Nepal.

Table 1: Expenditure on Education and GDP, 1994-2014, Nepal

Regression Result (with natural log)

Variables	Coefficients	Std. Error	T	p-value (Sig.)	Tolerance	VIF
(Constant)	7.5579	1.8730	4.0351	0.0012		
DeE	-0.0254	0.0293	-0.8695	0.3992	0.3759	2.6604
HEE	0.3961	0.0839	4.7198	0.0003*	0.0663	15.0751
AGFE	-0.2808	0.1669	-1.6828	0.1146	0.0866	11.5507
AgoR	-1.0499	0.3057	-3.4343	0.0040**	0.3160	3.1643
GFCFI	0.4386	0.1175	3.7333	0.0022	0.1603	6.2369
R Square: 0.9824 , Adjusted R Square: 0.9761, F- Statistics:156.184, Prob. :0.000						

*significant at the 0.05 level

**significant at the 0.01 level

The coefficients of gross fixed capital formation investment (ln GFCFI) and higher level educational enrollment (HEE) are positive and statistically significant indicating the positive relation with GDP. Results from our econometric analyses revealed that variables like students enrollment in agriculture and forestry institute (lnAGEF) and agriculture output ratio in GDP (lnAgOR) are not in expected direction though the second one is statistically significant. The result thus signifies that the impact of investment in education especially in agriculture and forestry technical education is inconclusive demanding more deeper analysis about the possible mechanism of the nexus between the two. . The results further depict that all the explanatory

variables considered in the model together explain about 97 percent of the variations in GDP which is the dependent variable and the proxy of the economic growth.

CONCLUSION

The paper attempted to examine the effects of development expenditure in education on the Nepal's economic growth, using data of gross fixed capital formation investment, higher level education students enrollment, students enrollment in agriculture and forest and agriculture contribution ratio in the GDP. The analysis of the empirical facts results that the education spending that is also called the investment in agriculture sector relation is so far from the output level of the economy and education policy programs has not been relate and able to enhance the main economic contributor as agriculture is the main sector of the country of Nepal. Results from our econometric analyses revealed that variables like students enrollment in agriculture and forestry institute (lnAGEF) and agriculture output ratio in GDP (lnAgOR) are not in expected direction. The result thus signifies that the impact of investment in education especially in agriculture and forestry technical education is inconclusive demanding more deeper analysis about the possible mechanism of the nexus between the two.

RECOMMENDATION

Public intervention along with private coordination and cooperation of the organizations and institutions require for technological improvement and increment of agriculture production and its appropriate market supply mechanisms where the produce have high demanded. But this is only possible by linking the education and main economic contributor with the national budget spending. The coordination of technical education i.e agriculture and forest education, higher level education is very essential and inevitable of the both private and as well as public sector policies, programs in the main stream of the economy.

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APPENDIX:1

Expenditure on Education and GDP, 1994-2014, Nepal

Tt	GDP	DeE	HEE	AGFE	AgOR	GFCFI
1994/95	9.952163	4.979213	11.78732	6.954639	3.707456	8.48405
1995/96	10.00753	5.187944	11.52379	6.828712	3.689379	8.631967
1996/97	10.05638	5.46222	11.57953	6.919684	3.683364	8.712661
1997/98	10.0892	5.316697	11.51682	6.857514	3.658936	8.78531
1998/99	10.13364	5.100659	11.76228	7.030857	3.642574	8.783687
1999/00	10.19278	5.550515	11.81182	7.037028	3.63125	8.900058
2000/01	10.23906	5.629023	11.95396	7.047517	3.638375	8.962276
2001/02	10.23584	5.618624	11.93617	6.984716	3.663562	9.007159

2002/03	10.26284	5.609472	11.77363	6.826545	3.661251	9.070653
2003/04	10.29708	4.608564	11.82041	6.918695	3.663562	9.133664
2004/05	10.74325	4.836599	12.2625	7.003065	3.54674	9.120711
2005/06	10.77986	5.081156	12.48586	7.123673	3.499533	9.225918
2006/07	10.80701	5.078232	12.59328	7.355641	3.468856	9.277438
2007/08	10.86334	5.691575	12.74651	7.16935	3.440418	9.295802
2008/09	10.90164	5.863688	13.0623	7.203406	3.48124	9.30072
2009/10	10.94334	4.693089	13.11882	7.438972	3.555348	9.454439
2010/11	10.9811	4.850936	13.11809	7.433075	3.602777	9.447174
2011/12	11.0262	5.202577	13.1959	7.45472	3.549617	9.390702
2012/13	11.06024	2.632608	13.41013	7.685703	3.511545	9.495602
2013/14	11.11049	3.058707	13.42697	7.919356	3.484312	9.575095

GDP = Gross Domestic Product; DeE= Development expenditure in Education

HEE= Higher level Educational Enrollment.; AGFE= Agriculture and Forest students Enrollment

AgOR= Agriculture output contribution Ratio; GFCFI= Gross Fixed Capital formation Investment.

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
1	(Constant)	7.558	1.873		4.035	.001		
	DeE	-.025	.029	-.050	-.870	.399	.376	2.660
	HEE	.396	.084	.650	4.720	.000	.066	15.075
	AGFE	-.281	.167	-.203	-1.683	.115	.087	11.551
	AgoR	-1.050	.306	-.217	-3.434	.004	.316	3.164
	GFCFI	.439	.117	.331	3.733	.002	.160	6.237

a. Dependent Variable: GDP